EDUCATING PHYSICIANS FOR THE 21ST CENTURY: LEARNING FROM THE
EXPERIENCES OF ‘SYSTEMS CITIZENS’

A Dissertation in
Adult Education

by
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ABSTRACT

The purpose of this study was to explore why some fourth-year medical students exemplify the principles of Health Systems Science (HSS), and how they came to incorporate these principles into their perspectives on the role of a physician. This study was grounded in the theoretical frameworks of transformative learning theory in adult education and diffusion of innovations theory. Data were primarily collected through qualitative interviews with 12 fourth-year medical students. Eligible participants were fourth-year medical students who were enrolled in either a year-long longitudinal HSS elective and/or in a voluntary COVID-19 elective course. Data were analyzed using the constant comparative method.

There were four main sets of findings relating to how participants came to exemplify the principles of HSS, namely through: engaging in experiences first hand; interacting with formal curricula; engaging in social networks; and implementing system change. They engaged with experiences first hand, through participating in the health journey of a family member or by overcoming a significant health problem of their own. Students learned from their formal HSS curriculum and through clinical experiences, and through global trips that formed part of formal education in the humanities. Students’ social networks formed HSS perspectives through effective physician role models, and support networks in sub-communities that also highlighted the political environment, the presence of political issues in the media, and in popular culture. Students described how physicians could advocate for patients, as a way of implementing system change by advocating through policy, taking up issues that are important to the health and wellness of patients, educating patients and others as a form of advocacy, and leveraging the skills of all members of the health care team as a means to advocating for patients. The study concludes with a consideration of the findings for theory and practice, and suggestions for further research.
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Chapter 1

INTRODUCTION

This chapter provides an overview of a qualitative research study examining the experiences of fourth-year medical students who exemplify the principles of Health Systems Science (HSS). Students exemplifying the principles of HSS are committed to: a) providing patients with an excellent experience by seeking to understand the patient’s perspective; b) providing cost-conscious care; c) having an orientation of patient care that is consistently interprofessional in nature; d) taking an approach to patient care that shows a working knowledge of health systems and the larger health system; e) seeking to conceptualize and apply health systems improvement plans; f) demonstrating enthusiasm and motivation to improve population health while reducing costs. The specific purpose of this study was to explore why some fourth-year medical students exemplify the principles of HSS, and how they come to incorporate these principles into their perspectives on the role of a physician. In order to address this purpose, this chapter begins with background to the study including its purpose statement, followed by a description of the conceptual and theoretical frameworks, and research questions guiding this research. An overview of the qualitative research methodology that was used in this study is also provided in this chapter. The chapter concludes with a discussion on the significance of the study, including a review of its major assumptions, limitations, and definition of terms.

Background

The contexts in which adults learn is seemingly limitless, and adult educators work in a variety of distinctive fields (Brookfield, 2019). Indeed, adult learning takes place in non-formal
settings like human resource development programs at places of work, and in formal programs offered by colleges and universities (Merriam & Bierema, 2014). The health care setting is an incubator for adult learning. Health care providers learn through their practice and more formally in continuing medical education environments. In spite of the many opportunities for learning in the health care setting, most health care providers are not formally trained in adult education (McMains & Peel, 2014). Like many higher education faculty who are generally content experts but know about teaching only through their experience as students, experience with students, trial and error, teaching assistantships, and interactions with fellow instructors (Fletcher, 2018), most physicians teach how they were taught themselves or how they think their learners will learn best, with little reflection in and on their teaching/pedagogical decisions.

Academic physicians often teach in clinical settings but there are many other venues in which they are called upon to share their knowledge, including providing lectures and serving as small group facilitators. At many academic health centers, faculty delivering didactic sessions typically only receive mandated classroom visits/observations when it is required for the purpose of promotion and tenure or for placing records in their files. In addition to most academic physicians receiving little or no formal training in teaching during medical school or residency (Pierce, Rendon & Rao, 2018), they are faced with the challenges of teaching in time-constrained clinical settings with a variety of potential learners (e.g. medical, nursing, and pharmacy students, along with the patient). Thus, while the health care setting provides many opportunities for adult learning, the situation is complex and there are environmental factors that impact negatively on health care providers’ learning in general and on medical student learning more specifically.

This dissertation is focused on medical students as adult learners and how they learn to adopt a specific, systems-conscious approach in this environment. As will be discussed below, this systems-conscious approach is thought to be the key ingredient needed to overcome discrepant and systemic health care issues in the United States (U.S.).
Health care delivery in the U.S. is costly, fragmented, inefficient (Berwick & Hackbarth, 2012), and often produces sub-optimal patient outcomes (Institute for Healthcare Improvement, 2009). The Institute of Medicine’s To Err is Human, which brought concepts of patient safety and health care quality to the forefront of medicine (Tartaglia & Walker, 2015), estimated that between 44,000 and 98,000 Americans die each year due to preventable medical errors (Kohn, Corrigan & Donaldson, 2000). In response to this situation, new models of care delivery are being developed and attempting to be implemented to improve patient experience, promote population health, and reduce cost. The tenets of these models represent fundamental paradigm shifts, where the traditional role expectations of physicians are changing towards a model of collaboratively effective physicians who are able to function in new systems of care (Gonzalo, Graaf, Johannes, Blatt, Wolpaw, 2017).

Davis and Gonzalo (2019) argue strongly that the traditional focus areas of medical education are “insufficient for preparing future clinicians to function well in the rapidly evolving U.S. health care system” (p. 239). Indeed, these care delivery changes bring new role expectations for physicians and, consequently, new expectations for medical education programs training future physicians (Gonzalo, Dekhtyar, Hawkins et al., 2017). Certainly, the prevalence of avoidable medical errors, poor patient outcomes, and the high cost of care have caused medical educators to reimagine medical education, to prepare students to be able to address these systemic health care issues. Hence in what follows, and to give context, I first provide an overview of traditional approaches to medical education. Next, I provide a snapshot of the underpinnings of health systems science (HSS), particularly in light of aspects of diffusion of innovation theory. Given that neither of these provide context of how students might actually change their thinking, so in the third section I discuss transformative learning in adult education and its connection to possibly understanding how medical students could potentially engage their thinking in relation to HSS. Finally, in the last subsection I briefly mention some of the key research that has been
done, to set up the lack of research specifically related to how medical students might change their thinking and adopt an HSS approach.

**Traditional Medical Education**

The traditional framework of medical education has been a “Flexnerian 2+2 system of undergraduate medical education”: two years of basic science followed by two years of clinical science (Le & Willis, 2018, p. 2). In 1910, Flexner published a report that introduced the modern sciences as foundational for the medical curriculum in the two successive phases of two years of basic biomedical sciences and two years of clinical training, based in universities and academic medical centers respectively (Frenk et al., 2010). The basic sciences curriculum was originally designed to advance medicine, academic vigor, and the professionalization of medicine, while the clinical portion allowed students to learn medicine by observing and doing (Le & Willis, 2018).

The history of the Flexner reforms illustrates clearly how and why a progressive philosophy strongly informed medical education and continues to do so today. Elias and Merriam (2005) noted that the progressive philosophy includes the idea that individuals achieve freedom as they master the tools of learning that are available. Progressive education was prominent in the early twentieth century and many leaders were arguing that the main goal of education should be to promote problem solving, self-learning, and critical thinking (Ludmerer, 1999). Ludmerer (1999) describes how medical educators fought against quackery, fraud, and patent medicines and actively participated in the campaign that led to the first pure food and drug legislation in the U.S. By the 1920s, the medical profession had contributed to society in myriad ways and private individuals, organizations, and the state contributed financially to make possible the massive expansion of medical education (Ludmerer, 1999). This kind of social contract between physicians and the rest of society has endured and is part of the motivation for
establishing HSS. Indeed, in the face of poor patient outcomes, avoidable medical errors, and the high cost of care, medical educators recognize the need to reimagine medical education to prepare students to be able to address these systemic health care issues.

It is worth noting that Frenk et al. (2010) describe two additional “generations” of educational reforms in the health professions in the last century. They explain that around the mid-century, the second generation of reforms introduced problem-based instructional innovations. Moreover, they insist that there is now a need for a third generation of reforms, which should be “systems based to improve the health systems by adapting core professional competencies to specific contexts, while drawing on global knowledge” (p. 1924). HSS represents a third-generation reform.

**Health Systems Science (HSS)**

An idea of growing influence is that systems-thinking and interprofessional collaborations are both crucial to move from fragmented, siloed care to integrated, team-based solutions and efficient care delivery (Skochelak & Hawkins, 2017). Systems-thinking is an idea that is borne out of systems science, which is a broad class of analytical approaches that aim to uncover the behavior of complex systems (Carey et al., 2015). It has been argued that the knowledge and skills of systems thinking allow medical students to be cognizant of and apply a comprehensive and holistic approach to medical care and health care issues (Gonzalo, Starr et al., 2017). In 2013, through the American Medical Association’s (AMA) Accelerating Change in Medical Education (ACE) initiative, Health System Science (HSS) was conceptualized as the third pillar of medical education.

HSS is based on the idea that physicians are expected to go beyond caring for an individual patient and improve the health of communities and populations in a manner that is
equitable, efficient, and cost-effective (Skochelak & Hawkins, 2017). HSS has now taken its place as the third pillar of medical education that compliments the foundational basic and clinical sciences, which are the other two pillars of medical education (Gonzalo & Ogrinc, 2019). Having a deep understanding of HSS involves knowing how health care is delivered, how health care professionals work together to deliver that care, and how the health system can improve health (Skochelak & Hawkins, 2017). HSS, therefore, conceptualizes how to work in collaborative teams for improved quality, value, and safety in the delivery of patient- and population-centric health services (White, Lewis & McCoy, 2018).

As will be discussed in Chapter 2, HSS learning experiences have had positive implications for patients, students, and clinical sites, while also giving students opportunities to learn about the roles and responsibilities of other health care providers in interprofessional teams. Yet HSS related education has not been widely embraced by medical students (Gould et al., 2002), and they often express dissatisfaction for tasks that are not traditionally associated with physicians, and their desire to participate is highest for patient care activities, especially those approximating tasks traditionally performed by physicians (Hunderfund et al., 2018). Indeed, HSS can be perceived as educational innovation that is exposing medical students to new ways of thinking and practicing medicine.

In the diffusion of innovations theory, Rodgers (2003) highlights how it is the perceived newness of the idea that will determine whether it is an innovation, not necessarily how new the idea might actually be. The emergence of HSS as the third pillar of medical education and the new perspectives future physicians must have of their role as a consequence, can be considered an innovation that requires adoption or rejection. By applying the lens of the diffusion of innovations theory, we could gain insight into why some medical students are adopting the HSS innovation while many others are not. Rogers posits that there are five characteristics of innovations, as perceived by individuals, that explain their different rates of adoption; these
characteristics are: relative advantage, compatibility, complexity, trialability, and observability. These characteristics will be discussed in detail in Chapter 2, but it is worth noting here that the diffusion of innovations framework is concerned with understanding the process by which an innovation is communicated and then adopted by individuals within a social system. While the diffusion of innovations framework can help identify the motivating factors for why some medical students might adopt an HSS approach, it will not explain how a change in a medical student’s perception of the role of a physician might shift from a traditional view to a systems-conscious view. Emerging from the adult education literature, transformative learning theory does provide a framework for understanding perspective shifts.

**Transformative Learning Theory**

Following his study of re-entry programs for women in community colleges in the U.S., Mezirow (1978) developed a transformative learning model that described the learning processes that led participants in his study to experience significant change in the ways they understood their identity, culture, and behavior, which he labeled “perspective transformation” (Keily, 2005, p. 7). Mezirow’s theory of perspective transformation was the seminal contribution to what has become the broader concept of transformative learning and has arguably remained the most robust theoretical elucidation of learning in the whole corpus of literature concerned with transformative learning (Hoggan, Mäkki & Finnegan, 2017). Mezirow (1990) defined perspective transformation as:

the process of becoming critically aware of how… we perceive, understand, and feel about our world; of reformulating these assumptions to permit a more inclusive, discriminating, permeable, and integrative perspective; and of making decisions or otherwise acting upon these new understandings. (p. 14)
Since Mezirow’s seminal perspective transformation work, many definitions of transformative learning have emerged and these are discussed in Chapter 2 of this dissertation.

Mezirow’s (2000) transformative learning model includes the following nonsequential learning processes: 1) a disorienting dilemma, 2) self-examination with feelings of fear, anger, guilt or shame, 3) a critical assessment of assumptions, 4) recognition that one’s discontent and the process of transformation are shared, 5) exploration of options for new roles, relationships, and actions, 6) planning a course of action, 7) acquiring knowledge and skills for implementing one’s plans, 8) provisionally trying new roles 9) building competence and self-confidence in new roles and relationships, and 10) a reintegration into one’s life on the basis of conditions dictated by one’s new perspective. There are myriad revisions and adaptations of Mezirow’s original ten phases of individual perspective transformation and some that follow a course entirely of their own. All proposals are tied to each other by the presence of fundamental components of transformative learning theory like reflective discourse, critical reflection, and a change in action resulting from revised assumptions. For Arnold and Prescher (2017), then, “it can be concluded that the goal of transformative learning is to question and put into perspective our self-conception of the world” (p. 287). There is an orientation towards action embedded as a fundamental feature of transformative learning theory.

While Mezirow’s theory of transformative learning has been discussed in detail within the larger field of adult education in research articles (as summarized by Taylor, 1997, 2007), books (Mezirow, 1991; Mezirow & Taylor, 2009) and handbooks (Taylor & Cranton, 2012), it has only been discussed in a limited way in the medical education literature since 2006. Van Schlakwyk, et al. (2019) conducted a scoping review of how transformative learning is currently represented in the health professions education literature, including how it influences curricular activities. Covering the period of January 2006 to May 2018, they were able to consider 99 full-text articles that met their eligibility criteria (Van Schlakwyk et. al, 2019). A total of 42 of the 99
studies were conceptual in nature, whereas 57 studies were considered empirical work. Of all 99 studies, 52 represented nursing while only 24 represented programs in medical education.

Nonetheless, transformative learning theory gained increased attention in health professions education (HPE) when Frenk et al. (2010) declared, in the Lancet Commission’s seminal article on HPE, that realizing the next generation of educational reforms in the health professions “will require a series of instructional and institutional reforms, which should be guided by two proposed outcomes: transformative learning [emphasis added] and interdependence in education” (p. 1924). Thus, while there has been sparse coverage of transformative learning theory in medical education, it remains relevant because medical educators are seeking to usher in educational reforms that will result in transformative learning experiences for medical students.

Within this context, it is little surprise that Saxena (2019) claims that transformative learning theory “offers health professional educators great promise to exploit the enriched perspective it provides to transform their learners, themselves and their institutions” (p. 534). Bergh, Bae, Hugo, and Sanders (2016) argue that the complexity of real-world contexts provides numerous experiences to stimulate transformative learning. Indeed, the possibilities for applying a transformative learning theory lens appear numerous in the medical education environment, especially with respect to settings where medical students are active participants in unfamiliar surroundings (Van Schalkwyk et al., 2019).

Existing Literature and How this Research Can Contribute

Although HSS-related education has reportedly had positive implications for patients, students, and clinical sites, while also giving students opportunities to learn about the roles and responsibilities of other health care providers in interprofessional teams, no research has explored what makes some students more intrinsically open, engaged, and likely to engage in new HSS-
related experiences. Existing literature, which will be discussed in Chapter 2, reveals that students have variable responses to HSS-related education (Gould et al., 2002) and they often express dissatisfaction for tasks that are not traditionally associated with physicians (Hunderfund et al., 2018; Neeman, Ranji & Sehgal, 2012). However, while these studies may recognize factors that have facilitated and/or inhibited learning, finding what factors cause students to have a voluntary interest in HSS, or why they find it acceptable to adopt this educational innovation, would address an area in the HSS literature that has never been explored.

Problem Statement

The prevalence of avoidable medical errors, poor patient outcomes, and the high cost of care have caused medical educators to reimagine medical education in order to prepare students to address these systemic health care issues. Since the early 1900s, physicians in the U.S. have been at the forefront of societal changes related to health issues, and the emergence of HSS as the third pillar of medical education is an effort to prepare the physicians of the future to take leadership in addressing the systemic issues in health care today. Systems-ready physicians of tomorrow will need to embrace the Quadruple Aim for improvement of population health, patient care experiences, provider work life, and cost reduction (Borkan, Wolpaw & Stagg Elliott, 2017). This will require a shift in how future physicians perceive their role in relation to patients, how they perceive other people in the health professions, and how they perceive the entire health care system.

Unfortunately, faculty in general lack expertise in HSS and its related fields (Headrick et al., 2012), since these aspects of medical education are relatively new and fall outside of what they would normally have been taught in traditional medical education curricula. This lack of faculty expertise is concerning because faculty mentorship is a key determiner of whether
educational interventions in this subject area will be successful (Jackson, Chandauka & Vivekananda-Schmidt, 2018). Students also have variable responses to HSS-related education and often express dissatisfaction for tasks that are not traditionally associated with physicians (Neeman et al., 2012). However, while the HSS and related literature highlight factors that have facilitated and/or inhibited learning, none consider what makes some students more intrinsically open, engaged, and likely to engage in new HSS-related experiences.

**Purpose Statement and Research Questions**

The purpose of this study was to explore why some fourth-year medical students exemplify the principles of HSS, and how they came to incorporate these principles into their perspectives on the role of a physician. This research was guided by the following questions:

1. How do students who exemplify the principles of HSS perceive the process of how they experience a shift in their perspectives on the role of a physician?
2. What key experiences have they had that helped them begin to embrace the principles of HSS, both before medical school and since being in medical school?
3. What role has the support or influence of others had in contributing to their exemplification of the principles of HSS?
4. What are their perceptions of what needs to happen in order for the system to really change?

**Conceptual and Theoretical Frameworks**

In light of the prevalence of avoidable medical errors, poor patient outcomes, and the high cost of care, Davis and Gonzalo (2019) have argued that the traditional focus areas of
medical education have been insufficient for preparing clinicians to function well in a rapidly evolving U.S. health care system. Traditionally, students have had a physician-centric education which is largely separated and divorced from authentic perspectives into health care processes and interprofessional collaboration (Gonzalo, Skochelak & Wolpaw, 2017). The goal of HSS, therefore, is to shift physicians’ perspectives about their roles and responsibility to communities, to prepare them for this changing health care environment. It is appropriate, therefore, that HSS should be understood through the lens of transformative learning theory as it provides a framework for understanding deep, structural, qualitative shifts in learners and their meaning schemes/perspectives (O'Sullivan, 2003). Although transformative learning theory provides a robust framework for understanding the process of perspective transformation, Rogers’ (2003) diffusion of innovations theory contributes to understanding HSS education in uniquely positive ways. Transformative learning theory has been criticized for being too egocentric and for providing an analysis that fails to adequately account for the social context in which learning takes place. The diffusion of innovations framework is concerned with understanding the process by which an innovation is communicated and then adopted by individuals within a social system. Although primarily concerned with individuals and their status with respect to the adoption of innovations, the diffusion of innovations framework serves as a useful balancing lens alongside transformative learning theory, given its overarching focus on how innovations diffuse within social systems.

**Transformative Learning Theory**

Transformative learning theory guided the development of the interview guide in this dissertation study and also to some extent guided the analysis of data. Merriam and Simpson (2000) discuss theoretical framework as the “underlying structure, orientation, and viewpoint of
your study” (p. 23-24). To understand what will be the underlying structure, orientation, and viewpoint of this study, it will be important to discuss relevant aspects of transformative learning theory and highlight how this informed my analysis.

Mezirow defined learning as “the process of using a prior interpretation to construe a new or a revised interpretation of the meaning of one’s experience in order to guide future action” (2000, p. 5). Mezirow’s definition emphasizes learners’ meaning-making from their experiences. His definition also stresses that learners are learning when they create new or revised interpretations of the meaning they have made, and that this learning will ultimately guide their future action. For Mezirow, learning is directly connected to the process of meaning formation. How participants in this study have made meaning of their experiences, in relation to the principles of HSS, was thus of primary interest.

For Mezirow (2000), learning occurs in three ways, all of which relate to changes with meaning schemes. Meaning schemes are “specific expectations, beliefs, feelings, attitudes, and judgments” that “tacitly direct and shape a specific interpretation and determine how we judge, typify objects, and attribute causality” (Mezirow, 2000, p. 18). Within this framework, the first way adults learn is within meaning schemes, when the meaning schemes become further differentiated. The second way learning occurs is when new meaning schemes are learnt, which are compatible with existing schemes. Finally, transformative learning occurs when new perspectives are constructed after the underlying assumptions of the prior and inadequate structures are critically assessed. That is, transformative learning occurs when a person’s prior meaning structures are no longer adequate for making meaning of their lives, so a new perspective is formed after critically assessing the prior meaning structures. This view of how learning occurs is of utmost importance to the orientation of this study.

Certainly, I was acutely attentive to the meaning-making process students associated with their exemplification of the principles of HSS. All learning was of interest, but any indications
students made of a shift in perspective from a prior state with meaning structures incompatible with the principles of HSS, to a new and revised perspective compatible with the principles of HSS, was of greatest interest to me in this study. Of secondary interest was students’ motivating factors for being early adopters of the HSS innovation; this was best understood through the diffusion of innovations theoretical framework.

**Diffusion of Innovations Theory**

The diffusion of innovations theory has been applied to a wide range of studies in areas including hybrid seed corn, modern math, antibiotic drugs, and HIV/AIDS prevention (Haider & Kreps, 2004). Dearing and Cox (2018) argue that diffusion of innovations is applicable to the complex context of health care, for both explanatory and interventionist purposes. Indeed, diffusion of innovations has been applied to understand the health care and medical education contexts.

In Rogers’ (2003) diffusion of innovations theory, he argues that the successful spreading of an innovation follows a typical pattern. First, after 10–20% of a population adopts an innovation, “critical mass” is reached to the point that the innovation’s further rate of adoption becomes self-sustaining. Importantly, Rodgers (2003) highlighted how it is the perceived newness of the idea that will determine whether it is an innovation, not necessarily how new the idea might actually be. Although HSS has developed out of the quality improvement, patient safety, and systems-based practice literature since at least the early 1990s, HSS is undoubtedly widely perceived as being new to medical education. Thus, the diffusion of innovations theory was useful in exploring why some students came to be early adopters of this perceived innovation.
Rogers posits that there are five characteristics of innovations, as perceived by individuals, that explain their different rates of adoption; these characteristics are: relative advantage, compatibility, complexity, trialability, and observability. Each of these characteristics will be described in greater detail in Chapter 2 of this dissertation.

**Overview of Design and Methodology**

In order to explore this study’s research questions, I utilized a qualitative research design in this study. Yilmaz (2013) notes that qualitative research focuses on the study of people, cases, phenomena, social situations and processes in their natural settings in order to reveal in descriptive terms the meanings that people attach to their experiences of the world. This emergent, inductive, interpretive and naturalistic approach (Yilmaz, 2013) was appropriate for this study which captured descriptions of the meanings medical students attach to their life and learning experiences and how they related these experiences to their perception of the role of a physician.

The most common form of qualitative study in the field of education is the basic interpretive study (Merriam, 2009). Merriam and Tisdell (2016) highlight how a central characteristic of all qualitative research is that individuals construct reality in interaction with their social worlds and that constructivism underlies what they term *basic qualitative research*, or interpretive studies. In general, qualitative researchers conducting an interpretive study, therefore, would be interested in (a) how people interpret their experiences, (b) how they construct their worlds, and (c) what meaning they attribute to their experiences (Merriam & Tisdell, 2016). This study was concerned with how some medical students interpreted their experiences both before and during medical school, to construct their systems-orientated
perspective on the role of a physician. Therefore, an interpretive research design was chosen as
the specific qualitative research approach of best fit for the purpose of this dissertation research.

Qualitative research typically makes use of a purposeful sample (Creswell, 2014). I was
particularly interested in medical students who have more obviously adopted a health systems
science worldview of medicine. Therefore, a purposeful sampling method was used to identify
fourth-year medical students who demonstrated a commitment to HSS through their voluntary
enrollment in COVID-19 and HSS Academy electives. Students were invited to voluntarily
participate in a 60- to 90-minute semi-structured interview with me. Overall, 12 fourth-year
medical students were interviewed for this study. Seven of these participants were male and five
were female. The 12 participants were entering 10 different specialties, or specialty
combinations, for residency training.

Documents are also an important source of data in qualitative research that are often
available, stable, and richly descriptive with contextual clues, and are a record that an event or
phenomenon has taken place (Lincoln & Guba, 1985). In this study, curricula documents were
most relevant. Indeed, these documents were an important reference point as students referred to
the timing of particular HSS courses or to other important milestones in their medical school
journey. Such documents were already generated and can provide an additional source of data.
Furthermore, all participants were asked to complete a journey map (see Appendix A) of the most
important self-identified milestones in their lives that had caused them to demonstrate a
commitment to the principles of HSS (Howard, 2014). Participants mapped any high or low
points in their lives that they perceived as having some influence in their commitment to the
principles of HSS.

As will be discussed further in Chapter Three, the constant comparative method of data
analysis was used in this study. I also relied on the critique of the experts on my dissertation
committee, who each provided their own perspective on the rigor of my investigative work and the dependability of my findings.

**Significance**

Health Systems Science is a bourgeoning discipline that emerged from the work of the AMA’s ACE Consortium, consisting of nearly one-fifth of all allopathic and osteopathic medical schools (White et al., 2018). There are few research studies that connect adult education and medical education though there are a few. But there are currently no adult education publications related to HSS or published contributions from adult educators working within the discipline of HSS in medical education. This research study was a timely contribution to understanding how learners are experiencing the recently developed educational model intended to redefine what is understood to be the role of a physician.

For the most part, HSS focuses on broad imperatives driving the need for change in medical curricula with little attention to how educators can support medical students through the shift. Hawkins, Hauer, and Lomis (2017) use the language of adult education in their chapter on “The Use of Assessment to Support Learning in Health Systems Science” without providing physician educators any guidance on how to support trainees and medical students through the process. As examples of how the language of adult education is used, Hawkins et al. (2017) emphasize how self-regulated learning is the basis for lifelong learning (p. 191), how self-efficacy is critical for self-regulated learning (p. 192), and how reflection on (and awareness of) personal perspectives on learning are key to success in health systems science (p. 191). By exploring why some fourth-year medical students easily embody the principles of HSS, and how they come to incorporate these principles into their perspectives on the role of a physician, this
A research study provided insight into how medical students can be supported through the process of becoming educated in HSS.

Yet the benefit of this work is not contained to medical education alone; the field of adult education stands to be enriched by this work too. Contributions to the field of adult education that are examined through the lens of transformative learning have not slowed down over the last decade. As scholars continue to explore how transformative learning theory can be applied in varying contexts, we are likely to see modifications to the framework that account for specific settings and add new dimensions to our analysis of adult learning. Adults in this new era will face new psychosocial challenges that may impact some of the foundational tenants of our thinking about how and why adults learn and what kind of learning might result in their transformation as individuals.

This work is particularly important because of its context in medical education, which affects the U.S. health care system. If systems-thinking and interprofessional collaborations are indeed necessary to move the health care system from fragmented, siloed care to integrated, team-based solutions and efficient care delivery, then understanding how some students came to transform their perspective of the role of a physician might contribute to understanding how that shift in perspective might happen for others. Indeed, unless a majority of physicians are able to adopt systems-thinking and have an orientation towards interprofessional collaboration, the U.S. health care system will remain costly, fragmented, and inefficient. This work thus stands to contribute to the field of transformative learning in medical education that ultimately relates to thinking about the health system itself, which might one day lead to positive changes in the U.S. health care system at large. This work is significant to me because of its potential to make a fundamental impact on the value of health care in the U.S., and its potential to influence how we approach educating adults in favor of patients in this context.
Assumptions, Limitations and Strengths

Every study is based on a certain set of assumptions as well as limitations and strengths that are related to its conceptualization and its methodology.

Assumptions

The following assumptions were embedded in this research:

1. Life experiences, in conjunction with the individual and social contexts in which they occur, provide the potential for learning and development, or a change in perspective.
2. Medical students can identify and articulate their experiences that are most closely associated with exemplification of the principles of HSS.
3. Medical students will be able to identify motivating factors for their exemplification of the principles of HSS.
4. Some medical students choose to embrace the principles of HSS to a much greater degree than others.
5. Medical students were honest and accurate in sharing their views about HSS.
6. Among medical students who exemplify the principles of HSS, some will have experienced a shift in perspective from the traditional role of the physician to the HSS-espoused perspective of the role of a physician

Limitations and Strengths

As for the study’s limitations and strengths, some of the potential limitations of this study included:
1. This study was dependent upon medical students voluntarily participating in this research. As a result, it is possible that there may have been selection bias because students who agreed to participate may have done so because of strong negative or positive experiences or views about HSS.

2. A purposive sample was determined using students’ voluntary enrollment in COVID-19 and HSS Academy electives as an indicator of their commitment to HSS. Students may have enrolled in these electives for a number of reasons, so this may not truly reflect whether students are committed to systems-based practice.

3. Owing to my status as a staff member actively involved in the education mission of the institution, students may have felt some hesitation in being open and honest about their views of HSS and the experiences that have shaped their perspectives.

In spite of the limitations of this study, the study adopted strategies of qualitative research to add to its strengths and to insure the dependability of the findings. While these will be discussed more fully in Chapter Three, some of these include: triangulating the data I collected in this study with multiple sources of data and conserving data integrity by maintaining a record of all raw data, transcripts, field notes, coding lists with explanations, process notes, and written reflexive notes about literature relevant to this study.

**Definition of Terms**

Health Systems Science (HSS) is defined as “the principles, methods, and practice of improving quality, outcomes, and costs of health care delivery for patients and populations within systems of medical care” (Gonzalo, Starr & Borkan, 2017, p. 11).
1. Clinical clerkships are the clinical portion of undergraduate medical education, which typically occurs in the third and fourth year of students’ medical training.

2. Entrustable Professional Activity (EPA) is a concept that was introduced in 2005 and it can be defined as a “unit of professional practice that can be fully entrusted to a trainee, as soon as he or she has demonstrated the necessary competence to execute this activity unsupervised” (Cate et al., 2015).

3. Medical Education is divided into undergraduate (UME), postgraduate (GME) and continuing medical education (CME), but increasingly there is a focus on the ‘lifelong’ nature of medical education (Wojtczak, 2002a).

4. Traditional undergraduate medical education (UME) is a time of education that comprises a preclinical and a clinical period. It results in the medical student being permitted to start postgraduate education and training.

5. A medical student is someone enrolled in an undergraduate medical education degree program. In the United States, it is necessary for students to have completed a pre-medical college undergraduate education, which results in a Bachelor’s degree (Wojtczak, 2002a).

6. Graduate medical education (GME), or postgraduate education and training, is used to designate the period of post-UME training and is designed to lead to competence in a chosen branch of medical practice (Wojtczak, 2002a).

7. A resident is someone completing postgraduate education and training.

8. A physician is “a professional, qualified by education and authorized by law to practice medicine” (Wojtczak, 2002b) independent of supervision.

9. Systems-thinking is an idea that is borne out of systems science, which is a broad class of analytical approaches that aim to uncover the behavior of complex systems (Carey et al., 2015).
10. **Value-added clinical systems learning roles** can be defined as experiential roles for medical students that can positively impact health outcomes while also enhancing student knowledge, attitudes, and skills in Clinical or Health Systems Science (Gonzalo, Wolpaw et al., 2018).
Chapter 2

LITERATURE REVIEW

The purpose of this study was to explore why some fourth-year medical students exemplify the principles of HSS, and how they came to incorporate these principles into their perspectives on the role of a physician. I begin this chapter with a short introduction to the context that has given rise to the need for change in medical education, followed by a historical overview of the undergraduate medical education curriculum in the United States. I follow with a subsequent discussion about Health Systems Science (HSS) and its curricular domains, and then provide a thematic overview of the empirical HSS literature. Following this, I provide a definition of the behaviors of a ‘Systems Citizen’, which I generated from an analysis of the findings from the HSS empirical literature. Then, I present a thematic overview of the emergent themes from the Quality Improvement (QI) and Patient Safety (PS) education literature. The conceptual and theoretical frameworks of transformative learning theory and the diffusion of innovations theory are then discussed. Finally, the chapter is concluded with a summary.

The Need for Change

Health care delivery in the United States (U.S.) is costly, fragmented, inefficient (Berwick & Hackbarth, 2012), and produces sub-optimal patient outcomes (Institute for Healthcare Improvement, 2009). In response to this situation, newer care delivery models have increasingly focused on interprofessional care teams to achieve the goals of the Institute for Healthcare Improvement’s (IHI) Triple Aim – to improve the patient experience and population health while reducing costs (Berwick, Nolan, Whittington, 2008). These care delivery changes
bring new role expectations for physicians and, consequently, new expectations for medical education programs training future physicians (Gonzalo, Dekhtyar, Hawkins et al., 2017).

There is an idea of growing influence that systems thinking and interprofessional collaborations are both crucial to move from fragmented, siloed care to integrated, team-based solutions and efficient care delivery (Skochelak & Hawkins, 2017). Systems-thinking is an idea that is borne out of systems science, which is a broad class of analytical approaches that aim to uncover the behavior of complex systems (Carey et al., 2015). It has been argued that the knowledge and skills of systems thinking allow medical students to be cognizant of and apply a comprehensive holistic approach to medical care and health care issues (Gonzalo, Starr et al., 2017). In 2013, the American Medical Association (AMA) solicited grant proposals for its Accelerating Change in Medical Education (ACE) initiative which had the goal of enhancing the systems thinking competencies of medical school graduates (Gonzalo, Dekhtyar, Hawkins et al., 2017). Of the 30 grants that were submitted, eleven medical schools were awarded $1 million each as part of the ACE initiative (Gonzalo, Baxley et al. 2017). In June 2013, these eleven schools formed a consortium to collaborate and share resources and experiences, and many of the schools proposed new Health System Science (HSS) curricular components (Gonzalo, Dekhtyar, Hawkins et al., 2017).

HSS is based on the idea that physicians are expected to go beyond caring for an individual patient and improve the health of communities and populations in a manner that is equitable, efficient, and cost-effective (Skochelak & Hawkins, 2017). HSS has taken its place as the third pillar of medical education that compliments the foundational basic and clinical sciences, which are the other two pillars of medical education (Gonzalo & Ogrinc, 2019). Having a deep understanding of HSS involves knowing how health care is delivered, how health care professionals work together to deliver that care, and how the health system can improve health (Skochelak & Hawkins, 2017). HSS, therefore, conceptualizes how to work in collaborative
teams for improved quality, value, and safety in the delivery of patient- and population-centric health services (White, Lewis & McCoy, 2018).

**Overview of Undergraduate Medical Education Curriculum**

The traditional framework of medical education has been a “Flexnerian 2+2 system of undergraduate medical education:” two years of basic science followed by two years of clinical science (Le & Willis, 2018, p. 2). In 1910, Flexner published a report that introduced the modern sciences as foundational for the medical curriculum in the two successive phases of two years of basic biomedical sciences and two years of clinical training, based in universities and academic medical centers respectively (Frenk et al., 2010). The basic sciences curriculum was originally designed to advance medicine, academic vigor, and the professionalization of medicine, while the clinical portion allowed students to learn medicine by observing and doing (Le & Willis, 2018).

The history of the Flexner reforms is fascinating, as it illustrates clearly how and why a progressive philosophy strongly informed medical education and continues to do so today. Elias and Merriam (2005) note that the progressive philosophy includes the idea that individuals achieve freedom as they master the tools of learning that are available. Progressive educators therefore consider learner needs, interests, and experiences as key elements in learning (Wang & Sarbo, 2004, p. 209). By the 1920s, there were entrance requirements for medical school, the course of instruction had been expanded to four years, and the scientific components of the curriculum had been greatly strengthened (Ludmerer, 1999). In addition, didactic teaching had been deemphasized and, in its place, the laboratory and clinical clerkship provided the core of the learning experience for students (Ludmerer, 1999). These changes in the medical education system resulted in health professionals being equipped with the knowledge that contributed to the doubling of life span during the twentieth century (Frenk et al., 2010). Progressive education was
prominent in the early twentieth century and many leaders were arguing that the main goal of education should be to promote problem solving, self-learning, and critical thinking (Ludmerer, 1999, p. 10). These ideas were most closely associated with John Dewey, and Flexner, who was a school master and not a physician, was a fervid supporter of these educational principles (Ludmerer, 1999). The presence of this sentiment in medical education could be seen through not only the support, but also through the leadership of medical professionals in the public health movement. Ludmerer (1999) describes how medical educators fought against quackery, fraud, and patent medicines and actively participated in the campaign that led to the first pure food and drug legislation in the U.S. The medical profession contributed to society in myriad ways and private individuals, organizations, and the state contributed financially to make possible the massive expansion of medical education (Ludmerer, 1999). This kind of social contract between physicians and the rest of society has endured and is part of the motivation for establishing HSS. Indeed, in the face of poor patient outcomes, avoidable medical errors, and the high cost of care, medical educators are reimagining medical education to prepare students to be able to address these systemic health care issues.

It is worth noting that Frenk et al. (2010) describe two additional ‘generations’ of educational reforms in the health professions in the last century (p. 1924). They explain that around the mid-century, the second generation of reforms introduced problem-based instructional innovations. Frenk et al. (2010) argue that there is now a need for a third generation of reforms, which should be “systems based to improve the health systems by adapting core professional competencies to specific contexts, while drawing on global knowledge” (p. 1924). HSS represents a third-generation reform.

This third-generation of educational reform in the health professions emerges in the context of new care delivery models that are being implemented to improve patient experience, promote population health, and reduce cost. These directions represent “fundamental paradigm
shifts,” where the traditional role expectations of physicians are changing towards a model of collaboratively effective physicians who are able to function in new systems of care (Gonzalo, Graaf, Johannes et al., 2017, p. 261). Davis and Gonzalo (2019) argue strongly that the traditional focus areas of medical education are “insufficient for preparing future clinicians to function well in the rapidly evolving U.S. health care system” (p. 239). Skochelak and Hawkins (2017) suggest that HSS topics need to be formally embraced in medical education, as the relevance of HSS to the health of the entire U.S. population, and the importance of training medical providers to lead health systems improvement and ensure the delivery of high-value care, is undeniable. As such, HSS represents a reform of medical education programs to meet the evolving needs of health systems (Gonzalo & Ogrinc, 2019).

Gonzalo, Baxley et al. (2017) posit that education in HSS has the potential to develop a more broadly prepared physician workforce that is better able to lead the health care system to meet the needs of patients and society. They argue that we need to move away from physician-centric training and thinking; the ultimate goal is to expand future physicians’ perspectives by training them to work alongside care-coordinators, patient navigators, social workers, nursing staff, and collaborating physicians, to improve patient outcomes (Gonzalo, Baxley et al., 2017).

**Health Systems Science**

Health Systems Science (HSS) is defined as “the principles, methods, and practice of improving quality, outcomes, and costs of health care delivery for patients and populations within systems of medical care” (Gonzalo, Starr et al., 2017, p. 11). Skochelak and Hawkins (2017) claim that HSS is “emerging as a critical discipline that aims to provide a holistic and comprehensive approach to improving health outcomes and the overall patient experience of care, while simultaneously reducing the per capita cost of care” (p. 1419). Emerging from the
Systems-Based Practice competency domain introduced by the Accreditation Council for Graduate Medical Education (ACGME), the skills expected of students, residents, and faculty were broadened. In the early 2000s, interprofessional education and collaboration, together with social determinants of health, increased in prominence and many medical schools modified their curricula in these areas (Fred & Gonzalo, 2018). HSS resulted from national calls for change in medical education. Many schools altered the traditional framework of medical education by creating new courses and early clinical roles for students to learn about the health care delivery system in a more structured way (Gonzalo, Dekhtyar, Hawkins et al., 2017).

Curricular Domains in HSS

Through a detailed review of the thirty full grant submissions that were submitted to the AMA for its ACE initiative, a comprehensive list of HSS curricular domains were identified by the eleven school AMA consortium (Gonzalo, Dekhtyar, Starr et al., 2017). There are six core curricular domains and five cross-cutting domains in HSS. The core curricular domains include (1) health care structures and processes, (2) health care policy, economics, and management, (3) clinical informatics and health information technology, (4) population health, (5) value-based care, and (6) health system improvement (Skochelak & Hawkins, 2018). The cross-cutting domains include (1) leadership and change, (2) teamwork and interprofessional education, (3) evidenced-based medicine and practice, (4) professionalism and ethics, and (5) scholarship (White et al., 2018). Systems thinking was identified as a linking domain that relates to all the issues associated with the attention of a complex web of interdependencies (Skochelak & Hawkins, 2018). Figure 2-1 (below), illustrates how the six core curricular areas, five cross-cutting domains, and one linking domain in HSS relate to each other (Gonzalo, Starr, et al., 2017, p.14).
These HSS competencies are highly interdisciplinary and distinct from traditional basic and clinical sciences (Fred & Gonzalo, 2018). Nonetheless, there is relative scarcity of validated assessment methods targeting HSS domains and HSS does not have a robust framework of milestones, competencies, and/or Entrustable Professional Activities (EPAs) (Fred & Gonzalo, 2018). An Entrustable Professional Activity (EPA) is a concept that was introduced in 2005 and it can be defined as a “unit of professional practice that can be fully entrusted to a trainee, as soon as he or she has demonstrated the necessary competence to execute this activity unsupervised” (Cate et al., 2015). Nevertheless, it stands that a current gap in HSS education lies in the absence of an assessment tool that will set the foundation for programmatic evaluation of HSS.
competencies and curricula (Dekhtyar et al., 2019). Thus, the subsequent section describing the HSS curricular areas is a surface-level description of each area, which is currently what I have found to be offered in the literature with respect to this nascent curricular area in medical education. A section with a description of each of the core curricular domains will be followed by a section describing each of the cross-cutting curricular domains.

**Core Curricular Domains**

The *health care structures and processes* domain relates to issues that affect patients, providers, care systems, resources, or processes (Gonzalo, Starr, et al., 2017). Broad determinants of quality of care include patient satisfaction, nature of interactions with staff, personalized care, accessibility to care, timeliness of care, and teamwork (White et al., 2018). This domain includes the processes of collaboration and coordination required for the delivery of health care (Gonzalo, Dekhtyar, Starr et al., 2017). The *health care policy, economics, and management* domain encompasses all issues related to the decisions, actions, and plans undertaken to achieve specific health care goals and the issues related to efficiency, effectiveness, value, and behavior in the production and consumption of care (Gonzalo, Starr, et al., 2017). To understand this domain, students explore policy and health care finance, insurance markets, and forms of reimbursement. Students further evaluate how these factors influence consumer and provider behavior, systems, and health outcomes (White et al., 2018, p. 409). These sciences are used to promote health through the study of all components of the health care system and managed care (Gonzalo, Dekhtyar, Starr et al., 2017). The *clinical informatics/health information technology* domain focuses on informatics sciences, clinical decision-support systems, and electronic health record (EHR) system functions and interoperability (White et al., 2018, p. 410). Specific curricular examples in this domain could include something like:
awareness of real-time data viewing and decision support to manage data registries and analyze clinical reports (Gonzalo, Starr, et al., 2017). The population health domain is inclusive of public health principles for the promotion of equitable health, wellness, and access to quality care for all people (White et al., 2018, p. 410). The dynamic interrelationships among various personal, socioeconomic, and environmental factors that relate to health outcomes or prevention are central for those interested in population health (Gonzalo, Starr, et al., 2017). All issues related to traditional public health and preventative medicine are captured in this core domain (Gonzalo, Dekhtyar, Starr et al., 2017). The value-based care domain of HSS is an important component of the Quadruple Aim for improvement of population health, patient care experiences, provider work life, and cost reduction (White et al., 2018, p. 410). As already mentioned, the Institute for Healthcare Improvement originally proposed the “Triple Aim” (Population Health, Experience of Care, Per Capita Cost) (Gonzalo, Graaf, Johannes, Blatt, Wolpaw, 2017) but HSS literature frequently now cites Bodenheimer and Sinsky’s (2014) “Quadruple Aim”, which added the goal of improving the work life of health care providers, including clinicians and staff. Health system improvement pertains to the analyses of root causes for effective change management (White et al., 2018, p. 410). Gonzalo, Dekhtyar, Starr et al. (2017) note that this domain includes “all issues related to processes of identifying, analyzing, or implementing changes in policy, health care delivery, or any other function of the health care system to improve the performance of any component of the health care system” (p. 125).

Cross-Cutting Curricular Domains

The cross-cutting domain of leadership and change agency relates to all issues connected to inspiring motivation in others to create goals toward a desirable vision (Gonzalo, Dekhtyar, Starr et al., 2017). In the context of Undergraduate Medical Education (UME), the leadership
domain might be concerned with team-based care and quality improvement projects, as examples (Gonzalo, Starr, et al., 2017). Teamwork and interprofessional education includes all issues related to collaboration and team science (Gonzalo, Starr, et al., 2017). In particular, the process of individuals working together on specified tasks to achieve shared goals is captured in this cross-cutting domain (Gonzalo, Dekhtyar, Starr et al., 2017). The Evidence-based medicine cross-cutting domain is defined as all issues related to the “conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients, populations of patients, or interventions in health care delivery improvement” (Gonzalo, Dekhtyar, Starr et al., 2017, p. 125). This domain could manifest as, for example, the utilization of evidence-based guidelines to ensure appropriate care delivery for a panel of patients (Gonzalo, Starr, et al., 2017). Professionalism and ethics relates to ethical behavior and professionalism, including conduct, leadership ethics such as honesty and responsibility, “as well as ethics and professionalism specific to the HSS domains” (Gonzalo, Dekhtyar, Starr et al., 2017). Specific curricular examples of this cross-cutting curricular domain could include being able to define professionalism, exhibit professional behavior when working in collaborative team-based models of care, and awareness of professionalism in the context of social media (Gonzalo, Starr, et al., 2017). With respect to Scholarship, this is defined as being related to scholarship of HSS content and/or health services research that investigates any HSS domain (Gonzalo, Dekhtyar, Starr et al., 2017). Typical aspects of traditional research like ‘discovery’ and ‘teaching’ (educational scholarship) are captured in this domain too. Integration of scholarship which makes connections across disciplines and places specialties in a larger context, is an aspect of this domain (Gonzalo, Starr, et al., 2017). Finally, an interaction between research and practice is considered application of scholarship and is a vital component of this cross-cutting domain (Gonzalo, Dekhtyar, Starr et al., 2017).
Overview of Empirical Literature and Emergent Themes: Health Systems Science

Efron and Ravid (2019) suggest that it is advisable to use primary rather than secondary sources when writing a literature review. They argue that primary sources, like research reports, provide the advantage of offering firsthand experience by researchers who have conducted the studies. In order to identify all the empirical literature about HSS education, I conducted literature searches using the ERIC, ProQuest, and PubMed databases. There was a total of 18 empirical articles about HSS education published at the time of this review. Six of the 18 explored *value-added clinical systems learning roles* (Gonzalo, Graaf, Ahluwalia, Wolpaw & Thompson, 2018; Gonzalo, Graaf, Johannes, Blatt & Wolpaw, 2017; Gonzalo, Wolpaw, Graaf & Thompson, 2018; Hunderfund et al., 2018; Polak et al., 2017; Rivera, O'Brien, & Wamsley, in press). Six of the 18 articles sought to describe or evaluate *innovative ways of integrating HSS* into medical school curricula (Ackerman et al., 2016; Couzos, 2019; Gonzalo, Graaf, Kass et al., 2017; McCoy et al., 2018; Lawson et al., 2019; Pruitt et al., 2017). Three articles addressed *faculty professional development in HSS* (Baxley et al., 2016; Gonzalo, Ahluwalia et al., 2018; Walsh et al., 2019); two articles investigated *perceptions around the implementation of HSS curricula* (Gonzalo, Haidet, Blatt, Wolpaw, 2016; Sheu, Burke, Master & O'Sullivan, 2018); and one article, which will not be addressed in this section, sought to develop a potential comprehensive HSS curricular framework by reviewing 30 AMA full grant submissions (Gonzalo, Dekhtyar, Hawkins et al., 2017). A final article reported on a new National Board of Medical Examiners (NBME) HSS examination with respect to the reliability, validity and difficulty of examination items, and the performance of student test-takers (Dekhtyar et al, 2019).
Value-Added Clinical Systems Learning Roles

Of the six articles that explored value-added clinical systems learning roles for students, four articles reported using qualitative research methods in the research design of the studies (Gonzalo, Graaf et al., 2018; Gonzalo, Graaf, Johannes et al., 2017; Gonzalo, Wolpaw et al., 2018; Rivera, O'Brien, & Wamsley, in press), and two used a quantitative research design (Hunderfund et al., 2018; Polak et al., 2017). All of these studies were conducted in the U.S., except for the Polak et al. (2017) study which was based out of the Hadassah Hebrew University Medical School in Israel.

In their qualitative analysis of medical student perceptions of value-added clinical systems roles, Gonzalo, Wolpaw et al. (2018) defined value-added roles for students as “experiential roles that can positively impact health outcomes while also enhancing student knowledge, attitudes, and skills in Clinical or Health Systems Science” (p. 1). This was consistent with the definition used by all the articles exploring value-added clinical systems learning roles for students.

These studies found that value-added clinical systems learning roles benefited both students and patients by facilitating student learning about issues related to patients’ lives (Gonzalo, Wolpaw et al., 2018) and by, for example, giving patients an avenue to share things that they may have forgotten to tell the nurse (Gonzalo, Graaf et al., 2018). Indeed, students described how these roles allowed them to focus exclusively on the patient without having to focus on the disease or diagnosis, and this helped build empathy in them for patients (Gonzalo, Graaf et al., 2018). Yet Hunderfund et al. (2018) did find that students’ desire to participate in value-added roles varied depending on the task. Indeed, students’ desire to participate was highest for patient care activities, especially those approximating tasks traditionally performed by physicians (Hunderfund et al., 2018). As value-added clinical systems learning roles are almost
always embedded in an interprofessional setting and Hunderfund et al. (2018) concluded that value-added activities will be most successful when they embed students in multidisciplinary health care teams, this finding is of great interest. Gonzalo, Graaf et al. (2018) found that difficulty in understanding the applicability of the program to their future careers was one reason students lacked engagement in value-added clinical systems learning roles. While students recognized the importance of a health coaching curriculum, of participating in value-adding clinical roles, and the role of physicians in managing their patients’ lifestyles (Hunderfund et al., 2018; Polak et al., 2017), students in the Gonzalo, Graaf et al. (2018) study felt disengaged when they just shadowed providers, conducted repetitive tasks, and perceived having limited autonomy. The most valuable tasks were those where students had the most amounts of autonomy (Gonzalo, Graaf et al., 2018; Polak et al., 2017). Direct patient benefit activity roles for students where they monitor care plans, perform home visits, facilitate patient access to services and resources, and are involved in patient education (Gonzalo, Graaf, Johannes et al., 2017) are those that provide the most autonomy (Gonzalo, Graaf et al., 2018).

Findings from these studies indicate, however, that the level of autonomy involved in the tasks associated with students’ roles was not the only determining factor in the success of the experience or the depth of the interprofessional interactions. Indeed, the nature of the space allocated for students to work while participating in these roles and the proximity of these spaces to non-physician colleagues, had a significant influence on whether students felt that they could be successful at a clinical site and the depth of interprofessional collaboration students experienced (Gonzalo, Graaf et al., 2018; Rivera et al., 2020). Also, staff and student schedules were barriers for students feeling like they could have continuity with their patients and for students and staff to have meaningful interprofessional interactions (Gonzalo, Graaf et al., 2018; Rivera et al., 2020). Gonzalo, Wolpaw et al. (2018) found that students felt that one benefit of participating in value-added clinical systems learning roles was the opportunity it provided to
learn about the roles and responsibilities of other health care providers and to collaborate with them to help patients. Rivera, O'Brien, and Wamsley (in press), however, found that this was only true of placement sites where the clinical workflow supported these kinds of interactions. In busy placement sites like Emergency Departments, students felt that they would be imposing on patient care activities if they engaged with other care providers (Rivera et al., 2020). Gonzalo, Graaf et al. (2018) reported that students often needed encouragement or prompting to understand how to assist patients and that to improve student engagement, they would need site-specific training, which could be facilitated by ongoing communication, collaboration, and sharing of ideas between the medical school, the placement sites, and the students. For pre-clinical students who had the experience of practicing coaching family members and friends in the Polak et al. (2017) study, the experience was viewed positively by most students, though there were sometimes perceived difficulties in being taken seriously by those with whom students had existing personal relationships.

Participants in the Gonzalo, Graaf, Johannes et al. (2017) study believed that by performing these value-added clinical systems learning roles, students could develop a different perspective on health care delivery and the patient experience, thereby enhancing their education. Students did report learning about barriers to care, including insurance, disability, etc., in a direct way and learning about components or processes of the larger health care system and how care is delivered, including policy, informatics, etc. (Gonzalo, Graaf et al., 2018; Gonzalo, Wolpaw et al., 2018). However, the amount of time and the level of support mentors/coaches could provide to students significantly influenced the depth of interprofessional interactions and students’ success in their value-added clinical systems learning roles (Gonzalo, Graaf et al., 2018; Rivera et al., 2020). While students expressed growing in empathy for patients and identified that participating in these roles helped them learn how to communicate more effectively with patients (Gonzalo, Graaf et al., 2018; Gonzalo, Wolpaw et al., 2018), none of these studies have identified
how participating in value-added clinical systems learning roles would exactly help students develop new perspectives, as participants in the Gonzalo, Graaf, Johannes et al. (2017) study predicted would happen if students participated in these roles.

Indeed, there is much variability in students’ level of engagement in value-added clinical systems learning roles, in the types of tasks students express being willing to engage with, and in their interprofessional interactions and experiences while participating in these roles (Gonzalo, Graaf et al., 2018; Hunderfund et al., 2018; Rivera et al., 2020). One student participant in the Gonzalo, Graaf et al. (2018) study expressed, “I entered patient navigation with little expectation and an open mind so I feel I got a lot out of it.” (p. 709). Aside from recognizing the external facilitators or barriers that exist in making students successful in their interprofessional interactions and in their value-added clinical systems learning roles, identifying what it is that makes some students more open, engaged, and likely to gain new perspectives, could provide powerful insights that could make participating in these roles a truly transformative experience for students, especially if that information could be used deliberately to design the learning environment differently.

Findings from these studies about value-added clinical systems learning roles for students are critical contributions to the growing literature around HSS. These studies show us that not only can students contribute positively to holistic patient care and the clinical sites where they are learning, but they can learn about important topics like social determinants of health and cost-conscious care, as examples, while doing it. Value-added clinical systems learning roles provide unique opportunities to expose students to a wide range of perspectives, as these roles often place students on interprofessional teams and include students working directly with patients to overcome barriers to health care.
Innovative Ways of Integrating HSS

Six articles reported on studies where innovative ways of integrating HSS into curricula was implemented. Three of these reported studies used qualitative research methods (Couzos, 2019; McCoy, Lewis et al., 2018; Pruitt et al., 2017), one used quantitative research methods (Lawson et al., 2019), and two used mixed methods research methodology (Ackerman et al., 2016; Gonzalo, Graaf, Kass, et al., 2017). The purpose of each of these studies was to: evaluate a distinct HSS track with an immersion component (Lawson et al., 2019); describe an HSS curriculum that utilized Problem-Based Learning (PBL) across 4 years of systems-based practice medical education (Pruitt et al., 2017); determine if final-year medical students can apply HSS learnings to optimize health outcomes for populations experiencing disproportionate levels of ill health (Couzos, 2019); describe the integration of HSS competencies in engaging case studies online (McCoy et al., 2018); describe an Action Research Program (ARP) and provide an assessment of its impact on students and the participating ambulatory practice (Ackerman et al., 2016); and describe a systems ethnography role for first-year medical students that could enhance their learning with regard to health care systems, ethnography, and systems thinking (Gonzalo, Graaf, Kass, et al., 2017). These studies reported on curricular innovations that were implemented from 2013 to 2018. These studies were based out of the University of California San Francisco (UCSF) (Ackerman et al., 2016), the University of South Florida at Florida and Pennsylvania training sites (Pruitt et al., 2017), the Brody School of Medicine at East Carolina University (BSOM) (Lawson et al., 2019), the A.T. Still University, School of Osteopathic Medicine in Arizona in Mesa (McCoy et al., 2018), Penn State College of Medicine (PSCOM) (Gonzalo, Graaf, Kass, et al., 2017), and at the James Cook University in Australia (Couzos, 2019).
Pruitt et al. (2017) were successful in achieving their purpose of describing an HSS curriculum that utilized PBL across four years of medical school, and they provide details about how content was delivered, how students were assessed, and the nature and volume of the content that spanned the curriculum. Although not the explicitly stated purpose of their study, Pruitt et al. (2017) reported on students’ perceptions about whether they gained working knowledge of health systems and gained analytical skills by engaging in HSS sessions. This data was lacking in its ability to convince the reader that this four-year PBL-based HSS curriculum was truly effective, as reported non-specific survey items like “the course was well-organized and administered” did not appear to unequivocally address the expected subject matter or goals of an HSS curriculum. Similarly, McCoy et al. (2018) were successful in achieving their purpose of describing how they integrated HSS competencies in online case studies, and how much of the content was aligned with the HSS curricular domains, but further research is needed to truly assess how effective these online case studies were in helping students to, as examples, embrace new perspectives about the role of the physician, and to actively work towards improving the patient experience and population health while reducing costs. McCoy et al. (2018) cite McCoy et al. (2016) as having shown that these online cases were generally cognitively engaging, and fostered teamwork and participation and significantly improved clinical reasoning in first-year medical students. However, these findings do not contribute to our understanding of whether this education contributed to students’ embracing the triple or quadruple aims of health care.

Lawson et al. (2019) successfully demonstrated how an eight-week summer immersion program in HSS, between the first and second years of medical school, was effective in increasing knowledge, skills, and confidence in topics related to HSS and, they argue, laid the groundwork for more intensive, longitudinal experiences for students interested in developing greater expertise. Using three evaluation instruments: (1) a pre- and post 20-item knowledge test, (2) a self-assessment of pre- and post-program knowledge, skills, and confidence, and (3) a post-
program, 39-item, subjective assessment of the program structure, content, and delivery, Lawson et al. (2019) were able to show statistically significant (p < .001) improvements in at least ten items on a post-test knowledge self-assessment. The authors also reported on how students enrolled in the summer immersion program viewed it positively, with 93% of students rating the experience as “highly valuable” or “valuable” (Lawson et al., 2019). However, all of the 15 students who had been accepted over two years into the program had applied voluntarily, and they may have had a predisposition toward HSS. The 17 percent improvement from the mean knowledge pre- to post-test data (p < .001) was, therefore, a welcome and reliable data point to add into the evaluation of this summer immersion track. In addition to being viewed positively by students, this track did appear to improve students’ knowledge in HSS-related session content.

More than being successful in acquiring new knowledge, Couzos (2019) claims that the assessment method used in a final-year medical student capstone project in the clinical setting was able to ensure that graduates could integrate basic, clinical, and HSS to deliver better patient-centered care outcomes together with and for the Aboriginal and Torres Strait Islander communities. The students in the Couzos (2019) study completed a five-part written assignment, completed over eight months. Students recorded encounter information from ten patients that explored: (1) patients’ psychosocial risk factors and included patient-reported experiences of the quality of their care; (2) an evaluation of a hospital incident that led to a patient discharge against medical advice; (3) a health systems assessment of primary care intended to reduce potentially preventable hospitalizations for a selected chronic disease; (4) a systematic exploration with a patient of the five dimensions of medication adherence (patient, condition, therapy, socio-economic, and health care team and system-related factors) outlining personal supports; and (5) a reflection. Using an assessment method that was endorsed by Aboriginal and Torres Strait Islander academics and overseen by an Aboriginal-led committee, trained assessors, including Aboriginal and Torres Strait Islander academics and clinicians with real-world experience,
followed a checklist, a detailed assignment guide, and a grading rubric to assess students’ capstone, five-part written assignment. While this article was a condensed report that did not provide extensive study details that could be critically appraised here, there appears to have been great value for students to respond to deliberate writing prompts about their engagement with patients who report poorer access to quality care and have needs that reflect their greater burden of disease.

Graaf, Kass, et al. (2017) had 14 first-year medical students participate in design systems ethnography roles. After spending 12-15 hours in the emergency department (ED) observing patient experiences and clinical processes, students submitted written assignments, participated in a debriefing session, and completed an electronic survey regarding the educational benefits and perceived clinical value conferred to the ED department. Students identified four key themes of systems vulnerabilities occurring within the ED, which include: (1) patient experience, (2) communication and collaboration, (3) processes, physical space, and resources, and (4) professionalism. Perhaps most importantly, students gained appreciation of patients’ experiences of care, many of which diminished patients’ satisfaction, dignity, or understanding. In a different environment and with a different approach, Ackerman et al. (2016) similarly aimed to describe a unique, nine-month clerkship for first-year medical students focused on systems-based practice, patients’ experience of clinical care, and strategies to improve the delivery of care and clinic work processes. Students participated in: (1) nine half-day experiential learning sessions in a cardiology clinic; (2) articulated and reflected on their clinical experiences in written field notes; (3) attended weekly didactic sessions; and (4) each conducted a clinic-based quality improvement (QI) project. Data was collected through semi-structured exit interviews and surveys with eight students, narrative field notes submitted by students, semi-structured interviews with six staff Medical Assistants (MAs), and semi-structured interviews with four physicians.
Findings from the Ackerman et al. (2016) study reported similar benefits to those from the studies related to the benefit of value-added clinical systems learning roles for students. As a result of their experiences in this clerkship, students learned how delivery systems work (Ackerman et al., 2016; Gonzalo, Graaf et al., 2018; Gonzalo, Graaf, Kass, et al., 2017; Gonzalo, Wolpaw et al., 2018), developed clinical skills (Ackerman et al., 2016; Gonzalo, Wolpaw et al., 2018), and improved their communication with patients (Ackerman et al., 2016; Gonzalo, Graaf et al., 2018; Gonzalo, Wolpaw et al., 2018). Like students participating in value-added clinical systems learning roles, students in this clerkship had time to dedicate to tasks that clinic staff could not, and thereby improved the clinic workflow (Ackerman et al., 2016; Gonzalo, Graaf et al., 2018; Gonzalo, Graaf, Johannes et al.; 2017), though some students reportedly took too much time from attending physicians, who were not expected to perform as clinic preceptors for this clerkship (Ackerman et al., 2016). MAs, who are not typically asked to serve as mentors or educators for medical students, played a critical educational role in this clerkship and clinicians noted improved morale and work performance from MAs as a result (Ackerman et al., 2016). They also found that students did not have enough time to dedicate to improvement projects and students felt as though they did not have enough guidance from faculty. As a result, many improvement projects did not move from conceptualization to full implementation.

These six articles demonstrate how medical schools are experimenting with innovative ways of implementing HSS education. While these studies may recognize factors in each of these approaches that have facilitated and/or inhibited learning, none consider what makes some students more intrinsically open, engaged, and likely to engage in new experiences. The Lawson et al. (2019) study, in particular, was able to show significantly positive results in student learning. Students in that study represented several different medical schools and had applied to participate in an HSS immersion track, making them predisposed toward HSS. Finding what
factors caused students to have a voluntary interest in HSS in the first place would address a current gap in the HSS literature.

**Faculty Professional Development in HSS**

Two studies utilizing quantitative research methods (Baxley et al., 2016; Walsh et al., 2019) and one study using qualitative research methods (Gonzalo, Ahluwalia et al., 2018) addressed the matter of faculty professional development in HSS. The studies aimed to: develop a potential competency framework for faculty development programs aligned with the needs of faculty in Academic Health Centers (Gonzalo, Ahluwalia et al., 2018), describe three distinct online graduate courses that promoted faculty skills in educational leadership, curriculum development, and assessment of educational effectiveness (Baxley et al., 2016), and assess whether a Teachers of Quality Academy (TQA) program would be successful in equipping faculty to be skilled in teaching principles of HSS, when compared with a control (Walsh et al., 2019). These studies were conducted from 2014-2015 (Baxley et al., 2016; Gonzalo, Ahluwalia et al., 2018) and Walsh et al. (2019) did not disclose when they implemented their 15-month faculty development program. Two of these studies were conducted at the Brody School of Medicine at East Carolina University (Baxley et al., 2016; Walsh et al., 2019) and 23 of the 25 participants from the Gonzalo, Ahluwalia et al. (2018) study were from the Penn State College of Medicine (PSCOM) and the two others were from another regional health system and another regional academic health center, respectively.

After analyzing transcripts from 23 one-on-one interviews, Gonzalo, Ahluwalia et al. (2018) found that there were seven functional competencies and curricular domains for curricular learning, namely: (1) patient-centered care, (2) health care processes, collaboration, and teamwork, (3) clinical informatics, data, and tools, (4) population and public health, (5) policy
and payment, (6) value-based care, and (7) health systems improvement. Within each of these functional competency domains, Gonzalo, Ahluwalia et al. (2018) identified three to five subcategories. They also identified the foundational competencies: (1) systems thinking, (2) change agency and management, (3) teaming, and (4) leadership. The TQA six, two-day learning sessions program described by both Baxley et al. (2016) and Walsh et al. (2019) covered the content areas of patient safety, quality improvement, and interprofessional education. The curricula described by Baxley et al. (2016) and Walsh appeared representative of some, but not all, of the functional and foundational competencies described by Gonzalo, Ahluwalia et al. (2018). To assess the educational effectiveness of their faculty development program, Baxley et al. (2016) cited, as examples, the number of: (1) curricular contributions by faculty at an institution-level Medical Education Day; (2) new modules for resident hand-off training, which relates to transitions of care for patients from one clinical team to another; (3) Quality Improvement (QI) electives developed for residents, nurses, and public health students; (4) participants who became chapter authors for a textbook; (5) faculty who contributed to the National Board of Medical Examiners’ (NBME) development of an examination based on HSS concept; and other intended and unintended completion outcomes. What remained somewhat unclear, however, was the quality of these outcomes which may have contributed to a more robust assessment of the educational effectiveness of this program.

Walsh et al. (2018), on the other hand, utilized multiple data points in their assessment of their TQA faculty development program. All measurement instruments were administered at three time points: pre- and post-intervention and one year after completion of the program. HSS knowledge was assessed using a 50 multiple-choice question examination related to Patient Safety (PS), improvement capability, person- and family-centered care, quality, cost and value, and leadership. Attitudes about interprofessionalism were assessed through a 30-question TeamSTEPPS® Teamwork Attitudes Questionnaire. TeamSTEPPS® is an evidenced-based
team training curriculum developed by the Department of Defense (DoD) and the Agency for Healthcare Research and Quality (AHRQ). TeamSTEPPS® teaches the knowledge and skills that improve teamwork and it is built on five key principles: team structure, communication, leadership, situation monitoring, and mutual support (AHRQ, 2017). A baseline self-perception questionnaire assessing skills and confidence in prior experience with HSS, knowledge of PS, QI, adult education, and curriculum development was administered. A post-program survey captured participants’ impressions regarding their likelihood of continuing to incorporate what they learnt into their work and their confidence in conducting clinical QI initiatives and teaching HSS topics to medical learners. The second component of the post-program survey, regarding their confidence, was administered to participants and a control group one year after the program.

Participants’ completion of requirements and attendance at program components were also recorded alongside participants’ qualitative assessment of the program’s success in achieving the intended objectives, their satisfaction and perceived value of the individual program components, and their overall experience. The researchers also tracked participants’ scholarly products and career development following their participation in the program.

Although there was a significant increase in the perceived level of enjoyment of curriculum and program development from baseline to program completion, these increases did not persist one year after program completion (Walsh et al., 2018). Also, participants reported high levels of enjoyment of QI and teaching at the onset of the TQA program, these levels of enjoyment did not increase further directly after the TQA program nor a year later. Walsh et al. (2018) reported significant increases in knowledge of HSS content among participants following completion of TQA, with only minimal improvement in controls. However, the authors admit that a major limitation of this objective content test was that it “lacked the degree of validation and specificity needed to capture the knowledge transmitted” (p. 43) in the TQA program.

Importantly, also, participants neither reported a continued increase in self-reported knowledge of
QI in the year following the program, nor rated their confidence in conducting QI higher than the control group. Although Walsh et al. (2018) utilized multiple data points in their assessment of their TQA faculty development program, it is unclear how many of these assessments contributed to the overall assessment of the program. Objectively, it appears that the TQA faculty development program results were somewhat underwhelming, though participants did exhibit some gains that controls did not.

**Perceptions Around the Implementation of HSS Curricula**

Two empirical studies addressed perceptions around the implementation of HSS curricula, both of which used qualitative research approaches (Gonzalo et al., 2016; Sheu et al., 2018). These studies, which were conducted in 2014 (Gonzalo et al., 2016) and 2016 (Sheu et al., 2018), aimed to: investigate students' perceptions of the barriers to, challenges involved in, and benefits of the implementation of an HSS curriculum (Gonzalo et al., 2016), explore how clerkship directors perceive current student roles and the potential for change (Sheu et al., 2018). The Dekhtyary et al. (2019) study, which used a quantitative methodological approach, will also be included in this subsection.

In a conceptual article, Gonzalo, Baxley et al. (2017) note that there are at least seven priority areas for the successful integration and sustainment of HSS in education programs. They argue that it will be necessary to partner with licensing, certifying, and accrediting bodies to raise the curricular importance of HSS. This suggestion is made because of students' perceptions of the barriers to the successful implementation of HSS in medical school curricula. After conducting 12 focus groups with 50 medical students across all years of medical school at PSCOM, Gonzalo et al. (2016) found that students identified four barriers to the implementation of a HSS curriculum: (1) medical board licensing examinations from the NBME foster view of
basic science as core topics; (2) systems concepts are important but not essential; (3) students lack sufficient knowledge and skills to perform systems roles; (4) the culture of medical education and clinical systems does not support systems education. Findings like these have led medical schools that are part of the AMA ACE consortium to partner with the NBME to develop an examination that is based on HSS concepts (Dekhtyar et al., 2019). The authors discuss how a current gap in HSS education is the absence of a tool that will set the foundation for programmatic assessment of HSS competencies and evaluation of HSS curricula. Therefore, they aimed to gather validity evidence to develop a written examination that could evaluate HSS knowledge broadly and efficiently. The Dekhtyar et al. (2019) study is simply a report on the reliability and difficulty of different items and student performance in different content areas.

Sheu et al. (2018) analyzed the transcripts from 23 semi-structured interviews with clerkship directors and site directors prior to the launch of a new four-year medical school curriculum at University of California San Francisco (UCSF). They found that participants identified three major factors that influence clerkship roles for students: student factors, supervisor factors, and context factors. Consistent with the findings from other studies, Sheu et al. (2018) found that student factors such as enthusiasm, engagement, and motivation were key determinants of the student role (and how well they would perform in particular roles) (Gonzalo, Graaf et al., 2018; Hunderfund et al., 2018; Rivera et al., 2020). Again, consistent with the findings from other studies, Sheu et al. (2018) found that supervisor factors that influence the student role include: varied expectations, experience, interest and comfort with teaching, and ability to delegate to students (Gonzalo, Graaf et al., 2018; Rivera et al., 2020).

Like Rivera et al. (2020), Sheu et al. (2018) found that contextual factors in the clinical environment, like patient volume, acuity, and complexity, would influence students’ role. Participants in the Sheu et al. (2018) study described roles of clerkship students that reflected three archetypes: apprentice, academic, and communicator. The apprentice archetype
emphasized carrying out concrete patient care tasks; the academic archetype focused on building medical knowledge as the main task of the clerkship; and the communicator archetype emphasized communication with patients, families, interdisciplinary team members, and outpatient providers. Consistent with the findings from other empirical studies (Gonzalo, Graaf et al., 2018; Polak et al., 2017), Sheu et al. (2018) found that the authenticity and value of student roles were enhanced when they were given autonomy and their efforts were central and necessary in their patients’ care. Sheu et al. (2018) concluded that to move from traditional to transformed clerkship experiences, changes in the three main factors that influence student roles, student factors, supervisor factors, and context factors, would make this possible.

Summary of Key Takeaways: HSS

It is clear that the U.S. health care system is evolving rapidly and it is necessary to educate the physicians of the future to be effective in this new environment. White et al. (2018) propose that the study of HSS will give new physicians a view that is broad enough to encompass the administrative challenges and societal factors that affect health outcomes and can complicate patient care (p. 408). Gonzalo, Graaf, Johannes et al. (2017) argue for an emerging educational model that focuses on systems roles and immersing students in the work of an interprofessional team of providers and mentors in experiences that are tailored to the needs of each clinical site where students are placed. While the HSS literature is consistent in advocating for value-adding roles for students, there are differences in the timing and nature of that immersion in different curricula. HSS is being integrated into medical school curricula in innovative ways. Gonzalo, Dekhtyar, Hawkins et al. (2017) note that future scholarly work will be needed to determine when and where along the training spectrum HSS topics should be introduced. Gonzalo, Baxley et al. (2017) also note that to integrate and sustain HSS curricula there is a need to: develop
comprehensive, standardized, and integrated curricula; develop, standardize, and align assessments; improve the Undergraduate Medical Education (UME) and Graduate Medical Education (GME) transition; enhance teachers’ knowledge and skills, and incentives for teachers; demonstrate value added to the health system; and address the hidden curriculum.

**Defining the Behaviors of a ‘Systems Citizen’**

This dissertation considers a ‘Systems Citizen’ as a member of the health professions who exemplifies the principles of HSS. In reviewing the empirical HSS literature and assessing what opportunities may realistically be available to students to demonstrate that they exemplify the principles of HSS, six behaviors can be identified. A systems citizen is one who (a) shows a commitment to providing the patient with an excellent patient experience by seeking to understand the patient’s perspective, accounting for psychosocial risk factors, and thereby effectively communicating with the patient (Ackerman et al., 2016; Gonzalo, Graaf et al., 2018; Gonzalo, Wolpaw et al., 2018); (b) is dedicated to cost-conscious care and shows an awareness of socio-economic barriers to care, including insurance, that influences the approach to patient care (Gonzalo, Graaf et al., 2018; Gonzalo, Wolpaw et al., 2018); (c) has an orientation of patient care that is consistently interprofessional in nature, drawing on the expertise of other care providers with an awareness of their roles and responsibilities, acknowledging multiple perspectives, and contributing to a holistic and unfragmented patient experience of care (Ackerman et al., 2016; Gonzalo, Graaf, Kass, et al., 2017; Gonzalo, Wolpaw, Graaf et al., 2018; Rivera, Hunderfund et al., 2018; O’Brien, & Wamsley, in press); (d) takes an approach to patient care that shows a working knowledge of health systems, the larger health system, and how care is delivered (including policy, informatics, etc.) (Ackerman et al., 2016; Couzos, 2019; Gonzalo, Ahluwalia et al., 2018; Gonzalo, Graaf, Johannes et al., 2017; Gonzalo, Graaf, Kass, et al., 2017; Gonzalo,
Graaf et al., 2018; Gonzalo, Wolpaw et al., 2018; Pruitt et al., 2017); (e) is confident with QI principles and seeks to conceptualize and apply health systems improvement plans (Baxley et al., 2016; Walsh et al., 2019); (f) demonstrates enthusiasm, engagement, and motivation to affect changes to improve the patient experience and population health while reducing costs (Gonzalo, Graaf et al., 2018; Hunderfund et al., 2018; Rivera et al., 2020). The behaviors identified here are limited by the nature of the interventions reported in the HSS empirical literature. Thus, there may be other behaviors of systems citizens that have not been captured here.

**Empirical Literature on Quality Improvement and Patient Safety**

In their assessment of current drivers and barriers that exist in relation to achieving meaningful and sustainable changes in medical education in the direction of high value, team-based care, Le and Willis (2018) argue that this work will only be successful if we extend beyond quality improvement and patient safety, though these are the “engines that power this movement towards value” (p. 34). Indeed, this claim that the transformation of medical education cannot be limited to QI alone is supported by Gonzalo, Ahluwalia et al. (2018), when they highlight how HSS is not simply about quality improvement tools and methodologies, like plan-do-study-act, Lean, and Six Sigma, even though such tools and methodologies feature fairly prominently in programs nationally. Nonetheless, Bergh, et al. (2016) note that QI has the intention of “improving the health care system to provide better health care” (p. 1), which aligns neatly with HSS and its aims to provide a holistic and comprehensive approach to improving health outcomes and the overall patient experience of care, while simultaneously reducing the per capita cost of health care (Skochelak & Hawkins, 2017).

Wise et al. (2017) argue that performing a hands-on QI project within the constraints and context of a busy clinical service is both a feasible and effective method of teaching QI and
provides value to the health service (p. 49), a sentiment that is consistent in the HSS literature regarding value-added roles that are created for students in HSS curricula. Some of the same drivers for the need to have a third pillar of medical education (HSS) are behind the drive to more fully expose students to QI. In particular, reference is made to the Institute of Medicine’s *To Err is Human*, which brought concepts of patient safety and health care quality to the forefront of medicine (Tartaglia & Walker, 2015), when it estimated that between 44,000 and 98,000 Americans die each year due to preventable medical errors (Kohn, Corrigan & Donaldson, 2000). The Institute of Medicine’s *Crossing the Quality Chasm* (Institute of Medicine, 2001) has also been described as the harbinger of QI (Weigel, Suen, & Gupte, 2013), while others have highlighted the importance of the Institute of Medicine’s 2007 roundtable on evidence-based medicine in reinforcing the significance of patient safety and quality (Butler, Anderson, Supiano, & Weir, 2017).

The adoption of practice-based learning, systems-based practice, and improvement knowledge as core competencies for medical resident education by the Accreditation Council for Graduate Medical Education (ACGME) in 2002 undoubtedly acted as a driver for the inclusion of QI education in the realm of Graduate Medical Education (GME) (Pensa, Frew, Gelmon, 2013), but also likely influenced UME and its educational efforts to prepare students for residency. Also, the Association of American Medical Colleges (AAMC) endorsed the introduction of Patient Safety (PS) and QI topics early in medical school training (Wong, Levinson, Shojania, 2012). This emphasis on QI and PS education appears to be intensifying, as the ACGME has subsequently updated the common program requirements in 2017 to include explicit expectations for QI and PS education and engagement among trainees (Myers & Bellini, 2018). For these reasons, it is imperative that the QI and PS education literature is reviewed when considering the topic of HSS.
Identifying QI/PS Empirical Literature

In order to identify all the empirical literature about QI/PS education, literature searches were conducted using the ERIC, ProQuest, and PubMed databases. A total of 46 empirical articles about QI/PS education that met this study’s eligibility criteria were included here for review. An additional 12 articles were included after hand-searching through the 46 articles and through review of three QI/PS systematic reviews (Kirkman et al., 2015; Ogrinc et al., 2003; Wong, Etchells, Kuper, Levinson & Shojania, 2010). The educational interventions described in the 58 included and eligible studies were implemented between 1990 and 2017. A total of 20 of these empirical articles focused primarily on PS education interventions, while the remaining articles focused primarily on QI education interventions.

The Importance of Time

Several QI/PS empirical studies have found that the success of student QI/PS educational interventions depends on a feasible timeline for projects and enough time dedicated in overall curriculum for QI/PS education (Headrick, Neuhauser, Meinkow & Vanek, 1991; Jackson et al., 2018; Kool et al., 2017; Locke & Kneeland, 2017; Wylie & Leedham-Green, 2017). Findings from QI education studies suggest that there can be unique time pressures associated with conducting QI projects. For example, in their study of 46 fifth-year students in the United Kingdom (U.K.), Wylie and Leedham-Green (2017) found that students can feel underprepared if inadequate time is set aside to brief them on QI project expectations. Both Tartaglia and Walker (2015) and Kool et al. (2017) found that students struggled to get QI projects underway because of difficulties in accessing data they needed; these access to data issues took time to resolve, thereby adding more time pressure to the QI project completion process. Additional time may
also be needed to adequately engage all stakeholders involved in student QI projects (Paulman & Medder, 2002). Indeed, many QI projects are interprofessional in nature and regularly involve the engagement of clinical site and other stakeholders (Anderson, Thorpe, Heney & Petersen, 2009; Berg, Bac, Hugo, Sanders, 2016; Brannan, Russ, Winemiller & Mast, 2015; Chessman et al., 1998; Fowler et al., 2018; Gonsenhauser, Beal, Shihadeh, Mekhjian & Moffatt-Bruce, 2012; Gunderson, Smith, Mayer, McDonald & Centomani, 2009; Headrick et al., 2012; Headrick, Katcher, Nehauser & McEachern, 1994; Headrick et al., 1998; Kutaimy et al., 2018; Leeper et al., 2018; Miller, Winterton & Hoffman, 2014; Shen, Dumenco, Dollase & George, 2016; Tully et al., 2018; Wise et al., 2017). The amount of time students need to spend when conducting QI projects naturally increases because of the larger number of stakeholders who are being engaged in the process.

It is hardly a surprise, then, that Ogrinc, West, Eliassen, Liuw, Schiffman and Cochran (2007) concluded that the time cost of their practice-based learning and improvement (PBLI) module with 83 first-year students was excessive. Headrick et al. (1991) also found that third-year students in their study did not have enough time in their eight-week clerkship to affect any changes in asthma care; however, this outcome is typical of student QI/PS projects. Wise et al. (2017) explain how typical QI projects require iterative cycles of implementation and evaluation, but longitudinal learning attachments and integrating QI learning into day-to-day clinical work are often not feasible because of the demanding nature of regular clinical work. Student QI/PS projects are, therefore, often not required to move from conceptualization to implementation (Ackerman et al., 2016), and an emphasis on the need for quantitative data may also skew student projects towards having short-term goals (Wylie & Leadham-Green, 2017). These time constraints surrounding students’ learning of QI/PS concepts and their experiences with QI/PS projects can have important implications for the clinical learning environments where they are learning.
Benefits and Challenges at Clinical Learning Sites

Student QI/PS projects can have benefits for clinical learning sites, though these projects are not without challenges. Indeed, several studies have found an acute need to identify QI/PS project topics that have benefits for both the clinical sites, where projects are conceptualized and/or implemented, and for the students with respect to their interests and goals (Kool et al., 2017; Jackson et al., 2018; Wylie & Leedham-Green, 2017). Certainly, while QI projects for students are intended as educational interventions, they can have a positive and sustainable impact at clinical sites. In their study of 137 students at the Medical University of South Carolina (MUSC), Fowler et al. (2018) found that the 778 observations students performed while using the TeamSTEPPS® Team Performance Observation Tool (T-TPO) resulted in domain improvements in team structure, communication, leadership, situation monitoring, and mutual support. Furthermore, these improvements at the hospital-based unit were sustained at a 15-month follow-up assessment after the student QI intervention. Fowler et al. (2018) make the case, therefore, that student QI projects can be good data gathering activities for managers and administrators.

Failing to obtain leadership buy-in at clinical sites where students are conceptualizing or implementing QI/PS projects can act as a barrier to the success of student projects. This was the case in the Bac et al. (2015) study where a South African government-led initiative promoting breast-feeding was experienced as a top-down approach to project implementation. This approach resulted in some hospital management resisting students’ work in implementing project plans, which acted as a serious barrier to student project success. Interestingly, Chessman et al. (1998) found that bringing a student into the operation of a clinical site could allow for change to be framed as educational rather than practice-driven, which can position students as agents for change and promote the breaking down of barriers. It is important to note, however, that the Chessman et al. (1998) study only included one medical student among 21 other study
participants. This has important implications about whether medical students could be positioned with enough agency to actually be agents of change. Nonetheless, Chessman et al. (1998) recognized that health professions students in their study had been positive, idealistic, and able to offer fresh perspectives at clinical sites.

Students are not unanimously characterized in this way across all studies. Wylie and Leedham-Green (2017) found that poor student engagement can act as a significant barrier to the success of student QI projects and associated learning from these experiences. Typically, groups of students cycle through the same clinical sites over the course of an academic year. Bac et al. (2015) suggest that educational programs should try to avoid having students work on QI/PS projects that are repeated by different students who rotate through the same clinical site. Indeed, Bac et al. (2015) found that having a mix of short-term projects for students to pursue when rotating through clinical sites was a useful way of keeping both clinical site staff and students engaged in QI projects.

**Countering Student Dissatisfaction**

Finding ways to keep students engaged in QI/PS education is also important to its success, especially since some studies have found that students tend to have mixed responses to QI/PS curricula (Henley, 2002; Mak & Miflin, 2012; Ogrinc et al., 2007), while other studies have reported outright student dissatisfaction with QI/PS educational interventions (Gould et al., 2002; Levitt, Hauer, Ponchelet & Mookherjee, 2012; Neeman et al., 2012). Gould et al. (2002) reported how 77 second-year medical students at the University of Connecticut School of Medicine reported a general dissatisfaction with a patient chart-audit learning experience. Students in that study found the chart-auditing process excessively time consuming and did not
recognize this as a high value educational activity. Specifically, only 16% of the students in the Gould et al. (2002) study gave that QI curriculum a positive rating.

Fisher et al. (2006) aimed to identify major factors and areas of tension in trainees' learning from medical errors. Through structured telephone interviews with 29 residents and 30 medical students, Fisher et al. (2006) found that students and residents wanted more open discussion about medical errors. Indeed, students and residents noted variation and conflict in institutional recommendations and individual actions, and many expressed role-confusion regarding whether and how to initiate discussion after medical errors occurred. Some participants also noted conflict between reporting medical errors to their seniors, who were responsible for their evaluations as students on an educational rotation. These findings have important implications for PS educational interventions and highlight the need for providing learners with a way to report medical errors anonymously, and for having real-life experiences or at least educational environments that mirror the actual clinical environment.

Indeed, several studies have argued that students find real-life QI/PS educational experiences more valuable than traditional classroom experiences (Bae et al., 2015; Berg et al., 2016; Teigland et al., 2013). These real-life experiences allow students to experience first-hand the discrepancies between reality and the ideal (Fisher et al., 2006; Headrick et al., 1991). Headrick et al. (1991) found, for example, that students were able to experience how algorithms for asthma care were at odds with what actually happened with patients with this condition. Students in the Fisher et al. (2006) study reported that learning from actual medical errors was more valuable than learning from near-miss situations. Certainly, these real-life experiences can provide space for students to face dilemmas, which are valuable for learning (Berg et al., 2016). High-fidelity simulation environments have also been found to be valuable for students (Leeper et al., 2018), as have those QI/PS educational activities with experiential value (Leeper et al., 2018; Ranji, Neeman, Sehgal, 2013).
Leeper et al. (2018) have also reported the benefit of teamwork experiences when teaching QI/PS, and medical students are highly receptive to learning from each other (Shah, Kohn, Goyal & Stewart, 2017) and from residents/near-peers too (Raty, Teal, Nelson & Gill, 2017). Near-peer teaching of QI/PS to medical students correlates positively with improved course evaluations (Raty et al., 2017), indicating that there may be opportunities to positively integrate near-peers in QI/PS education. In their study of preclinical medical students embedded with residents on a QI track, Locke and Kneeland (2017) found benefit in a tiered student-resident-faculty member learning structure that is analogous with the structure in the clinical learning environment. Interestingly, faculty members also learn about QI when working with students on QI projects (Wise et al., 2017) which helps to entrench the integration of QI in clinical practice across the spectrum of student, trainee, and faculty physicians.

Thus, while students have widely reported dissatisfaction with QI/PS education, it is evident that there are ways of countering this dissatisfaction. Ensuring that students’ time is spent on activities that they perceive as highly valuable, integrating near-peers into student learning of QI/PS in team-based settings, and designing QI/PS education to include high fidelity simulation or real-life experiences are all examples of ways to improve students’ experience of QI/PS education.

**Drawing Patient Benefits from QI/PS Education**

Studies have also reported patient benefits that flow from student QI/PS educational interventions. Patients are at the heart of why doctors exist, so it is important that they too benefit from student education in QI/PS. In general, it is opportunities to pursue meaningful work while learning QI/PS that matters most to students (Brown et al., 2018; Locke & Kneeland, 2017). It is significant, therefore, that studies report direct patient outcome benefits as a result of student
QI/PS projects (Brannan et al., 2015; Gould et al., 2002; Henley, 2002). Furthermore, student QI/PS projects improve patient safety (Brannan et al., 2015; Sweigart, Tad-y, Pierce, Wagner, Glasheen, 2016), support existing clinical site quality improvement initiatives (Brannan et al., 2015), and result in clinical sites implementing student recommendations for QI (Headrick et al., 1998; Sweigart et al., 2016). Studies have also found that students learn about matters that will directly impact their work as physicians. Students learn about and add knowledge to others about reimbursement (Brannan et al., 2015), cost effectiveness (Gould et al., 2004; Headrick et al., 1994; Headrick et al., 1991), and patient satisfaction (Gould et al., 2004). Kaddan, Poznansku, Amir, Mimouni, and Waisman, (2006) reported that while residents and medical students were learning QI/PS, they were able to contribute meaningfully in a quality assurance initiative by reviewing charts, retrieving positive culture results and attaching them to ED records, and following up with patients. Kaddan et al. (2006) concluded that a combined educational and quality assurance program is feasible, efficient, and productive.

In spite of students’ mixed responses and outright dissatisfaction with QI/PS curricula as reported elsewhere (Gould et al., 2002; Henley, 2002; Levitt et al., 2012; Neeman et al., 2012; Ogrinc et al., 2007), QI/PS projects make students feel like they are making a difference to the health care system (Berg et al., 2016; Brown et al., 2018; Sweigart et al., 2016). This may be why students reportedly were motivated to continue QI/PS practice during the rest of their medical school careers, through their residency training, and into their practice as physicians (Brown et al., 2018; Brown, Greenway, Kwan & Grierson, 2017; Bradham, Sponsler, Watkins & Ehrenfeld, 2018; Paulman & Medder, 2002; Mookherjee et al., 2013; Vinci, Oyler & Arora, 2014). Fowler et al. (2018) found that this motivation was sustained 15 months after a QI education intervention. Similarly, Patey et al. (2007) found that final-year students from the University of Aberdeen in the U.K. maintained their motivation to continue PS practice 12 months after their experience with a patient safety pilot course.
Overreliance on Perception Data

A major weakness of QI/PS education intervention studies is the almost exclusive reliance on perception change data in many studies. Research findings suggest that students’ perceived improvement in their confidence in employing QI/PS skills following participation in QI/PS education (Bac et al., 2015; Brown et al., 2018; Gunderson et al., 2009; Kool et al., 2017; Mookherjee et al., 2013). In addition, following participation in QI/PS education, medical students improved in their: attitudes about QI/PS (Anderson et al., 2009; Thompson et al., 2015; Varkey, 2007); knowledge about QI/PS and understanding of QI principles (Brown et al., 2017; Gould et al., 2002; Levitt et al., 2012; Myung et al., 2012); and appreciation, perceived usefulness, and awareness of PS, patient harm, and how to communicate medical error and causes of PS error (Gunderson et al., 2009; Hall et al., 2010; Jackson et al., 2018; Kutaimy et al., 2018; Moskowitz, Veloski, Fields & Nash, 2007; Myung et al., 2012; Shah et al., 2017; Thompson et al., 2015). The positive changes in perceptions about QI/PS following interventions were most profound for medical students without prior exposure to QI/PS education (Kool et al., 2017).

Findings from QI/PS studies suggest that medical students are infrequently exposed to QI/PS education prior to the time of these studies. Indeed, many medical students report never having exposure to QI approaches like Plan-Do-Study-Act (PDSA) (Blasiak et al., 2014; Shen, Dumenco, Dollase & George, 2016; Teigland et al., 2013), though students do report having more exposure to PS than QI (Blasiak et al., 2014; Teigland et al., 2013). For those students without prior exposure to QI/PS education, the positive changes in perception were more pronounced than for those with previous exposure to QI/PS. Previous exposure to QI/PS education and whether medical students held advanced degrees were also associated with higher knowledge scores in PS (Blasiak et al., 2014).
To demonstrate that QI/PS education initiatives have been successful, many studies rely on positive medical student evaluations of QI/PS pathways, clinical blocks, tracks, modules, courses, and exercises (Bradham, Sponsler, Watkins & Ehrenfeld, 2018; Dysinger & Pappas, 2011; Elghouche et al., 2016; Ferguson & Lamb, 2015; Halbach & Sullivan, 2005; Headrick et al., 1998; Leeper et al., 2018; Mak & Miflin, 2012; Neeman et al., 2012; Patey et al., 2007; Paulman & Medder, 2002; Teigland et al., 2013). Students are reported as perceiving QI/PS as needing to be part of their medical education curriculum and being important for their future careers (Brown et al., 2018; Shen et al., 2016; Teigland et al., 2013), equal to basic and clinical sciences (Teigland et al., 2013), and important for their development as physicians (Bradham et al., 2018). Students have reportedly perceived QI/PS as being more adequately covered in their medical school curricula when there have been targeted QI/PS curricular interventions at their medical schools (Gould et al., 2004). Also, students were found to be more likely to perceive that physicians were responsible for improving the health care system, following QI education (Gonsenhauser et al., 2012). While reporting findings on perception data, in itself, is not entirely problematic, it matters with respect to QI/PS education, because findings reported from objective data, like knowledge tests, have not shown QI/PS education interventions to be particularly effective.

The Failure of QI/PS Education Interventions: Poor Student Outcomes

QI/PS education interventions have not contributed convincingly to lead to improvements in students’ ability to write clear problem statements, use measurements to improve skills, to implement structured plans to test a change (Tartaglia & Walker, 2015), or to evaluate plans for implementing a quality change (Levitt et al., 2012). These are essential skills associated with demonstrating proficiency in QI. Furthermore, in some cases knowledge of QI concepts have not
improved following a QI education intervention (Levitt et al., 2012). Wylie and Leedham-Green (2017) posit that the need for quantitative data in QI interventions skews students towards short-term projects. In one study (Mookherjee et al., 2013), student Quality Improvement Knowledge Application Tool (QIKAT) scores actually declined after a pilot QI/PS elective involving six senior medical students was implemented. The QIKAT assesses an individual’s ability to decipher a quality problem within a complex system and propose an initiative for improvement (Singh et al., 2014).

There have been studies, however, that have reported positive outcomes based on objective data. Some studies have reported improvements in QI/PS knowledge following QI/PS education for medical students (Gonsenhauser et al., 2012; Kerfoot et al., 2007; Kutaimy et al., 2018; Leeper et al., 2018; Madigosky, Headrick, Nelson, Cox & Anderson, 2006; Miller & Hoffman, 2015; Miller et al., 2014; Patey et al., 2007; Mookherjee et al., 2013; Sweigart et al., 2016). A critical appraisal of these findings, however, raises questions about the substance behind these conclusions. Mokherjee et al. (2013), for example, tested only six students before and after a two-week advanced QI/PS elective for senior medical students using a knowledge test that was first used by Levitt et al. (2012). Levitt et al. (2012) were testing, *inter alia*, improvements in student knowledge acquisition before and after a one-year longitudinal integrated clerkship (LIC) experience. Students were first asked to answer the questions “What does PDSA stand for?” and “What does CQI stand for?” (Levitt et al., 2012). Then, students were presented with nine phrases and asked to determine whether each one should be defined as “structure”, “process”, or “outcome”. This basic knowledge test seems to lack the depth needed to test student knowledge acquisition after a year-long LIC doing QI (Levitt et al., 2012) or student knowledge acquisition after a two-week advanced elective in QI/PS (Levitt et al., 2012). Similarly, Kutaimy et al. (2018) used a 10-item multiple choice question (MCQ) directly before and after a 3-hour PS and QI workshop to conclude that students had gained knowledge about
While it may not have been their intention to measure the sustainability of students’ knowledge acquisition, it would be expected that students in this context should be able to improve in their performance on almost any short basic MCQ test directly following a workshop on the topic(s) covered in that test.

Gonsenhauser et al. (2012) reported that students showed improvement on the QI knowledge section of their post assessment survey. However, their pre and post survey simply asked medical students to answer with a scale from “strongly agree” to “strongly disagree” to prompts such as, “I have an understanding of what quality improvement initiatives are” (Gonsenhauser et al., 2012, p. 39). Thus, what Gonsenhauser et al. (2012) referred to as improvements in the QI knowledge section of their post assessment survey, was most accurately an improvement in students’ perceptions of their knowledge of QI. Other studies also reported on students’ improvements in self-ratings of knowledge, rather than demonstrating improvements in an actual knowledge test (Brown et al., 2017; Miller & Hoffman, 2015; Miller et al., 2014; Patey et al., 2007; Sweigart et al., 2016).

Two studies appeared to base findings of student improvement in QI/PS knowledge, following a QI/PS educational intervention, on more robust data (Kerfoot et al., 2007; Leeper et al., 2018). Leeper et al. (2018), however, provide little indication about the nature of the 25-item MCQ that was used to measure student improvement in QI/PS knowledge. Leeper et al. (2018) noted that their questionnaire underwent “rigorous critique” and an “editorial process based on feedback from content experts using a modified Delphi technique” (p. 1269). The traditional Delphi technique is a widely used and generally accepted method for gathering data from respondents within their domain of expertise (Hsu & Sanford, 2007). The technique works by delivering a series of questionnaires, using multiple iterations to collect data from a panel of experts. Leeper et al. (2018) provided no further information relating to how the Delphi technique was modified, nor any sample of the questions asked of students, was provided to the
reader. Madigosky et al. (2006) also failed to provide any additional information relating to the nature of the five knowledge questions they used to assess student learning following PS education. While they included all other attitude and skill items from their questionnaire in their report, they did not provide any samples of their knowledge items. Kerfoot et al. (2007), on the other hand, described a rigorous question-development process that involved: a panel of content experts reviewing their initial 33-item MCQ test, a piloting process involving 18 medical students answering the test, and the elimination of 7 items following point-biserial correlation and Kuder-Richardson 20 calculations being performed for each test item. While there are no sample test items for the reader to view, Kerfoot et al. (2007) provide some description about how the 26-item MCQ knowledge test they administered to 693 medical students over two years who a reliable and valid test of PS and US health care system knowledge. The Kerfoot et al. (2007) study therefore stands out as an anomaly among the ten studies cited in this review of the literature, that reported improvements in QI/PS knowledge following QI/PS education for medical students. Nonetheless, there have been other kinds of benefits of QI/PS education cited in the literature that are worth noting.

Following QI/PS education interventions, studies have reported improvements in students’ ability to identify an area for educational improvement (Brown et al., 2017) and to propose more robust PS solutions (Hall et al., 2010). Brown et al. (2017) also found that students were able to better formulate plans to test QI changes and Denton et al. (2015) showed how knowledge of QI concepts improved after a PS education intervention. While the QIKAT is not a validated tool for assessing student knowledge of QI/PS, some studies were able to show improvements in QIKAT scores after the implementation of a QI/PS education intervention (Ferguson & Lamb, 2015; Ogrinc et al., 2007; Sweigart et al., 2016). While the validity of the findings from many of these studies still remains a question, there have still been contributions
from the research suggesting a wide range of benefits to medical students participating in QI/PS educational activities which would not normally result from traditional medical education.

A Wide Array of Atypical Benefits

There has been a wide array of benefits attributed to students who participate in QI/PS education that fall outside of what would normally result from traditional basic and clinical science education. QI/PS education interventions reportedly help medical students build skills in professionalism (Bac et al., 2015; Newell, Harris, Aufses & Eilozy, 2008) and contribute to their professional development (Chessman et al., 1998; Elghouche et al., 2016). The QI/PS education literature also suggests that there are improvements in students’ communication skills (Bac et al., 2015; Brannan et al., 2015; Fowler et al., 2018) and management skills (Bac et al., 2015; Fowler et al., 2018), including situation monitoring and decision-making skills (Jackson et al., 2018), as a result of student participation in QI/PS education curricula. Students are also reported to produce and engage in scholarly activity and build associated skills following QI/PS education interventions (Bac et al., 2015; Elghouche et al., 2016; Neeman et al., 2012; Miller & Hoffman, 2015; Varkey, 2007; Wise et al., 2017). In addition, students have been found to build health advocacy and leadership skills (Bac et al., 2015; Fowler et al., 2018; Jackson et al., 2018; Sweigart et al., 2016).

A significant emphasis is QI/PS education is interprofessional collaboration (Shen et al., 2016) and student participation in QI/PS education has resulted in interprofessional and cross functional collaboration (Anderson et al., 2009; Brannan et al., 2015; Headrick et al., 2012) and a reported improvement in understanding of student selves and others (Berg et al., 2016). Paradoxically, a lack of knowledge about the roles of others has been cited as both a result and a barrier for interprofessional success in PS/QI education (Headrick et al., 2012). Nonetheless,
many studies cite findings of improved teamwork in the clinical learning environment, mutual support, and collaboration between students and other health professions as a result of participation in QI/PS education initiatives (Bac et al., 2015; Brannan et al., 2015; Fowler et al., 2018). Although these benefits have been noted, there is still much to be learned about when to implement QI/PS education initiatives in medical student curricula, what the goals of QI/PS education should be, and what assessment measures should be used to evaluate these initiatives.

Learning from the Literature

While there are still many unknowns in the QI/PS literature, studies have contributed by providing perspective on a range of matters related to QI/PS education. Shen et al. (2016) concluded from their study with 120 rising third-year medical students, for example, that it is possible to make QI teaching and learning fun. Specifically, teams of interprofessional students were asked to assemble Mr. Potato Head patterns, to debrief, and re-strategize their approach as a way of experientially learning about QI. Kutaimy et al. (2018) integrated a similar approach that included having interprofessional students draw and redraw pigs.

Other studies have noted the noticeable role of emotions in student responses while participating in PS education (Fisher et al., 2006; Kutaimy et al., 2018). Given the time constraints surrounding students being able to actually implement QI/PS initiatives, Wylie and Leedham-Green (2017) have suggested, from their findings involving 46 students at a very large medical school in the U.K., that assessment of QI/PS should focus on what is done rather than what was accomplished. Given this context, Kool et al. (2017) note that finding ways of acknowledging work that students have done on QI projects remains a concern. Kool et al. (2017) also remained concerned about staff workload at clinical sites and the ability to be able to accommodate practical student QI projects. Similarly, due to its technical nature, Headrick et al.
(2012) reported that all six universities in their study had difficulties associated with scheduling interprofessional and QI/PS education initiatives, which may indicate the need for embedding these initiatives throughout the curriculum.

While there are still aspects of QI/PS education that educators are grappling with, it appears certain from the literature reviewed here that many faculty members still lack QI expertise (Headrick et al., 2012; Henley, 2002) and faculty mentorship/support for medical students who are working on QI/PS interventions is a clear determiner of student and project success (Brannan et al., 2015; Henley, 2002; Jackson et al., 2018; Levitt et al., 2012; Wylie & Leedham-Green, 2017).

**Summary of Emergent Themes: Quality Improvement/Patient Safety**

It is evident that the need to improve patient outcomes and improve the value of care in the U.S. have been the impetus for the simultaneous rise of QI education and the establishment of HSS as the third pillar of medical education. Although HSS is not limited to QI education, QI is a major vehicle for the movement towards value. QI projects appear most successful when dedicated faculty mentorship is available to students and the amount of time allocated to QI interventions is of particular importance. There is still debate about when and how to integrate QI and PS education into UME but an increasing number of scholars are suggesting that it is necessary to also expose students to these topics in the preclinical years in a manner that allows them to apply the concepts they learn. Documented approaches to teaching QI appear still to be underdeveloped and the assessment of QI education interventions is still largely dependent on student perceptions. While there have been mixed responses to QI/PS education from students, several atypical benefits attributed to students, because exposure to this education, have been reported in the literature.
Conceptual and Theoretical Frameworks

Like HSS is poised to be the educational change that transforms the physicians of the future to be systems-ready, QI/PS education has also been framed as having a transformative potential. The primary objective in most QI/PS curricula is learning the principles and methods of QI/PS, with common educational content, including QI science and skills, safety incident analysis, and systems thinking (Wise et al., 2017). Students typically encounter QI/PS through three main groups of activities: (1) formal curricula; (2) educational activities that impart specific skills related to safety or quality; and; (3) real-life QI initiatives that involve students as active or passive participants (Wong et al., 2012). It is where students are active participants in real-life QI initiatives that Bergh et al. (2016) claim that a student can experience a transformative shift in her/his worldview. They argue that the complexity of real-world contexts provides numerous experiences to stimulate transformative learning and that this process has long been recognized as an outcome of service learning, where students participate in community projects.

Transformative Learning Theory

Transformative learning has been discussed in a limited way in the medical education literature since 2006. Van Schlakwyk, et al. (2019) conducted a scoping review of how transformative learning is currently represented in the health professions education literature, including how it influences curricular activities. Covering the period of January 2006 to May 2018, they were able to consider 99 full-texts that met their eligibility criteria (Van Schlakwyk et. al, 2019). Of the 99 texts that were considered, 52 represented nursing while only 24 represented programs in medical education. Nonetheless, transformative learning theory took the center stage in health professions education (HPE) when Frenk et al. (2010) declared, in the Lancet
Commission’s seminal article on HPE, that realizing the next generation of educational reforms in the health professions “will require a series of instructional and institutional reforms, which should be guided by two proposed outcomes: transformative learning [emphasis added] and interdependence in education” (p. 1924).

Within this context, it is little surprise that Saxena (2019) claims that transformative learning theory “offers health professional educators great promise to exploit the enriched perspective it provides to transform their learners, themselves and their institutions” (p. 534). Indeed, the possibilities for transformative learning theory appear numerous, especially with respect to settings where medical students are active participants in unfamiliar surroundings (Van Schalkwyk et al., 2019). It is noteworthy that these opportunities for students to be engaged outside of the conventional classroom are on the rise. Crampton, McLachlan, and Illing (2013) report that it is an increasing trend in clinical training to allocate students to sites (urban, peri-urban and rural) away from the tertiary health care center. Tertiary health care centers are hospitals that provide tertiary care, which is a level of care obtained by specialists after referrals from primary care providers.

Along with the trend towards engaging students away from the tertiary health care center, there are increasing educational efforts to prepare students to function in the new, interprofessional, team-based healthcare environment of the future. Gonzalo, Wolpaw, and Wolpaw (2018) contend that HSS is “an innovation that is truly transformational in process and outcome, resonating beyond medical school curricula” (p. 1431). They continue by stating “we wholeheartedly believe that the full incorporation of HSS as the third educational pillar is transforming an institutional culture as well as the hearts and minds of future physicians” (Gonzalo, Wolpaw, & Wolpaw, 2018, p. 1433). Indeed, there are unique opportunities to challenge meaning schemes of team members who are working in interprofessional teams. The
diverse backgrounds and experiences of interprofessional team members provides the appropriate canvas for a transformational picture.

Transformative learning theory provides us with a framework for how this transformation in individuals happens. Bringing members of the team into a critical assessment of their assumptions and exploring options for new roles, relationships, and actions, will require a deliberate effort if transformative learning is the goal of medical education, in general, and HSS, in particular. Mezirow’s (1978) research about women’s re-entry education programs in community colleges provided us with a way for understanding perspective transformation in that context. Not without its limitations or criticisms, transformative learning theory has provided adult educators with a robust framework for understanding the process of perspective transformation. It seems appropriate that this new movement towards shifting physicians’ perspectives about their roles and responsibility to communities, should be understood through the lens of transformative learning theory.

Although transformative learning theory provides a robust framework for understanding the process of perspective transformation, Rogers’ (2003) diffusion of innovations theory will contribute to understanding HSS education in uniquely positive ways. As will be discussed, transformative learning theory has been criticized for being too egocentric and for providing an analysis that fails to adequately account for the social context in which learning takes place. The diffusion of innovations framework is concerned with understanding the process by which an innovation is communicated and then adopted by individuals within a social system. The emergence of HSS as the third pillar of medical education and the new perspectives future physicians must have of their role as a consequence, can be considered an innovation that requires adoption or rejection. Rogers (2003) articulates diffusion as a kind of social change whereby alteration occurs in the structure and function of a social system. Although primarily concerned with individuals and their status with respect to the adoption of innovations, the diffusion of
innovations framework served as a useful balancing lens alongside transformative learning theory, given its overarching focus on how innovations diffuse within social systems. The transformative learning theory and diffusion of innovations theory frameworks, which served as the conceptual and theoretical lenses for this dissertation, will be discussed in detail below.

**Basic Premises of Transformative Learning Theory**

Following his study of re-entry programs for women in community colleges in the U.S., Mezirow (1978) developed a transformative learning model that described the learning processes that led participants in his study to experience significant change in the ways they understood their identity, culture, and behavior, which he labeled “perspective transformation” (Keily, 2005, p. 7). Mezirow’s theory of perspective transformation was the seminal contribution to what has become the broader concept of transformative learning and has arguably remained the most robust theoretical elucidation of learning in the whole corpus of literature concerned with transformative learning (Hoggan, Mälkki & Finnegan, 2017). Mezirow (1990) defined perspective transformation as:

> the process of becoming critically aware of how... we perceive, understand, and feel about our world; of reformulating these assumptions to permit a more inclusive, discriminating, permeable, and integrative perspective; and of making decisions or otherwise acting upon these new understandings. (p. 14)

Since Mezirow’s seminal perspective transformation work, many definitions of transformative learning have emerged. As examples, Cranton (2006) defined transformative learning as “a process by which previously uncritically assimilated assumptions, beliefs, values, and perspectives are questioned and thereby become more open, permeable, and better justified” (p. vi), while Hoggan (2016) described transformative learning as the “processes that result in significant and irreversible changes in the way a person experiences, conceptualizes, and interacts...
Mezirow (2003) defined transformative learning as learning that “transforms problematic frames of reference – sets of fixed assumptions and expectations (habits of mind, meaning perspectives, mindsets) – to make them more inclusive, discriminating, open, reflective, and emotionally able to change” (p. 58). In this definition, he makes reference to several key concepts that will be described below.

Mezirow (2000) notes how a frame of reference is a “meaning perspective”, which is the structure of assumptions and expectations through which we filter “sense impressions” (p. 16). He continues by explaining how a frame of reference is comprised of two dimensions: a habit of mind and resulting points of view. He maintains that one interprets the meaning of one’s experiences using a set of assumptions that act as a filter for the interpretation (Mezirow, 2000). These “broad, generalized, orientating predispositions” are termed “habits of mind” (p. 17). Habits of mind, he claims, become expressed as points of view made up of clusters of meaning schemes, which are “specific expectations, beliefs, feelings, attitudes, and judgments” that “tacitly direct and shape a specific interpretation and determine how we judge, typify objects, and attribute causality” (p. 18). He adds that meaning schemes commonly function outside of awareness and they “suggest a line of action that we tend to follow automatically unless brought into critical reflection” (p. 18). As captured in the definitions of transformative learning that have been discussed in this section, it is clear that there is a process associated with transformative learning.

Mezirow’s (2000) transformative learning model includes the following nonsequential learning processes: 1) a disorienting dilemma, 2) self-examination with feelings of fear, anger, guilt or shame, 3) a critical assessment of assumptions, 4) recognition that one’s discontent and the process of transformation are shared, 5) exploration of options for new roles, relationships, and actions, 6) planning a course of action, 7) acquiring knowledge and skills for implementing one’s plans, 8) provisionally trying new roles 9) building competence and self-confidence in new
roles and relationships, and 10) a reintegration into one’s life on the basis of conditions dictated by one’s new perspective. Others have conceptualized their own models. Nohl (2015), for example, has proposed a five-phase model that maps out a nondetermining start and continuation that leads to a phase of experimental and undirected inquiry, a phase of social testing and mirroring, a shifting of relevance, and finally a social consolidation and reinterpretation of biography. Nerstrom (2014), too, presents her own phases of a transformative process model, but unlike Mezirow’s phases, “this representation follows a more sequential order where all phases of the model are encountered” and “entry to the phase can begin in any segment” (p. 327). The four phases of her model are “having experiences, making assumptions, challenging perspectives, and experiencing transformative learning” (Nerstrom, 2014, p. 327). Indeed, there are myriad revisions and adaptations of Mezirow’s original ten phases of individual perspective transformation and some that follow a course entirely of their own; as examples see Daloz (1999), Keagan (1982), and Dirkx (1998). Yet, all proposals are tied to each other by the presence of fundamental components of transformative learning theory like reflective discourse, critical reflection, and a change in action resulting from revised assumptions. For Arnold and Prescher (2017), then, “it can be concluded that the goal of transformative learning is to question and put into perspective our self-conception of the world” (p. 287). There is an orientation towards action embedded as a fundamental feature of transformative learning theory.

Hoggan et al. (2017) suggest that there has long been a praxis orientation underlying Mezirow’s theory of transformative learning and that ideas from Freire (1970) and Habermas (1984) have been absorbed into it. Mezirow (1991) describes praxis simply as the “creative implementation of purpose” (p. 12). He believes that perspective transformation is the most valuable form of praxis, and it begins with the exploration and rational reconstruction of our frames of references, resulting in the ability to overcome epistemic, psychological, and sociolinguistic distortions in our frames of reference through reflection facilitated by
collaborative discourse – ultimately creating the possibility to think and act differently (Hoggan et al., 2017). It is important to acknowledge that Mezirow (2003) recognizes the validity of Habermas’ (1984) instrumental, communicative, and emancipatory domains of learning, as these ideas are embedded in the essence of transformative learning theory. Instrumental learning is about controlling and manipulating the environment, with emphasis on improving prediction and performance, a kind of technical knowledge. Habermas (1984) argued that the knowledge needed to understand each other through language has been called practical or communicative knowledge, while a third type of knowledge named emancipatory knowledge is derived from questioning instrumental and communicative knowledge. For Habermas (1984), the goal of adult education is to help adult learners become more critically reflective through their participation in rational discourse and action, so that they might advance developmentally by moving toward meaning perspectives that are more inclusive, discriminating, permeable, and integrative of experiences. It is at this point of ‘critical reflection’ that Freire’s (2005) concept of critical consciousness is of most relevance, in that the learner’s critical self-reflection is inextricably intertwined with the learner’s environment. Intransitive, semi transitive, and critical consciousness are three stages or levels of consciousness coined by Freire. In the intransitive stage, individuals accept their lives unquestioningly and their lack of interest in investigation is “accompanied by an accentuated taste for fanciful explanations, by fragility of argument, by a strongly emotional style, by the practice of polemics rather than dialogue, (and) by magical explanations” (p. 14). In the semi-transitive consciousness state, Freire (2005) posits that people show an awareness of their problems but cannot connect those problems with the outside world (p. 14). The most sophisticated stage of consciousness, critical consciousness, involves one achieving an in-depth understanding of the forces that shape one’s life space and becoming an active agent in constructing a different, more just reality (Freire, 2005).
Summary of Key Issues and Concerns

There are still a number of unresolved issues around transformative learning theory. Laros (2017) examines, for example, how there is little consensus in the transformative learning theory literature about the nature or form of this disorientating dilemma. Daloz (2000), for example, rejects Mezirow’s (1978) original idea that a disorientating dilemma could be a sudden or single event, when he argues that “closer examination reveals that a change or shift was a long time coming and its possibility prepared for in myriad ways, generally across years” (p. 106). Others, like Nohl (2015), reject the notion that a disorientating dilemma is required to start the transformative learning process at all, when he contends, “no direct line exists between the first and novel event encountered by the actors and the subsequent transformative learning process” (p. 39). For Nohl (2015), then, “the process of transformative learning begins when novelty, neither anticipated nor planned, breaks into life” (p. 39). Whether it be a single event, a culmination of experiences, or a ‘novelty’, the transformative learning process begins with the introduction of a new variable, one that challenges the learner’s habits of mind or points of view.

Transformative learning theory has also been criticized for its tendency to stress the cognitive dimension at the expense of the emotional and social dimensions and the situatedness of learning processes (Illeris, 2004). Merriam (2004) questioned the cognitive and rational components of transformative learning theory when she asked, “what about ‘connected knowing’ and ‘interdependence…?’” (p. 66). Dirkx (2006) and Taylor (2009) have, in particular, argued for increased attention to the emotional dimension of transformative learning. Proposing an alternate view, Cranton and Roy (2003) propose, “the central process of transformative learning may be rational, affective, extrarational, experiential, or any combination of these depending on the characteristics of the individual and the context in which the transformation takes place” (p. 90). Mäkki (2010) argues that Mezirow does not ignore the influence of emotions as is often
claimed, though she does admit that transformative learning theory does not consider the nature, role, and origins of emotion explicitly, and thereby, gives emotion a subordinate role. Illeris (2014), likewise, claims that for several years, Mezirow had carefully mentioned in his writings that emotions and social relations are involved in the transformative learning process, though he acknowledges that meaning perspectives, frames of reference, and sometimes, also, habits of mind have remained the target areas of transformative learning.

Another major criticism launched at transformative learning theory is that it is too egocentric for those who see the goal of adult education as social action because of its emphasis on individual transformation (Merriam, Caffarella & Baumgartner, 2007). Christie, Carey, Robertson, and Grainger (2015) argue that the influence of context in transformative learning has to be better understood and accounted for and that “diversity in terms of class, ethnicity, gender, and sexual orientation has to be addressed” (p. 13). Merriam et al. (2007) highlight how both Freire and Mezirow have been criticized for romanticizing the social change process. Newman (1994) maintains that both Mezirow and Freire “start with the oppressed or the person trapped within a culturally induced dependency role, and both require these victims to liberate themselves, albeit with the help of the dialogic or transformative educator” (p. 241). In a somewhat different take on the criticisms launched at transformative learning theory, Mälkki and Green (2014) suggest that meaning perspectives can be seen as unique compilations of shared social resources and, as such, individuals and identities are fundamentally relational and do not exist independent of their social contexts. Nonetheless, in his critical review of transformative learning theory research from 1999 to 2005, Taylor (2007) argues that the transformative learning literature needs to give greater attention to “the role of context, the varying nature of the catalysts of transformative learning, the increased role of other ways of knowing, the importance of relationships and an overall broadening of the definitional outcome of a perspective transformation” (p. 174). Certainly, the broadening of the definitional outcome of perspective
transformation through research might counteract arguments like those made by Newton (2012) that transformative learning is nothing more than “good learning”.

**Transformative Learning Theory in HSS and QI/PS Education**

In one particular research study, where medical students from South Africa had been placed in rural areas through their involvement in QI projects during a district health rotation (Bergh et al., 2016), the authors use a transformative learning theory lens to understand the experience of students. In this discussion, Bergh et al. (2016) argue that when students participate in community QI projects, they are engaging in a specific type of service learning. They continue by noting that transformative learning is a process that has long been recognized as an outcome of service learning (Bergh et al., 2016, p. 1). They make reference to Kiely’s (2005) longitudinal case study where he researched the experience of 57 undergraduate students who participated in a service-learning immersion program in Puerto Cabezas, Nicaragua from 1994-2005.

Students in the service-learning program were engaged in different types of service-work related to health prevention, including: neighborhood assessments, health clinics, hospital work, skits, and workshops (Kiely, 2005, p. 9). Using Mezirow’s (1991) transformative learning theory as a model, Kiely (2005) highlighted ‘dissonance’ as a critical element in how students experience the transformational process in service learning. He explains that dissonance occurs frequently, because what students see, feel, touch, hear, and participate in is new and incongruent with their frame of reference or worldview (p. 10). From his longitudinal data, Kiely (2005) found students experienced historical, environmental, physical, economic, political, cultural, spiritual, social, communicative, and technological dissonance (p. 11). He claims that the intensity of dissonance leads to different types of learning. Low-intensity dissonance like
experiencing difficulties with communicating in another language or adjustment to new modes of transport resulted in instrumental or communicative forms of learning (Kiely, 2005, p. 11). High-intensity dissonance, on the other hand, often causes “powerful emotions and confusion and leads study participants to reexamine their existing knowledge and assumptions regarding the causes and solutions to ambiguous and ill-structured problems such as extreme forms of persistent poverty” (Kiely, 2005, p. 11). Kiely (2005) found that there was an important interconnected and dialectical relationship between the cognitive and affective dimensions of the transformative learning process. He found that students used various individual and social learning strategies to cognitively process their interactions and service-related experiences in Nicaragua but also connected to their experiences in the affective domain (Kiely, 2005). A key finding from his study was that:

> the reflection and dialogue entailed in processing the service-learning experience has limited transformative impact on students’ empathic understanding, sense of moral affiliation to Nicaraguans, and ongoing political engagement unless it is understood emotionally, viscerally, and affectively [emphasis added] (Kiely, 2005, p.17).

Kiely’s (2005) work has several significant implications for the use of transformative learning theory in medical education.

From Kiely’s (2005) study, we have rich longitudinal data that provides a deeper understanding regarding the intensity of dissonance that may be required to foster transformative learning experiences for students. One of the risks in medical education is that researchers may mistake instrumental or communicative learning to be representative of emancipatory learning, which leads to deep, structural, qualitative shifts in learners and their meaning schemes. Brooks, Magee, and Ryan (2018), for example, report from a pilot study with 50 medical students that a one-hour guided bus tour through disadvantaged public housing neighborhoods had fostered a transformative learning experience for students. During the bus tour, students were instructed to note their emotions on index cards and these emotions were discussed in a short debriefing
session at the end of the tour. While the bus tour may have engaged students in difficult emotions and perhaps even encouraged students to critically examine some of their assumptions, there is no cited evidence of a permanent change in behavior by students who may have adopted new worldviews as a result of their participation in the study. Instead, the authors suggest that students’ written responses to the question “what will you do differently as a result of your experience?” at the end of the bus tour was enough to suggest that students were motivated to pursue careers in medical service as a result of their participation in the guided bus tour (Brooks et al., 2018, p. 2), and that this was an indication that the intervention had fostered a transformative learning experience for students. Studies like these raise questions about whether medical education, with its long-standing rational positivist history, can make space for educational efforts that might result in students responding “emotionally and viscerally to the various forms of dissonance they experience” (Kiely, 2005, p. 12). There does appear to be a levelled openness to transformative learning experiences and the potential consequences, though.

Saxena (2019) cautions that, in educational settings, a disorienting dilemma should be carefully structured and even inviting to encourage the learner to commence the transformative learning journey. He further advises that all learners will need support as there is “a considerable affective component associated with ‘meaningful’ disorientating dilemmas” and so educators must be “careful to prevent derailment at the outset for some learners on whom the impact of transformative learning opportunities is severe” (p. 535). It is encouraging to note Saxena’s (2019) claim that extra-rational discourse, based on feelings and intuition, and relational transformative learning, connected knowing, “are just as important as rational (thinking) discourse” (p. 535). Yet, even his choice of words gives some indication that the HPE field has some way to go in truly recognizing that other ways of knowing are not extra, or not a way of thinking. The point here is that this indeed appears to be a prime moment in the history of medical education to incorporate the goal of transformative learning in curricula, but we cannot
underestimate how unfamiliar this terrain will be to the environment and its educators. Like proponents of HSS are going to great lengths to authentically integrate it as the third pillar of medical education, so, too, the authentic goal of transformative learning will require a concerted and deliberate effort in the approach to educating medical students.

As is evident in the discussion about value-adding roles that are being conceptualized for students in HSS curricula, there are an increasing number of unfamiliar environments that students will likely be exposed to in their training. Saxena (2019) notes that less familiar territories include caring for a patient in the home setting and experiences in advocating for the addressing of inequalities and subjugation. As already mentioned, Bergh et al. (2016) made the argument that when students participate in community QI projects, they are engaged in a specific type of service learning, which is associated with transformative learning experiences. We might accept that students’ value-adding roles are a kind of service learning, too, and that the context is increasingly in unfamiliar environments. With the process of transformative learning theory in mind, educators could design curricula that are supportive of transformative learning processes, as students perform in their value-adding roles. Also, transformative learning could provide researchers with a theoretical lens to be able to assess the extent to which HSS curricula are facilitating transformative learning processes.

Gonzalo, Wolpaw et al. (2018) argue that transformational changes in health care delivery and evolving perspectives on physician roles are precipitating a major re-visioning of medical education. Gonzalo, Graaf, Johannes et al. (2017) report that participants in their study believed that by performing systems roles, students could develop a different perspective on health care delivery and the patient experience. They felt that in identifying and addressing barriers to care, students have the opportunity to appreciate firsthand the fragmentation of the health care system and participate in efforts to overcome those gaps to improve outcomes (Gonzalo, Graaf, Johannes et al., 2017). With respect to HSS, Davis and Gonzalo (2019) claim...
“students who do fully embrace this component of medical education can experience a shift in their learning processes or perspectives, changing the way they study or the questions they ask patients and preceptors” (p. 243). We see the language of transformative learning theory firmly embedded in the language used in the HSS literature, as demonstrated by the citations above. Applying the theoretical framework of transformative learning theory in the design and assessment of HSS curricula might facilitate authentic shifts in students’ perceptions of physicians’ roles and could provide insight into whether students are actually being transformed into systems-ready physicians of the future. This will not be without challenges as transformative learning is difficult to neatly identify, as already mentioned earlier in this account.

**Diffusion of Innovations Theory**

The diffusion of innovations theory has been applied to a wide range of studies in areas including hybrid seed corn, modern math, antibiotic drugs, and HIV/AIDS prevention (Haider & Kreps, 2004). Dearing and Cox (2018) argue that diffusion of innovations is applicable to the complex context of health care, for both explanatory and interventionist purposes. Indeed, diffusion of innovations has been applied to understand the health care and medical education contexts. Grymonpre et al. (2016), for example, used the diffusion of innovations theory to explore the sustainable implementation of interprofessional education in the health care environment, and concluded that there is value in using this theory to guide implementation, sustainability, and scale-up of interprofessional education within a higher education institution. Since the first edition of Rodgers’ *Diffusion of Innovations* book in 1962, there have been myriad studies from the health care environment that have applied the diffusions of innovations theory (Rodgers, 1983), making this a suitable framework to supplement transformative learning theory in this dissertation.
Basic Premises of Diffusion of Innovations Theory

There are four main elements in the diffusion of innovations theory (Rodgers, 2003). These four elements are innovation, communication channels, time, and the social system. This section will describe each of these elements.

Innovation

Rodgers (1983) defined an innovation as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (p. 11). Rodgers (2003) highlights how it is the perceived newness of the idea that will determine whether it is an innovation, not necessarily how new the idea might actually be. There are five characteristics of innovations in the diffusion of innovations framework.

Not all innovations are equivalent units of analysis, and the characteristics of innovations, as perceived by individuals, help to explain their different rates of adoption (Rodgers, 2003). The five characteristics of innovations are: relative advantage, compatibility, complexity, trialability, and observability. Relative advantage is the degree to which the innovation is perceived as better than the idea it supersedes, and the rate of adoption of an innovation is correlated with how advantageous an individual perceives an innovation to herself/himself. Compatibility is the degree to which an innovation is perceived as being consistent with an individual’s existing values, beliefs, past experiences, and current needs. Complexity is the degree to which an innovation is perceived as difficult to understand and use, and new ideas that are simpler to understand and use are associated with more rapid adoption by individuals. The degree to which an innovation may be experimented with on a limited basis is the trialability characteristic of innovations. An innovation that is trialable is representative of less uncertainty for individuals,
and less uncertainty correlates with greater and more rapid adoption of innovations. *Observability* is the degree to which the results or impact of an innovation are visible to others; the easier it is for individuals to see the results of innovation, the more likely they are to adopt.

Another concept introduced by Rodgers (2003) is that of *re-invention*. Certain innovations are flexible in nature, and adopters who implement them are able to re-invent the innovations in different ways. This concept introduces the idea that when an individual adopts an innovation, this is not necessarily a passive action of simply implementing a standard template of the new idea.

**Communication Channels**

Communication channels are the means by which messages get from one individual to another (Rodgers, 2003). At the core of the diffusion process is the information exchange by which one individual communicates a new idea to one or several others. Rodgers (1983) described the diffusion process as involving (1) an innovation, (2) an individual or unit that has knowledge of the innovation, (3) another individual or unit that does not yet have knowledge of the innovation, and (4) a communication channel that connects the two units. The most effective channels of communication for persuading an individual to adopt a new idea are *interpersonal channels*, which involve a face-to-face exchange (Rodgers, 2003). *Mass media channels* are all those means of transmitting messages that involve mass medium, like newspapers, social media, and television.

Rodgers (1983) also introduced the concept of *homophily*, which is the degree to which pairs of individuals who interact are similar with respect to, as examples, beliefs, education, and social status. More effective communication occurs when individuals communicating with each
other are homophilous, though one of the most distinctive problems in the communication of innovations is that participants are usually quite heterophilous.

Time

Rodgers (1983) posited that time is involved in diffusion in (1) the five-step innovation-decision process, (2) innovativeness, and (3) individuals’ rate of adoption of an innovation. The five main steps of the innovation-decision process include: knowledge, persuasion, decision, implementation, and confirmation (Rodgers, 2003). Knowledge occurs when an individual is exposed to the innovation and gains understanding of how it works. Persuasion refers to when an individual forms either a favorable or unfavorable attitude towards the innovation. When an individual engages in activities that lead to a choice to adopt or reject the innovation, the decision has occurred. Implementation occurs when an individual implements an innovation, or puts it to use. Re-invention typically occurs at the implementation stage. When an individual seeks reinforcement of an innovation decision that has already been made, confirmation has occurred. If an individual is exposed to conflicting messages about the innovation during the confirmation stage, she/he may reverse their decision to adopt the innovation.

Innovativeness refers to the degree to which an individual is relatively earlier in adopting new ideas than the other members of that system (Rodgers, 2003). The rate of adoption is the relative speed with which an innovation is adopted by members of a social system. The rate of adoption is usually measured by the length of time required for a certain percentage of the members of system to adopt an innovation. Relative to other members of their social system, individuals are categorized according to their innovativeness. The five adopter categories are: innovators, early adopters, early majority, late majority, and laggards. At the extreme ends of the
spectrum of innovativeness, innovators are active information seekers about new ideas while laggards are the last in a social system to adopt an innovation.

**A Social System**

Rodgers (1983) defined a social system as “a set of interrelated units that are engaged in joint problem solving to accomplish a common goal” (p. 24) and members of a social system may be individuals, informal groups, organizations, and/or subsystems. The differences that exist between social systems can be accounted for in their differing structures. A *structure* can be defined as “the patterned arrangements of the units in a system” (Rodgers, 1983, p. 24). The structure of a social system can facilitate or impede the diffusion of an innovation in that system.

The social system can have a formal or informal *communication structure* (Rodgers, 2003). The formal communication structure in a school, for example, might consist of hierarchical positions where higher-ranked principals or superintendents would have the right to issue orders to individuals of lower rank, and their orders would be expected to be executed. The established behavior patterns for the members of a social system are the system’s *norms*. In medical education, these *norms* are what is termed the *hidden curriculum* (Hopkins, Saciragic, Kim & Posner, 2016). The social system also has an important kind of influence on how innovations can be adopted or rejected.

An individual, independent of the decisions of other members of the system, can adopt or reject an innovation through *optional innovation-decisions* (Rodgers, 2003). *Collective innovation-decisions* are those choices to adopt or reject an innovation that are made by consensus among the members of a system, where all the individuals/units in the system must usually conform to the system’s decision once it is made. Where a choice to adopt or reject an
innovation is made by a relatively few individuals in a system who possess power, status, and/or technical expertise, an *authority innovation-decision* has been made.

The consequences of any of these decisions can be classified as *desirable* or *undesirable*, depending on whether the effects of an innovation in a social system are functional or dysfunctional (Rodgers, 2003). Also, *direct* and *indirect* consequences can be classified depending on whether the changes to an individual or social system occur in immediate response to an innovation, or if they occur as a second-order result following the direct consequences of an innovation. Finally, *anticipated* versus *unanticipated* consequences are classified depending on whether the changes are recognized by the members of a social system as intended, or not.

There are different roles that certain individuals play in a social system, and each of these roles has an effect on the diffusion of an innovation (Rodgers, 2003). While the most innovative member of a system is often perceived as a deviant from the social system, there are members of the system who function in the role of *opinion leaders*. Opinion leaders are those who provide information and advice about innovations to many in the system. Opinion leadership has been defined as “the extent to which an individual is able to influence other individuals’ attitudes or overt behavior informally in a desired way with relative frequency” (Rodgers, 1983, p. 27). Opinion leaders typically have extensive *communication networks*, which are interconnected individuals who are linked by patterned flows of information. *Change agents* are often professionals who influence their clients’ innovation decisions in a direction that is deemed desirable by a change agency. An *aide* is a less than fully professional change agent who is usually more homophilous with their average client, and thereby provide one means of bridging the heterophily gap frequently found between professional change agents and their audience.
Summary of Main Criticisms of Diffusion of Innovations Theory

Rodgers (1995) identified four main criticisms of diffusion of innovations research. These were: (1) a pro-innovation bias, (2) the individual blame bias, (3) the recall problem, and (4) the issue of equality. The pro-innovation bias is the implication in diffusion of innovations research that innovations should be adopted by all members of the social system, and that the goal is for them to be diffused more rapidly, and that innovations should be neither rejected nor reinvented (Haider & Kreps, 2004). The individual blame bias is the tendency of diffusion of innovations researchers to hold an individual responsible for her/his problems, rather than to hold responsible the system to which the individual belongs. Given the importance of time in diffusion of innovations research, the dependence on unreliable recall data from participants has been referred to as the recall problem (Rodgers, 1995). This recall problem tends to emerge when respondents are required to recall the date they adopted a new innovation, in order to reconstruct their part history of innovation experiences. The issue of equality is an important criticism of the diffusion of innovations theory. The issue of how the socioeconomic benefits of innovation are distributed within a social system has not been given sufficient attention in diffusion of innovations research.

Chapter Summary

This chapter began by describing the context that has necessitated changes in the undergraduate medical education curriculum. The prevalence of avoidable medical errors, poor patient outcomes, and the high cost of care have caused medical educators to reimagine medical education, to prepare students to be able to address these systemic healthcare issues. Since the early 1900s, physicians in the U.S. have been at the forefront of societal changes related to health
issues, and the emergence of HSS as the third pillar of medical education is an effort to prepare the physicians of the future to take leadership in addressing the systemic issues in health care today. Systems-ready physicians of tomorrow will need to embrace the Quadruple Aim for improvement of population health, patient care experiences, provider work life, and cost reduction. This will require a shift in how future physicians perceive their role in relation to patients, other people in the health professions, and the entire health care system.

Some medical students are already espousing the principles of HSS and incorporating a shifted perspective of their role as future physicians. Transformative learning theory provides a robust framework for understanding perspective transformation, and will be an appropriate lens to employ in this dissertation. Yet transformative learning theory has been criticized for being too egocentric and for providing an analysis that fails to adequately account for the social context in which learning takes place. The diffusion of innovations theory will, therefore, serve as an important supplementary lens to understand how HSS has been communicated and then adopted by individuals within this particular social system.

Findings from the HSS and QI/PS empirical literature overlap in numerous ways. Education in HSS and QI/PS has repeatedly had positive implications for patients, students, and clinical sites, while also giving students opportunities to learn about the roles and responsibilities of other health care providers in interprofessional teams. Also, faculty in general lack expertise in HSS and QI/PS, which is concerning since faculty mentorship is a key determiner of whether educational interventions in this subject area will be successful. These studies also reveal that students have variable responses to HSS and QI/PS education and often express dissatisfaction for tasks that are not traditionally associated with physicians. However, while these studies may recognize factors that have facilitated and/or inhibited learning, none consider what makes some students more intrinsically open, engaged, and likely to engage in new HSS-related experiences. Finding what factors cause students to have a voluntary interest in HSS, or why they find it
acceptable to adopt this educational innovation, would address an area in the HSS literature that has never been explored.
Chapter 3

METHODOLOGY

The purpose of this study was to explore why some fourth-year medical students exemplify the principles of HSS, and how they came to incorporate these principles into their perspectives on the role of a physician. In many ways, the existing HSS literature focuses on broad imperatives driving the need for change in medical education curricula with little attention to how educators can support medical students towards a shift in perspective on the role of a physician. This research study contributes to understanding how learners are experiencing the recently developed medical educational model (Skochelak & Hawkins, 2017) intended to redefine what is understood to be the role of a physician, and will provide insight into the process that leads students to exemplifying the principles of HSS. Based on the purpose of this study, this research was guided by the following research questions:

1. How do students who exemplify the principles of HSS perceive the process of how they experience a shift in their perspectives on the role of a physician?

2. What key experiences have they had that helped them begin to embrace the principles of HSS, both before medical school and since being in medical school?

3. What role has the support or influence of others had in contributing to their exemplification of the principles of HSS?

4. What are their perceptions of what needs to happen in order for the system to really change?

I begin this chapter with a brief overview of the qualitative research paradigm and describe some of the general assumptions of this methodology. Since I will conduct a basic interpretive qualitative research study, particular attention is given to describing that type of
study. I then provide a discussion of my own background in relationship to the study and participants. Next, I discuss how this study was conducted in compliance with procedures set forth by the Pennsylvania State University College of Medicine Human Subjects Protection Office, how participants were selected, the data collection and analysis procedures and methods, and an overview of the verification strategies used to enhance the dependability and confirmability of findings. I end the chapter with a summary of the chapter.

**Qualitative Research Paradigm**

Qualitative research is an iterative process which improves understanding to the scientific community by making new significant descriptions resulting from getting closer to the phenomenon studied (Aspers & Corte, 2019). Denzin and Lincoln (2018) argue that qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what she studies, and the situational constraints that shape inquiry. Merriam and Tisdell (2016) support this claim with their assertion that qualitative researchers draw on the philosophies of constructivism, phenomenology, and symbolic interactionism through interest in how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences (p. 15). Yilmaz (2013) notes that qualitative research focuses on the study of people, cases, phenomena, social situations, and processes in their natural settings in order to reveal in descriptive terms the meanings that people attach to their experiences of the world (p. 312). This emergent, inductive, interpretive and naturalistic approach (Yilmaz, 2013) is thus appropriate for this study which explores why and how fourth-year medical students come to incorporate the principles of HSS into their perspectives on the role of a physician.
General Assumptions of the Method

Merriam and Tisdell (2016) identify six common types of qualitative research, namely: narrative analysis, ethnography, grounded theory, phenomenology, qualitative case study, and basic qualitative or interpretive research. Each of these types of qualitative research answer different types of research questions and have distinctive characteristics. Narrative analysis attends to chronological, story-oriented research questions and how life experiences of individuals unfold over time (Creswell, Hanson, Plano Clark, & Morales, 2007, p. 239). Grounded theory is differentiated by its focus on building theory (Corbin & Strauss, 2015) while ethnography is centrally concerned with culture (Willis & Trondman, 2000) and commits to conveying the meaning of participants lives with thick descriptions (Merriam & Tisdell, 2016, p. 30). Phenomenology pays particular attention to describing the lived experiences of researchers and participants alike (Gio  

Basic Interpretive Qualitative Research

The most common form of qualitative study in the field of education is the basic interpretive qualitative study (Merriam, 2009). A basic qualitative research design was chosen as the qualitative research approach of best fit for the purpose of this dissertation research. To some
extent a basic interpretive study, may draw on certain elements of other qualitative designs, though are not representative of these designs in the purest sense (Merriam & Tisdell, 2016). For example, this study takes place in the context of a medical school culture, but it will not make use of long-term observation in that culture specifically so it is not really an ethnographic study. Further, constant comparative analysis is a data analysis method that comes out of grounded theory, and this study made use of this data analysis method, but its intent is not to create a theory, so it is not a grounded theory study. While to some extent I am interested in students’ narratives of learning HSS, I will not be doing narrative analysis so it is not really a narrative study. Hence it is best conceived of as an interpretive study.

Merriam and Tisdell (2016) highlight how a central characteristic of all qualitative research is that individuals construct reality in interaction with their social worlds and that constructivism underlies what they term *basic qualitative research*, or interpretive research. Jonassen (1991) explains how constructivism holds that the mind is instrumental and essential in interpreting events, objects, and perspectives on the real world, and that those interpretations comprise a knowledge base that is personal and individualistic. In general, qualitative researchers conducting a basic qualitative study, therefore, would be interested in (a) how people interpret their experiences, (b) how they construct their worlds, and (c) what meaning they attribute to their experiences (Merriam & Tisdell, 2016). This study sought to explore why some fourth-year medical students exemplify the principles of HSS, and how they came to incorporate those principles into their perspectives on the role of a physician. In other words, this study is concerned with how some medical students have interpreted their life experiences to construct their systems-orientated perspective on the role of a physician.

To further demonstrate why a basic qualitative research design is most appropriate for this study, it is helpful to explore the difference between basic research and applied research. Merriam and Tisdell (2016) explain how research is typically divided into the categories of *basic*
and *applied*. The goal of basic research is to extend knowledge about a particular phenomenon. While basic research might eventually inform practice, its primary goal is to contribute more knowledge about a phenomenon. This differs from applied research where the purpose is to improve the quality of practice of a particular discipline. Also, researchers conducting applied research are addressing a different audience that includes policymakers and administrators to improve the way things are done. Given that the goal of this study is to understand why and how some fourth-year medical students more readily incorporate the principles of HSS into their perspectives on the role of a physician, a basic qualitative research approach is the most appropriate choice. Understanding my own background as the researcher is also important and is discussed next.

**Background of the Researcher and IRB Compliance**

It is important in qualitative research for the researcher to consider her or his background in relationship to the study and to also conduct research in light of Institutional Review Board (IRB) compliance.

**Researcher Background**

In all forms of qualitative research, the researcher is the primary instrument for data collection and data analysis, and the background of the researcher can introduce biases and subjectivities into the research being conducted (Merriam & Tisdell, 2016) if safeguards are not in place. Indeed, no qualitative data collection or interpretation can be completely unbiased and objectivity is simply not a possibility (Lincoln & Guba, 1985), even in most quantitative research.
It is therefore important to make visible my background and describe how the collection and interpretation of data in this study may have been influenced accordingly.

The Department of Medicine, in which I am employed, is the largest Department at the academic medical center and has comprehensive educational programming. The Department is made up of eleven divisions and two sections. There are a total of 138 residents and fellows from the Department’s Internal Medicine Residency Program and from its 15 fellowships. All approximately 150 third-year medical students rotate through a compulsory six-week Medicine Clerkship annually, in three calendar blocks. In my role as the Education Strategy and Planning Manager, I directly supervise an office of five full-time professional coordinators who coordinate the educational activities of the clerkship, residency, and fellowships in the Department. I also manage three financial cost centers with annual budgets totaling approximately $8,500,000. With my fourteen years of experience in international teaching and higher education, and my current status as a doctoral candidate in Lifelong Learning and Adult Education, I partner with clerkship, residency, and fellowship directors to continually improve the programs from an educational standpoint. I conduct education-related research in the Department and present data to various key stakeholders within the Department and the institution.

In my leadership role in the Department of Medicine at the participating academic medical center, I am also exposed to a wide array of issues that are impacting my local health care system and I am convinced that changes in the broader U.S. health care system are necessary to reduce costs and improve quality of care. This conviction makes me biased in favor HSS, since it is the only existing educational approach explicitly attempting to prepare future physicians for non-biomedical specific changes in the U.S. health care system. This motivates me to understand how and why some medical students demonstrate a greater commitment to the principles of HSS than others and makes me especially sensitive to learning from them. In spite of being a leader in the Department, I suspect that I will be viewed as non-threatening to the
medical students I intend to interview because I am not a physician and my role exists to advocate for learners of all levels and to support and extend the educational mission of the Department.

Since HSS is about preparing future physicians for a rapidly changing health care system and for equipping them to lead this change, it is important to describe my own assumptions about system change. My own philosophy of adult education for system change is aligned with humanistic and progressive philosophies (Elias & Merriam, 2005). I view adult learners as having the answers to their problems and skilled adult educators as being those who can create learning environments that are conducive for individual potentials to be unlocked. I absolutely have faith in the power of education to bring adult learners into a greater realization of their unlimited potential, but I acknowledge that education is but one modality for this process or moment. I place value on experiences, but recognize that learners must choose to learn from these experiences for them to be meaningful. In formal education spaces, dialogue with others and critical reflection on experiences are key for learning. In this way, I see the importance of the cognitive and social dimensions of learning. More particularly for contexts outside of formal learning spaces, I recognize somatic ways of knowing as contributing to how people learn. All this to say, my own philosophy of adult education for social change is focused on individuals. It is my view that those who have a critical self-awareness of their assumptions and are able to recognize the potential assumptions of others, are those who are able to motivate others along a path of change. I certainly bring all of these assumptions into my collection and analysis of the data in this study.

While I do not view myself as radical, I do acknowledge that there are many factors that may create additional barriers that prevent individuals from self-actualizing. Informed by a critical perspective to some degree, my own philosophy of adult education for social change recognizes that gender, race, sexuality, nationality, and economic status are some of the factors that make it more difficult for adults to progress along their path of self-actualization. Although
considered incompatible with humanism by some scholars, I see the critical perspective as enriching my own philosophy which focuses on the individual learner within the background of their social influences. In terms of this study, I must recognize that my perspective and experiences as an educated, heterosexual, White male have inevitably guided my interpretation of students’ perspectives. Equally, my history as a South African born citizen who has lived and worked in The People’s Republic of China, The Kingdom of Saudi Arabia, the United Arab Emirates, and the United States of America has influenced how I interpreted student perspectives.

Through my role in the Department of Medicine, I am not directly involved in the medical school curriculum. While my work has included contributing ideas to how to design and implement HSS courses in subjects like Patient Safety, the scope of my influence is contained within the Department of Medicine and its operations. Medical students typically rotate through the Department of Medicine in three, six-week blocks for their Medicine Clerkship, whereas the Department’s residency and fellowship programs are managed directly at the local level. As a consequence, much of role is focused on the Department’s graduate medical education programs. I am directly involved in the design and implementation of HSS educational offerings in the Department’s internal medicine residency program.

**Research Ethics and IRB Compliance**

This research study was conducted in compliance with procedures defined by the Pennsylvania State University College of Medicine Human Subjects Protection Office. The Institutional Review Board (IRB) determined that this study met the criteria for exempt research according to the policies of the institution and the provisions of applicable federal regulations. IRB approval was obtained prior to beginning this research study. In compliance with the IRB procedures, consent forms were obtained from all interviewed participants. Participants also
provided signed consent to the interviews being recorded, and they were informed about how the data would be transcribed and how their information would be protected. After the recorded interviews were transcribed, all identifiable information was removed and pseudonyms were used in place of participants’ actual names. Data security was maintained by storing the recordings of interviews in password-protected files that were only accessible to the researcher on a university database with state-of-the-art security and duo authentication.

**Participant Selection**

Qualitative research generally makes use of a purposeful sample (Creswell, 2014). Fourth-year medical students at a single academic medical center in the Eastern region of the United States who met particular criteria were eligible for this study. I made use of specific strategies to identify medical students who were mostly likely to have adopted, at least to some extent, an HSS paradigm or approach to medical practice. My assumption was that those who volunteered to participate in COVID-19 electives even though they did not need additional credit to graduate, were most likely to have done so. Purposeful sampling in this study was based on the idea that the researcher can discover, understand, and gain insight from a deliberately selected, information-rich sample or case (Patton, 2015). Since all fourth-year medical students had already completed their requirements for graduation at the time of this study, those who enrolled voluntarily in HSS COVID-19 electives were invited to participate in this study. There were 17 COVID-19 electives in which students could voluntarily enroll. These HSS electives were focused on giving students opportunities to make contributions to the health system, without being directly exposed in person to patients.

Since the purpose of this study was to explore why some fourth-year medical students exemplify the principles of HSS, and how they came to incorporate these principles into their
perspectives on the role of a physician, it was appropriate to favor using students’ voluntarily enrollment in the COVID-19 electives as an indicator of their commitment to the principles of HSS, when arriving at the purposeful sample. It was imperative that only fourth-year medical student were eligible to participate, since they would be the medical students best positioned to exemplify the principles of HSS in clinical practice.

In addition to inviting fourth-year medical students enrolled in COVID-19 electives to participate in this study, fourth-year students who had enrolled in a year-long longitudinal Health Systems Science Academy elective were also invited to participate. The HSS Academy elective is an interdisciplinary course where medical students have the opportunity to work alongside nurses, chaplains, nurse practitioners, hospital administration and financial personnel to implement a systems project. Students were taught in greater depth the HSS concepts that they would have had exposure to in the mandated HSS lectures throughout medical school.

Finally, during each of the interviews, I asked participants to name students in their class who they recognized as exemplifying the principles of HSS. This method of purposeful sampling is referred to as snowball, chain, or network sampling and is arguably the most common form of purposeful sampling (Merriam & Tisdell, 2016). No new students, outside of the initial selection criteria, were identified through snowball sampling.

Initially, all 14 fourth-year medical students who were enrolled voluntarily in COVID-19 electives were invited to participate in this study. Of these invited students, ten students agreed to participate, but one of these ten students was unable to keep the scheduled interview time and I was unable to reschedule a time to interview with her. A further five students who were enrolled in the HSS Academy elective were invited to be interviewed, and three of these agreed to participate in the study. All six students who were identified through snowball sampling were already enrolled in the COVID-19 or HSS Academy electives.
Participant Profiles

Overall, 12 fourth-year medical students were interviewed for this study. Seven of these participants were male and five were female. The 12 participants were entering 10 different specialties, or specialty combinations, for residency training. Participants in this study were aged at approximately 25-35 years old. Participants were assigned the following pseudonyms: Abheer, Brianna, Caitlin, Dianne, Duong, Garry, Lucy, Martin, Mary, Patrick, Paul, and Robert, and are described below based on their specialty, their primary influencers, and key experiences related to HSS.

**Abheer.** Abheer was about to enter into residency training in Anesthesiology when I interviewed him. He had studied biomedical engineering in his undergraduate studies. Though Abheer was most powerfully influenced by physician role models during his clinical experiences in medical school, he also worked at Epic, a well-known Electronic Medical Record (EMR) company, prior to starting medical school. For him, this experience was an opportunity to get insight into physician workflows, and also introduced him to the interprofessional nature of a physician’s work.

**Brianna.** Brianna’s dad is a trauma surgeon and he was a positive role model who had a major influence on her perspective on the role of a physician. Brianna was driven to serve her patients in whatever ways she could, because of the meaning she made from experiences with her father, who she described as a patient advocate. Brianna was entering Urology for residency at the time of her interview with me. In relation to the principles of HSS, Brianna emphasized how these principles became increasingly relevant to her as she gained more clinical experiences in her third and fourth years of medical school.

**Caitlin.** Caitlin’s mother is a general pediatrician and her father is an oncologist for adults. Caitlin became interested in population health and cost-conscious care through her
experiences with a formal HSS curriculum, through the influence of a near-peer Pediatrics resident mentor, and through her clinical experiences during an Indian Health Services rotation. Caitlin was acutely aware of health system issues because of the meaning she made from her parents’ experiences as physicians. Caitlin gained unique understanding about the physician-patient relationship through the example of her mother and how she worked with patients. She also had experiences with her family members having significant health diagnoses and a health concern of her own; these experiences were significant in shaping her perspective on the role of a physician. Caitlin was about to enter into a Pediatrics residency program at the time of our interview.

Dianne. Dianne emphasized her religious background as a Mennonite Christian as being important in her perspective on the role of a physician and how she has approached her interactions with patients. Dianne highlighted how the meaning she made from experiences with family members who had serious health diagnoses, had an important influence on her. Also, Dianne had pre-medical school experiences where she volunteered as a translator at a free clinic and where she worked as a caregiver for patients with disabilities; the meaning she made from these experiences gave her an orientation to patient care that was cost-conscious and acutely sensitive to the patient’s perspective. She also had a physician advisor who had a significant influence on her perspective on the role of a physician. Dianne remarked about how her clinical experiences were more influential in shaping her perspectives than her experiences in formal lectures. Dianne was entering an Internal Medicine residency program.

Duong. In 2010, Duong immigrated to the U.S. from Vietnam. He described growing up in a resource-limited familial environment and the meaning he made from this background caused him to be sensitive to the cost of care for patients. Uniquely, Duong worked as a medical scribe and as a medical technician in two different health systems one year after completing his undergraduate studies, just before he started medical school. The meaning he made from these
experiences gave him a view of the role of the physician within a interprofessional health care team, and helped to stress for him the importance of clear communication with patients and colleagues. Duong was entering into an Emergency Medicine residency at the time of our interview.

**Garry.** Garry’s father is a chemist and inspired him to have a love for the sciences and for academic pursuit. Garry’s mother was diagnosed with acute myeloid leukemia (AML), which resulted in significant experiences with the health care system for him. He interacted with physicians and other health care workers, which influenced him to have an interprofessional orientation embedded into his perspective on the role of a physician. The meaning Garry made from his significant exposure to the health care environment during his mother’s years of treatment, resulted in him having insight into how to communicate effectively with patients as a physician. Through his mother’s health journey and the insurance and financial struggles his family experienced, Garry also became acutely sensitive to the cost of care and the barriers to health care that patients face. Garry earned his place in a merit-based scholarship program during his undergraduate studies, which resulted in him participating in a like-minded cohort. The meaning he made from his experiences in this cohort, in addition to experiences he had through his participation in like-minded clubs during his college years, also had a significant influence on Garry’s perspectives on the role of a physician. Garry completed a minor in Anthropology in his undergraduate degree. This education, and his participation in a three-month educational trip to Ecuador while conducting ethnographic research, had a significant influence on his perspective on the role of a physician. Garry was entering a combined Internal Medicine/Pediatrics residency at the time of our interview.

**Lucy.** Before entering medical school, Lucy worked as a social worker. This work experience gave her first-hand exposure to how policy impacts the daily work of health care workers. Lucy took a keen interest in advocating for her patients through policy, once she started
medical school. During Lucy’s undergraduate studies, she majored in Philosophy. She recognized this academic background as influencing her view on the role of a physician. During her undergraduate studies, Lucy participated in several global educational trips. Lucy recognized a trip to El Salvador as being particularly influential in broadening her worldview. Also, the meaning Lucy made from a global educational trip to Uganda, and interactions while there with a physician with an educational background in Philosophy, significantly influenced her perspective on the role of a physician. Lucy’s experiences in working with exemplary, systems-orientated physicians during her clinical rotations, were also influential in shaping her perspective on the role of a physician. Lucy was entering an Internal Medicine residency program at the time of our interview.

**Martin.** Martin expressed how there was a strong sense of pragmatism underlying his view on the role of a physician. After being unsuccessful in two successive application cycles to medical school, Martin gained work experience for approximately three years in various roles. For him, these work experiences gave him opportunities to learn practical skills for the job and to gain the interpersonal skills needed to effectively do his work. Through his own life experiences, Martin gained a special appreciation for the patient’s perspective. Also, Martin expressed a commitment to value-based care, with an acute awareness of the cost of care. Martin’s perspective on the role of a physician was also significantly influenced by the meaning he made from his positive experiences with exemplary physicians during clinical rotations. Martin was entering a Surgery residency at the time he interviewed with me.

**Mary.** Mary’s perspective on the role of a physician was strongly influenced by a moral framework. She articulated several ways in which she was motivated, in any particular situation, to do the right thing. Mary’s religious background, and the meaning she made from her experiences with her father and grandfather while growing up, were significant in influencing her perspective on the role of a physician. Also significant in shaping Mary’s view on the role of a
physician was her pre-medical school experience as a Certified Nursing Assistant (CNA). Through this work experience, Mary adopted an orientation to patient care that was markedly interprofessional in nature. Mary highlighted how her participation in a health equity clerkship had a significant influence in shaping her perspective on the role of a physician to include patients’ socio-ecologic factors. Mary was entering an Obstetrics and Gynecology residency at the time of her interview with me.

**Patrick.** Patrick had significant exposure to the health care system throughout his life because of his need for multiple operations resulting from a rare genetic bone disorder. The meaning he made from this exposure significantly influenced his perspective on the role of a physician. In particular, Patrick had a special appreciation for the patient’s perspective, the importance of the physician-patient relationship, and the roles played by non-physician health care workers in the care of patients. Patrick’s view on the role of a physician was also influenced through his clinical experiences. He participated in a Longitudinal Integrated Clerkship (LIC) model, where he participated in all of his clerkships in a one-year program, in a single health system. This gave him the opportunity to work with the same patients, following them through various settings and specialties as they received care. Patrick had the view that this experience allowed him to gain a systems-thinking perspective. He was also motivated in the future to advocate for patients by educating medical students and trainees in approaching patient care in a systems-conscious manner. Patrick was entering an Internal Medicine residency program at the time of his interview with me.

**Paul.** Paul had significant exposure to the health care system through accompanying his grandfather through his journey with Parkinson’s Disease. Paul’s grandfather, and all of the family on his maternal side of the family, was deaf. Paul experienced the brokenness of the health care system when his family interacted with it and often encountered difficulties in getting physical interpreters to be present. Paul participated in several global educational trips and the
meaning he made from these experiences gave him a systems-orientation in his perspective on the role of a physician. Indeed, in the context of exaggerated systems issues in places like Zambia, Paul grew to appreciate the need to be resource efficient and cost conscious. Paul also formed his perspective on the role of a physician, in alignment with the principles of HSS, through his participation in formal experiential HSS-related courses like a patient navigation course. The meaning Paul made from his pre-medical school work experiences in a hardware store was also influential in the formation of his perspective on the role of a physician. Paul communicated believing strongly in advocating for patients by being visible and integrated into the communities in which they serve. Paul was entering into a Family Medicine residency at the time of our interview together.

**Robert.** Robert worked as a medical scribe in an emergency department in the year after his undergraduate studies, in the year before he started medical school. The meaning he made from his work experience had a significant influence on his perspective on the role of a physician. Robert’s participation in a health equity clerkship and a longitudinal patient navigation course was also formative in his systems-conscious view on the role of a physician. Robert highlighted how significantly his view on the role of a physician was influenced, through working with a particular pulmonary/critical care fellow who was careful to consider systems issues in his discharge planning for patients who were also prisoners. Robert was entering into a combined Emergency Medicine/Internal Medicine residency program at the time of his interview with me.

**Data Collection and Analysis Methods**

Denzin and Lincoln (2018) suggest that the word *qualitative* implies an emphasis on the qualities of entities, processes, and meanings that are not experimentally examined or measured in terms of quantity, amount, intensity, or frequency (p. 8). Indeed, Polkinghorne (2005)
articulates how qualitative research is inquiry aimed at describing and clarifying human experience as it appears in people’s lives. The most common data collection methods in qualitative research are interviews, observations, and analysis of relevant documents and artifacts (Merriam & Tisdell, 2016). To gather data to describe and clarify medical students’ relationship with the principles of HSS and their reasons and process for demonstrating commitment to these principles, this study’s primary method for collecting data was through semi-structured, face-to-face interviews that lasted for approximately 60 to 90 minutes each, as well as documents such as curricula documents relevant to their academic program.

**Interviewing and its Use in the Study**

In many fields, interviewing is likely the most common form of data collection in qualitative studies (Merriam & Tisdell, 2016). Interviews are often the major source of qualitative data used to uncover the essence of an individual’s experience (Merriam, 2002). Interviews allow the researcher to reach areas of reality that would otherwise remain inaccessible, such as people’s subjective experiences and attitudes (Perakyla & Ruusuvuori, 2011). Indeed, semi-structured interviews were appropriate for allowing opportunities for me to obtain rich descriptive data regarding the meaning of students’ transformative learning experiences and provided an opportunity to examine and focus on meaning questions in-depth (Merriam, 2009).

In this study, each participant was interviewed once and a list of questions that I prepared ahead of time was used to provide some structure to the interviews. Consistent with the general format of semi-structured interviews, the wording of the questions was considered fluid and new questions were spontaneously added in response to ideas presented by interviewees during the interviews (Merriam & Tisdell, 2016). Each interview started with a casual conversation that was
aimed at putting the participants at ease. After these pleasantries, interviews were audio- and video-recorded with participants’ permission and transcribed verbatim.

Since transformative learning involves deep, structural, qualitative shifts in learners and their meaning schemes/perspectives (O’Sullivan, 2003), I asked participants several questions aimed at exploring their current assumptions about the role of a physician and whether those assumptions have changed or developed over time. For example, I asked, “In the course of your life, did you always view the role of a physician in the way that you do now?” to identify whether participants acknowledged any transformation in their perceptions on the role of a physician. In Rogers’ (2003) diffusion of innovations theory, there are five characteristics of innovations, as perceived by individuals, that explain their different rates of adoption; these characteristics are: relative advantage, compatibility, complexity, trialability, and observability. During the interview, I asked questions that were aimed at understanding why participants could be early adopters of the HSS innovation. For example, I asked, “What is your motivation or intention for adopting an HSS perspective or approach?” to identify what the participants perceive to be the nature of the HSS innovation, and how that relates to their adoption of an HSS approach. Participants were also be asked, “Is there something that I did not ask you today that I should have?” at the end of the interview, to provide another opportunity for participants to potentially overcome my limitations in being able to ask all the right questions.

**Document Analysis and its Use in the Study**

Documents are an important source of data in qualitative research that are often available, stable, and richly descriptive with contextual clues, and are a record that an event or phenomenon has taken place (Lincoln & Guba, 1985). Using documents to verify or support what participants
have revealed in interviews, for example, can be a way of triangulating the data and showing that the study’s findings are not simply an artifact of a single method (Patton, 2015).

In this study, curricula documents were most relevant, as well as documents such as reflection papers that students may have written during their study of HSS. Indeed, these documents were an important reference point as students referred to the timing of particular HSS courses or to other important milestones in their medical school journey. Such documents were already generated and provided an additional source of data.

Merriam and Tisdell (2016) also discuss the possibility of research generated documents or artifacts where the research might generate a document or artifact with the participants during the course of the study. As such, all participants were asked to complete a journey map (see Appendix B) of the most important self-identified milestones in their lives that had caused them to demonstrate a commitment to the principles of HSS (Howard, 2014). Participants mapped any high or low points in their lives that they perceived as having some influence in their commitment to the principles of HSS. The y-axis represents the type of emotions, with negative emotions on the bottom and positive emotions on the top of the axis. The x-axis represents time and participants were able to choose any starting point in their lives, but had to arrange their milestone experiences chronologically. These journey maps were not only be helpful for participants to refer to during their interview to remind them of their important experiences, but, more importantly, they were another reference point to verify that the moments that matter most to participants were captured in the data analysis.

**Data Analysis**

Lichtman (2014) argues that the goal of qualitative analysis is to take a large amount of data that may be without clear meaning and interact with it in such a way that one can make sense
of what has been gathered. To make sense of the information contained in the transcripts from the interviews of this study, the constant comparative method of data analysis was used. The constant comparative method is often associated with data being analyzed from a grounded theory study (Merriam, 2002) but is used in many qualitative studies, including in this interpretive study.

Just as the theoretical frameworks of transformative learning theory, and diffusion of innovation theory, as well as the principles of HSS guided the development of the interview guide, they also to some extent guided the analysis of data. Nevertheless, a researcher does not want to close down the data that might not have anything to do with these theoretical frameworks. Just as in any qualitative study, shortly after each interview, I transcribed the recorded interviews. Following the first interview, I used open coding of the transcript to develop names and categories from that raw data, without directly considering the theoretical framework. Open codes were related to each other, as part of the next step of the constant comparative method: Axial coding (Lichtman, 2014); I provide an example of this below. I repeated this process for the subsequent interview and compared the codes. I then combined related codes so that codes do not overlap in meaning with each other. I repeated this process for each interview, comparing the new codes with the master list and revised the master list when necessary, and considered these codes in relation to the theoretical frameworks of the study. I then reread the transcripts and referred to the journey maps participants completed in the interview, to apply selective coding to focus on the most important codes. I also adjusted the way I asked questions in the interviews as I sought to explore the emerging themes in greater depth. Peripheral codes that did not add significantly to the findings were eliminated. Finally, the themes, or categories as Merriam and Tisdell (2016) refer to them, were grouped under major headings that represented the key findings.
It is also worth noting that during each interview, I took extensive field notes to track my thoughts, reflections, and any other points of interest. I used these notes as part of the decision-making process in the identification of codes and their renaming. I also used NVivo 12 for its organization capabilities; I recorded the codes that I manually identified and noted these in the relevant places on the transcripts within the NVivo software. To provide a specific example of how I did this, I will refer to Garry’s interview where he was describing his experience with the health care environment during his mother’s health journey with acute myeloid leukemia (AML). Garry’s interview was the first one that I coded. During the open coding of Garry’s transcript, I initially coded the below comment as “admiration for expertise and training of all types of health care workers”:

> I was always very cognizant of how the training expertise and dedication of the health care worker teams, whether it be physicians, PAs, nurses, NPs really everyone across the board who all came together and kind of helped make these events a reality for our family. I just grew up in admiration of them.

In light of other parts of Garry’s interview, I refined the open code of “admiration for expertise and training of all types of health care workers” to become “appreciating the roles of various health care workers”. This refining came after I compared the initial code of “admiration for expertise and training of all types of health care workers” to an open code like “positive experience with interdisciplinary health care workers”, which I had applied to this part of Garry’s transcript:

> There were social workers, there were nurses, there were coordinators, all these outside of the physicians who they also really, really liked, who contributed to a more positive, as positive an experience as could be had in many of those situations. And, so, it was a multidisciplinary team effort.

Another example of an open code I created was, “able to empathize with patients”, which I applied to the following part of Garry’s transcript:

> I think that it’s easier to understand why patients and families, what, what questions they ask why they ask them, and the type of answers that they’re looking for. I think in part and when there are frustrations, I think it’s really
much more easy for me to understand those frustrations and speak to them directly, was something that I came across. Like, you know, you just understand the important things to communicate and why…

Before putting any codes into NVivo, and during the manual coding of Garry’s transcript, I redefined this code of “able to empathize with patients” to become “learning how to communicate with patients”. This redefinition followed my review of other related open codes like “never too much communication”, which I had applied to Garry’s comment, “there’s never said, there’s no such thing as too much communication, or spending too much time with patients and, you know, kind of lessons I feel like I’ve learned from my personal experiences”. I reevaluated the initial code of “able to empathize with patients” and determined that Garry was actually focused on expressing that he learned how to communicate with his patients, as a result of his life experiences.

As it relates to these two examples of “learning how to communicate with patients” and “appreciating the roles of various health care workers”, and as part of the axial coding process, I examined the explicit relationship between the two open codes. Garry’s appreciation for all types of health care workers, and his ability to empathize with patients, resulted from him accompanying his mother as she directly experienced being a patient. As such, I placed these codes as sub-themes under the theme “living patient experiences first-hand”. After coding Garry’s and Lucy’s transcripts manually, I entered the codes I developed into NVivo. In NVivo, and under the theme “living patient experiences first-hand”, I had the sub-themes of: “appreciating the complexity of the health care system”, “appreciating the roles of various health care workers”, “experiencing financial hardship”, “learning how to communicate with patients”, “making connections with first-hand experiences”, and “relating to patient experiences through personal connections”. I then coded the first two transcripts again, this time using NVivo. Following this, I coded the remaining ten transcripts in NVivo without first coding them manually. While coding the last ten transcripts, I added any new codes directly into NVivo.
After all coding was complete in NVivo, I used its organizing capabilities to review the data in light of the codes I had created. As part of the selective coding process, I combined some codes and eliminated others. For example, I combined the codes “appreciating the complexity of the health care system” and “experiencing financial hardship” to become “experiencing the brokenness of the system”. Although I had identified the theme “living patient experiences directly” after coding the first two transcripts, there were many other themes that were created or revised only once I had completely finished coding all the transcripts in NVivo. Deciding on the categories of findings, and thereby how to arrange the themes, was the most iterative in the coding process and was a matter of relating themes to each other until I was able to work towards thematic specificity.

**Verification Strategies**

It is important in all forms of research to consider its verification strategies. Without rigor, research loses its utility and becomes worthless (Morse, Barrett, Mayan, Olson & Spiers, 2002). As qualitative research is based on ontological assumptions that are different from those of quantitative research, the standards for rigor in qualitative research necessarily differ from those in quantitative research (Merriam & Tisdell, 2016). Historically, Lichtman (2013) described at length how scholars and researchers had struggled to find appropriate criteria with which to evaluate the rigor of qualitative research, and she concluded that the field of qualitative research was still in a state of evolution. Nonetheless, almost all scholars accept the idea that the traditional criteria of objectivity, reliability, validity, and generalizability are not appropriate for use in qualitative research (Lichtman, 2013), which often deals with complex cultural and societal issues that may shift based on any number of regional or group differences. While still a matter of contestation, many qualitative researchers use Lincoln and Guba’s (1985) four primary criteria
to assess the trustworthiness of qualitative research: confirmability, credibility, dependability, and transferability. Each of these criteria and how they were applied in this study will be discussed in the subsections that follow.

**Confirmability**

Confirmability refers to the degree to which results can be confirmed or corroborated (Lichtman, 2012). Lincoln and Guba (1985) asserted that the primary means for addressing issues of confirmability is to conduct an audit trail. They discuss raw data, data reduction and analysis products, data reconstruction and synthesis products, process notes, materials relating to intentions and dispositions, and instrument development information, as the six categories for reporting information when developing an audit trail. In this study, I was able to conserve data integrity by maintaining a record of all raw data, transcripts, field notes, coding lists with explanations, process notes, and written reflexive notes about literature relevant to this study.

**Credibility**

The credibility of qualitative research relates to the correspondence between the research and the real world (Wolcott, 2005). In one way, that is, qualitative research is considered more credible if the researcher’s interpretations of the findings align consistently and accurately to participants’ actual perceptions. Having participants evaluate the findings of the research for its credibility is sometimes referred to as member checks or respondent validation and is a common strategy for ensuring credibility (Merriam & Tisdell, 2016). In this study, my interpretation of each interview was sent to all participants by email in order to solicit feedback on the initial findings.
Litchman (2013), however, argues that while she would agree that participants may be the only ones to judge the extent to which the research explained or captured the meaning of what she/he saw, they cannot be the only ones to determine the extent to which the interpretations make sense in the larger context. Triangulation is perhaps the best-known strategy, therefore, for supporting the credibility of a study (Merriam & Tisdell, 2016). Denzin (1978) proposed four types of triangulation that could be used: (a) the use of multiple methods, (b) multiple sources of data, (c) multiple investigators, and (d) multiple theories to confirm emerging findings. In this study, multiple methods and multiple sources of data were used to triangulate the data. Interview data, curricular documents, reflective papers and participant-created documents from the interview process, and observations recorded in field notes, were used as data sources in this study. These multiple sources of data were crosschecked at various times during the study and helped to increase the credibility of its findings.

**Dependability**

Dependability refers to the degree of consistency with which the research is conducted, with careful attention to the rules and conventions of qualitative methodology (Ulin, Robinson, Tolley, 2005). Triangulation of data, peer examination, investigator’s position, and the audit trail are strategies that a qualitative researcher can use to ensure dependability (Merriam & Tisdell, 2016). The audit trail and the ways in which data have been triangulated in this study have already been discussed in this chapter. I have already discussed my position in relation to the research at the beginning of this chapter and have attempted to describe my competence and skill, biases, interaction with participants, and sensitivity, which are also ways of improving credibility (Patton, 2002).
Worthen and McNeil (2002) argue that the dependability of findings can be enhanced by the manner in which data is collected during interviews. To that end, the interviews in this study were not constrained by too little time and participants were probed to elaborate until I was clear about the meaning they were trying to convey. Also, each interview ended with me asking, “Is there something that I did not ask you today that I should have?” to provide another opportunity for participants to share information that may not have been solicited through the questions asked during the interview. In addition, the questions that were asked of participants were carefully designed not to lead them in any particular direction.

**Transferability**

Transferability refers to the degree to which the findings from one study can be applicable to other situations (Merriam & Simpson, 2000). Lincoln and Guba (1985), however, argue that “the burden of proof lies less with the original investigator than with the person seeking to make an application elsewhere” (p. 298). Indeed, qualitative researchers select a single case or a small, nonrandom, purposeful sample in order to gain an in-depth understanding of the phenomenon, not to find out what is generally true of the many (Merriam, 2009). Thus, to enhance the possibility of the results of a qualitative study being transferable to another setting, several strategies can be employed (Merriam & Tisdell, 2016). These strategies for improving transferability include qualitative researchers providing thick descriptions of their observations, methodology, sample, data collection, and data analysis.

Providing thick descriptions means to offer a highly descriptive, detailed, presentation of the setting (Merriam & Tisdell, 2016). Thick descriptions of the research findings, in particular, enhance the transferability of the qualitative work (Creswell, 2014). Worthen (2002) notes that providing examples of how codes were combined and eliminated can demonstrate that the data
analysis was rigorous. In this study, both thick descriptions of findings as well as examples of how codes were combined and eliminated, were offered to enhance the transferability of the findings and to demonstrate that the data analysis was rigorous.

Chapter Summary

I began this chapter with a brief overview of the qualitative research paradigm and described some of the general assumptions of this methodology. I gave particular attention to describing the basic interpretive study, since this is the type of study I will be conducting. I also discussed my own background in relationship to the study and participants, how this study was conducted in compliance with procedures set forth by the Pennsylvania State University College of Medicine Human Subjects Protection Office, how participants were selected, and the data collection and analysis procedures and methods. I ended the chapter with a discussion and an overview of the verification strategies used to enhance the dependability and confirmability of findings.
Chapter 4

FINDINGS

The purpose of this study was to explore why some fourth-year medical students exemplify the principles of Health Systems Science (HSS), and how they come to incorporate these principles into their perspectives on the role of a physician. This research was guided by the following questions:

1. How do students who exemplify the principles of HSS perceive the process of how they experience a shift in their perspectives on the role of a physician?
2. What key experiences have they had that helped them begin to embrace the principles of HSS, both before medical school and since being in medical school?
3. What role has the support or influence of others had in contributing to their exemplification of the principles of HSS?
4. What are their perceptions of what needs to happen in order for the system to really change?

To answer these questions, I used qualitative interviews as the primary means of data collection. The methodology of the research process used in this study is detailed in Chapter 3. I begin this chapter with a brief description of the profiles of the participants, and follow by discussing the findings of this study in terms of the emergent themes. The themes, and associated sub-themes, are discussed in four separate sections in this Chapter. The first section describes how participants’ first-hand experiences have fundamentally shaped their perspectives on the role of the physician. The second section highlights key interactions with college and medical school curricula, and how these experiences have been an influence on students’ perspectives. The third section describes how students’ social networks have played a key role in shaping their
perspectives on the role of a physician. Finally, the fourth section details how students exemplify the principles of HSS through various forms of what they term *advocacy*, and how they imagine the system could really change.

There were 12 fourth-year medical students who participated in this study. Table 4-1 below provides a summary of the participant profiles.

Table 4-1: Summary of Participant Profiles.

<table>
<thead>
<tr>
<th>Alias</th>
<th>Specialty for Residency Training</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abheer</td>
<td>Anesthesiology</td>
<td>M</td>
</tr>
<tr>
<td>Brianna</td>
<td>Urology</td>
<td>F</td>
</tr>
<tr>
<td>Caitlin</td>
<td>Pediatrics</td>
<td>F</td>
</tr>
<tr>
<td>Dianne</td>
<td>Internal Medicine</td>
<td>F</td>
</tr>
<tr>
<td>Duong</td>
<td>Emergency Medicine</td>
<td>M</td>
</tr>
<tr>
<td>Garry</td>
<td>Medicine/Pediatrics</td>
<td>M</td>
</tr>
<tr>
<td>Lucy</td>
<td>Internal Medicine</td>
<td>F</td>
</tr>
<tr>
<td>Martin</td>
<td>Surgery</td>
<td>M</td>
</tr>
<tr>
<td>Mary</td>
<td>Obstetrics and Gynecology</td>
<td>F</td>
</tr>
<tr>
<td>Patrick</td>
<td>Internal Medicine</td>
<td>M</td>
</tr>
<tr>
<td>Paul</td>
<td>Family Medicine</td>
<td>M</td>
</tr>
<tr>
<td>Robert</td>
<td>Emergency Medicine/Internal Medicine</td>
<td>M</td>
</tr>
</tbody>
</table>

As presented in the table above, it is clear that seven of the 12 participants in this study were male and five were female. These participants were entering 10 different specialties, or specialty combinations, for residency training.

Table 4-2 below outlines the categories, themes, and sub-themes that emerged from the interviews in this study. Following the data display, each of the themes and subthemes are discussed, followed by a summary of the chapter.
### Data Display

Table 4-2: Data Display.

<table>
<thead>
<tr>
<th>Category</th>
<th>Themes</th>
<th>Sub-themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engaging in experiences first-hand</td>
<td>Living patient experiences directly</td>
<td>Experiencing the brokenness of the system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Appreciating the roles of various health care workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experiencing the impact of relationships and communication with patients</td>
</tr>
<tr>
<td></td>
<td>Experiencing the work environment prior to medical school</td>
<td>Experiencing non-physician roles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Understanding the patient experience</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Learning to communicate with patients</td>
</tr>
<tr>
<td></td>
<td>Making connections with lived experiences</td>
<td>Realizing the financial impacts of health care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connecting personal experiences to practice</td>
</tr>
<tr>
<td>Interacting with formal curricula</td>
<td>Learning through Health Systems Science curriculum</td>
<td>Shaping perspectives through early exposure to the system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Becoming aware through clinical rotations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Seeing how the system works through COVID-19 electives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expressing perceptions about shortcomings of curriculum</td>
</tr>
<tr>
<td></td>
<td>Combing Humanities education and global exposure to systems issues</td>
<td>Promoting awareness and a more permeating perspective</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fostering an appreciation for other ways of knowing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experiencing systems issues through global exposure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enduring motivations in practice</td>
</tr>
<tr>
<td>Shaping perspectives through social networks</td>
<td>Being influenced by role models</td>
<td>Learning from exemplary physicians</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Being molded by communicators of scientific knowledge</td>
</tr>
<tr>
<td></td>
<td>Reinforcing systems orientation through support networks</td>
<td>Participating in like-minded cohorts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enduring values</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recognizing the influence of community</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recognizing the influence of politics, the media, and popular culture</td>
</tr>
</tbody>
</table>
Participants were asked to identify significant moments in their lives that stood out as having made a fundamental mark on how they view the physician role. They then mapped these influential moments onto a Journey Map (see Appendix B). Participants recognized their experiences as patients, or as family members of a patient, as fundamentally shaping their views on the role of a physician. Indeed, through these experiences, they were able to experience the frustrations of a fragmented U.S. health care system and form perspectives on the role of physician in that context. These perspectives on the role of a physician align with the principles of HSS.

These findings are described in greater detail below. This section is divided into the three overarching themes of: Living patient experiences directly; experiencing the work environment prior to medical school; and making connections with lived experiences.

**Living Patient Experiences Directly**

For many participants, having direct, first-hand experiences with the health care system had a fundamental and lasting impact on how they viewed the health care system and its inherent...
challenges. Whether participants were patients themselves or were directly affected by the interactions immediate family members had with the health care system, having significant exposure to the health care environment definitely influenced their perspectives on the significance of various health care workers, on the importance of physicians building relationships with patients and communicating effectively, and on how well they thought the health care system was serving the interests of patients. After an introduction to findings related to having direct, first-hand experiences with the health care system, the remaining findings are presented in three sub-sections: Experiencing the Brokenness of the System, Appreciating the Roles of Various Health Care Workers, and Experiencing the Impact of Relationship and Communication with Patients.

Students gained a deep understanding of the health care system through their first-hand experiences with it. Paul described how he was able to understand what it was like for a patient going in and out of the health care system:

So, my grandpa got really sick, and I used to stay over at night. So, my mom and my, my mom's side of the family is all deaf, so I would stay over at night some nights, and they kind of just had me there in case he would have a fall or something. So, I called the ambulance. And it was just, it was a good experience because I think it really got me to understand what it was like going in and out the health system for him.

Patrick expressed how his need for multiple operations because of a rare genetic bone disorder gave him significant exposure to the health care system throughout his life. This exposure, he noted, gave him insight into how his patients might feel, and has forever shaped his understanding of patients, as a future physician:

Having the unique perspective of a patient going into medical school, I think that's not something that everyone has. I mean, of course, everyone's a patient to some extent. But I think that varies depending on just your own health needs. So, I came in with having this history of more of a patient experience just because of this need for multiple operations and that sort of thing. And like I said, I think it helps you understand like the fear and uncertainty that you have to navigate through as a patient and I adopt that, I think, as a future physician, just
understanding that, and trying to help my patients through that as much as possible because I know what it was like for myself.

Garry’s mother’s had acute myeloid leukemia (AML), and her diagnosis forced him into having significant exposure to the medical community, insurance, and medications, in various health care settings. He was also able to appreciate first-hand what the medical community was able to do in supporting his mother as she struggled with the disease:

My mother was diagnosed with AML... And, so, a significant portion of my childhood after fifth grade was spent involved in some fashion or another with the medical community, whether it be spending time on the inpatient wards accompanying my mother and father to her appointments, you know, what have you, were, you know, learning about insurance and medications at home, things like this. So, I was inundated from a pretty early age with the, the medical community and I saw a lot about what they were able to do for my mother.

Garry also reflected how he was able to relate to patients and families significantly more because of his own experiences with the health care system, and how the way he connects with patients through his own experiences is something he intends to continue through his residency training and beyond:

… I’ve had patients who, for various reasons, strongly mirrored the experiences of my family. And when I was out of clerkships and electives and as, and things like that, I felt that I was able to relate to the patient and the family significantly more because I know what it’s like to sit on the other side of the table. Not as a patient, but as a family member and to have seen in a longitudinal fashion a lot of the things that these patients and families were experiencing or were going to experience. And I remembered, you know, what was particularly invaluable for me as a family member or my mother as a patient on the part of health care workers that I would then try and model and emulate for these patients. I would then try to abstract, without compromising objectivity and, you know, those sorts of things, into my activities as a medical student and future physician. And I know that’s something that I’m going to continue to model as I move forward into residency and beyond.

Dianne described how she had significant exposure to the health care system when her grandfather was diagnosed with pancreatic cancer. While he ultimately passed away, Dianne expressed how she was able to appreciate the positive influence the health care system can have:

… obviously the death overall is, you know, not a positive experience. But we, my family, had very positive experiences with the health systems in our region
during that time… And then also hospice care was really essential during that process, and, for me, it was like part of the process of exposure. I hadn’t spent too much time in hospitals, prior to that, but since he was so sick, I ended up spending a lot of time at both the main tertiary care center and then hospice as he got more ill.

All in all, significant exposure to the health care system fundamentally impacted many of the participants in this study. Caitlin, whose parents are both physicians, also described first-hand experiences with the health care system that she had encountered through her parents, and also when she and her grandfather were both sick and in need of health care. Her experiences, as well as those of other participants, are captured in the three subthemes of this main theme of Living Patient Experiences Directly, namely: a) experiencing the brokenness of the system, b) appreciating the role of various health care workers, c) experiencing the impact of relationship and communication with patients.

*Experiencing the Brokenness of the System*

Garry and Paul described their first-hand experiences with the brokenness of the health care system. These experiences were pivotal in the formation of their perspectives on the role of physician. The aspects of their perspectives which were formed through these experiences are in alignment with the principles of HSS. Garry, for example, formed a perspective on the role of a physician where he is now dedicated to cost-conscious care and shows an awareness of socio-economic barriers to care, including insurance, that influence the approach to patient care. Paul associated his experiences with the system as having resulted in a perspective that the physician has to be able to apply systems-thinking, being able to see how the patient exists within the context of the larger system. These findings are described in greater detail below.
Garry’s family experienced the long-term financial strain and stress that came with a significant medical diagnosis, and he reflected on encounters with other families who had gone bankrupt because of the high costs of their medical care:

You know, the difficulty of things from the patient side, financial strain and stress that comes along with, you know, very significant diagnosis. The importance and fortune and privilege that we had of being insured. Because there were experiences when she, my mother, would meet people who were also in the ward who didn't have insurance, and were going bankrupt and these sorts of things. And although we experienced a lot of financial strain, it never came to that for us. And all the difficulties for a patient that don't involve their role as a patient really was something that really, really kind of came out of that on the negative side.

Garry also witnessed the inordinate about of time and effort his parents had to spend to protect themselves from extraordinary costs as they, for example, maneuvered the challenge of working with their insurance company to ensure that medical bills were paid:

I would, you know, listen and hear them on the phone for hours and hours their haggling with, you know, insurance companies about payment and all these sorts of things. And, so, I just, it was so, I just grew up in that milieu and there was a lot of experience there. There’s a lot of experience and interaction with it.

These interactions that Garry had with the components of health that were not strictly health, through his own life experiences, have molded his perspective on what should be expected of patients, in the context of the health care system:

So, things like time spent on insurance, time spent on, you know, reading about health benefits through their employer, time reading about, you know, x, y, and z and just massive amount of effort that went into those kind of auxiliary activities. And just the enduring impression that for people who are sick, their job should be focusing on getting better and not focusing on arguing with insurance companies and things like that. So, that really kind of molded me.

Paul described the resistance his family encountered when they wanted to have a physical interpreter present to facilitate communication between his deaf family members and their health care providers. He described how he witnessed the tension this caused when his family were trying to advocate for his grandfather to have a physical interpreter present at the hospital where he was receiving care:
… we would run into issues where it’s like, technically speaking, they don’t have to provide a physical interpreter, they can use the video screen. But it’s just not as ideal. So, like the interpreter like being there like adds a lot of value to the experience because they can kind of get the nuances better, they can perceive what’s happening in the room better. And a good interpreter doesn’t just interpret what’s said, but like, the context or environment of the room, so like, on their, on the small screen, they don’t always pick up all the cues or that kind of stuff. But it was one of the things that I remember my family would always keep pushing for…

Paul identified the tensions around the hospital system providing a physically present interpreter as a system issue. He described how his aunt, who worked for an interpreting company, would take a more forceful approach in advocating for an interpreter to be physically present. He explained how, “but she made the tension more apparent. So, she would be like, ‘okay, like, you’re not legally required to get one but I can sue you, I’m legally allowed to do that’”. He reflected on this approach, in the context of a health care system that failed to provide what his family viewed as an essential accommodation:

Which I don’t, it’s tough because it’s the system. So, we do the bypass. Yes, it’s the quickest way. But it’s also, you get into these, like, resistance for not following the protocol, or a pushback within the system, because these people are more on edge then because it’s like, “oh, these are the people that like threatened to sue”. So, that is one of the things that I think really played out. It’s kind of like, what happens is the patient feels like the system’s not listening and how they have to, like, respond to it.

Through Paul’s frustration with his family’s ability to have interpreters physically present as part of their care, he formed an enduring perspective on the role of a physician:

But you see that a lot where it’s like, sometimes things fall through the cracks because they’re not, the system is set up that so many people get pigeonholed that they can’t see the bigger picture. And I think that’s one of the things for a physician is you have to be able to do your role, but you also have to see that picture, because patients don’t exist in your interaction alone, but they exist in the bigger picture in the system. So yeah, I think that you get, I used to get really frustrated about the interpreters.

Paul’s experience of the system was that it failed to provide the best means for health care providers to be able to communicate with his deaf family members. He reflected on another incident where he had to interpret for his mother at a routine doctor’s appointment, and how the
experience left him with the enduring perspective that physicians should work to anticipate patient barriers ahead of time, to better serve their patients:

… But I just remember my mom asking after, like, “how many times a day do you take this med?” and I’m like, “I don’t really remember”. And then we ended up finding it in the paperwork. But it was just one of those things where it was like, how important again, you know, having it done, you know, making sure that the person is informed and making sure that their situations are, so the, I didn’t think that that time they did enough of the pre-work in saying like, you know “this patient’s deaf and other stuff. How do we set this up for the most possible chance of success at the appointment?” And, so, I always think that’s important too. It’s kind of anticipating the barriers ahead of time, so you don’t actually have to hit the barriers.

Although health care facilities were able to meet their legal obligations to Paul’s family by providing an interpreter via a video screen, Paul’s family recognized this arrangement as being suboptimal to facilitating communication between them and health care providers. Paul described this as one of the tensions that he “always saw”. These repeated experiences frustrated Paul and, interestingly, he made a direct connection between the experiences and his perspective on the role of the physician. For both Paul and Garry, these interactions with the health care system have resulted in an enduring perspective on the role of the physician which aligns with the principles of HSS.

Appreciating the Roles of Various Health Care Workers

Through their own experiences as patients or through their interactions with immediate family members who had significant exposure to the health care system as patients, participants in this study recognized the interdisciplinary nature of exemplary health care. For some participants in this study, this appreciation for the roles of various health care workers is embedded in their perspectives on the role of a physician. Having this appreciation for roles of various health care workers is a key foundation to having an orientation to patient care that is
consistently interprofessional in nature, which is a principle of HSS. Participants’ experiences and how they came to appreciate the role of various health care workers, is described below.

As Patrick reflected on his own journey of health care, he recognized the significance of medical and office staff in his surgeon’s office:

Interestingly, the medical staff of the office of the surgeon stands out to me. Because they were, they like became, they like eventually knew my family kind of, on a first name basis because my dad also had operations with this surgeon. So, he, so they kind of knew our story and with the multiple visits and that sort of thing, like, you just kind of develop a relationship with them. So even just like the front desk, office, like, yeah, that those workers there, or their nurses in the office, that sort of thing. Like, you get to know them.

Patrick’s recognition of the contributions all health care workers made in his bigger picture of care, in which the physician plays a part, is an important perspective that aligns with HSS principles and differs from the traditional physician-centric view of the role of the physician. Similarly, Garry also appreciated the influence various health care workers made in supporting the best possible patient experience as his family interacted with the health care system. He reflected, “there were social workers, there were nurses, there were coordinators, all these outside of the physicians who they also really, really liked, who contributed to a more positive, as positive an experience as could be had in many of those situations. And, so, it was a multidisciplinary team effort.”

Like Patrick, Garry and his family also built lasting relationships with non-physician health care workers. Through his experience as a family member supporting his mother through her AML diagnosis, Garry expressed the importance of a particular nurse coordinator: “Yeah, so, the nurse coordinator in the hematology oncology unit… who worked with my mother for like a decade. I still remember her name. I still remember her. And that was one of the people that my parents always pointed to as being one of the most supportive and valuable people in their experience with the health care system.” Through these experiences, Garry grew in admiration of various health care workers and appreciated their training and expertise:
I was always very cognizant of how the training expertise and dedication of the health care worker teams, whether it be physicians, PAs, nurses, NPs, really everyone across the board who all came together and kind of helped make these events a reality for our family. I just grew up in admiration of them. And I wanted to be like them. And, so, I had an inkling that I was going to like medicine.

Importantly, Garry’s appreciation and respect for the roles and training expertise of various health care workers, which he drew out of these experiences with the health care system, now form part of his perspective on the role of a physician. In reflecting on his own perspective on the role of a physician, he said, “there are skills and knowledge that I don't have that patients need, and recognizing the roles and skill sets that different people have as part of the medical team is critically important for patient wellness and good outcomes for patients”.

Paul’s experiences with the health care system as a family member of a patient also reflected in his perspective on the role of a physician. He viewed the physician as a leader on the health care team:

One of the things I think it really made me think about is, the physician as like a team leader. Because we would have issues, we would always talk to the physician. Like, “hey, like, we need an interpreter”, that kind of stuff. And sometimes they would differ away. So, they were like, “oh, talk to the social worker, talk to this person”. And the really good ones, though, they would say, “oh, I’m going to take care of it. I’m going to talk to these people because I know this is important”. So, they kind of took on that and took that off of our plate because that was a big focus for us, it was, “how do we get the right communication here to make this work?”

Paul’s perspective still highlights the need for the various non-physician health care workers on the team, but reflects an HSS-aligned idea that the physician should lead the team and tap into the expertise of those who will contribute the best possible patient outcomes.
Experiencing the Impact of Relationships and Communication with Patients

For participants in this study, having first-hand experiences with building a trusting relationship with physicians as patients, or with being on the receiving end of communication from physicians, fundamentally shaped their perspectives on the role of a physician with respect to how they should interact with patients. In particular, participants felt that their experiences as patients allowed them to be acutely aware of the patient’s perspective. A physician exemplifying the principles of HSS is committed to an excellent patient experience by seeking to understand the patient’s perspective, accounting for psychosocial risk factors, and thereby effectively communicating with the patient. For participants in this study, it was the meaning they constructed from their own experiences as patients, or through their experiences participating as accompanying family members, that enabled them to have a view on the role of the physician that aligns with these HSS principles.

Garry expressed how he felt it was easier for him, in the role of physician, to understand patients’ frustrations and address those issues effectively. Also, he attributed his personal experiences with the health care environment to an ability to communicate more effectively with patients, in a way that he felt could not have been taught through formal education:

I think that it’s easier to understand why patients and families, what, what questions they ask why they ask them, and the type of answers that they’re looking for. I think in part and when there are frustrations, I think it’s really more easy for me to understand those frustrations and speak to them directly, was something that I came across. Like, you know, you just understand the important things to communicate and why, and that’s not necessarily something that can be taught… I’m not disparaging, you know, but there are, I think, they are just aspects of communication that you come to inherently understand more when you’ve been through that experience in the non-professional setting.

Garry viewed his personal experiences as having taught him that there is no such thing as too much communication or spending too much time with patients as a physician: “There’s no such
thing as too much communication, or spending too much time with patients and, you know, kind of lessons I feel like I’ve learned from my personal experiences.”

Patrick reflected on his own experience as a patient, and the importance of being able to build a trusting relationship with his surgeon:

Yeah, I think it’s interesting to have a patient perspective... So, I think I had experiences with different doctors and health care systems, both positive and negative, but, for the most part, I felt very much at ease from my main surgeon who like really did a lot of the surgeries when I was growing up, because he was just so kind and sort of guiding, I guess, in a lot of the visits that I had with him, and never really made me feel more worried than I was. And I, and I placed my trust in him.

Patrick’s patient perspective now forms part of his perspective as a future physician. Garry also recognized that physicians having first-hand experiences as patients could help them in being able to foster a deeper physician-patient relationship:

You know if they say, like, you know, doctors always make the worst patients, and previous patients make the best doctors. I think, I think there’s a reason for that because you, you understand the internal machinations more and can speak to them and foster a deeper doctor-patient relationship.

Caitlin experienced first-hand the value of a physician investing time and effort into building a positive relationship with her/his patients. Through her own experience as a patient, Caitlin recognized that a positive relationship could result in positive patient outcomes, and that this physician-patient relationship could be characterized as a means for a physician advocating for her/his patients:

The pediatrician that I saw, I saw at the time was absolutely amazing. And she recognized after our first visit when I would, would not talk or would not engage. She kind of like recognized where I was at and adapted to that from then on, and I think she’s also one of the reasons I really wanted to get into medicine… But I really I think, I really appreciated her taking that extra time and kind of being that support person for me, and kind of advocating for me without me realizing she was, in the moment.

Caitlin was also able to see the value of a physician investing in the physician-patient relationship through her mother’s behavior when one of her Pediatric patients unexpectedly passed away.
Caitlin highlighted this experience as being something she distinctly remembered: “I also very, very distinctly remember, I don’t know when, sometime in high school, and my mom’s patient unexpectedly died. She’s a general pediatrician, so most her patients do just fine”. She reflected on how actively involved her mother was in supporting her patient’s mother and in creating a bond with that family, and how this is now incorporated into her own perspective on the role of a physician:

It wasn’t anything anyone could have done but she was very active with the family she kind of… The mom, they had a long-term relationship, all the time of taking care of the kid. My mom would still talk and call and check in on the mom, the patient, I think that’s where the kind of, in the pediatric world is not just the patient, it’s the family too, the parents are kind of your patients also, and that’s an important aspect... I think it was when I saw that, I saw the importance of that bond with the family members and kind of just being a support system for your patient and their family.

Caitlin also had a first-hand experience of when the absence of a positive physician-patient relationship can have a negative influence on patient outcomes.

Caitlin reflected on an experience she had when her grandfather passed away suddenly, after delaying being evaluated at a hospital because of his lack of trust in the physicians that would be there:

... It was a very unexpected end and I think because he waited so darn long to go to the hospital. So, I think that was when like, I first started questioning like, "Why didn’t he just go? Why didn’t he trust them?" And for me at the time I thought, the role of a physician is, like looking back on it, role of you as a physician is to have your patients, you have to gain that trust of your patients. Like, it’s really important to being someone they feel comfortable going to, and hopefully if you gain their trust and they’ll feel comfortable with another doctor when they need it. Kind of being that trust person someone that they can call, cause he just did not.

Caitlin constructed meaning from this experience and related this to her perspective on the role of the physician. She became convinced, through this experience with her grandfather, that it was important for the physician to create a trusting relationship with the patient, to make them feel
comfortable getting care from the individual physician, or other physicians in general, when they need it.

Paul’s experiences with his grandfather’s interactions with the health care system also fundamentally helped shape his view on the role of a physician. He recounted how his grandfather’s health had begun to deteriorate and there was an occasion when his heart had entered the lethal arrhythmia 18 times, and his pacemaker shocked him each time. Paul’s grandfather was able to pass away at home, which is something he really wanted. This experience, in particular, impressed upon Paul the need for the physician to account for the patient’s goals of care:

... he ended up living for a while afterwards, he went on hospice. And it was actually a sigh of relief, I think, for him and my family. And that’s where I really get into like the goals of care. Like, I always think back to that because his thing was like, he’s like, “I lived a long life. I hate this feeling of getting shocked all the time”. He’s like, “I can’t live another year or two being shocked all the time”. And then when hospice took over, they just did a really good job...

Paul reflected specifically on his grandfather’s transition to hospice and eventual passing, and made connections to the importance of physicians communicating well with their patients in general, but also for the purposes of establishing patients’ goals of care.

**Experiencing the Work Environment Prior to Medical School**

The second major theme related to the category of engaging in experiences first hand, centers on the experiences participants had in their work environments prior to medical school. Like most college students looking to enter medicine, gaining volunteer and research experiences are an essential part of the application process. Interestingly, many participants in this study highlighted seminal moments from these volunteer and work experiences that have contributed to the formation of their perspectives on the role of a physician. While not all volunteer, research,
and work experiences are detailed, some noteworthy experiences are presented here. Seminal moments from these work experiences are discussed in greater detail under each of the subsequent subthemes, after some initial presentation of findings related to the theme of: Experiencing the Work Environment Prior to Medical School.

Duong and Robert worked as medical scribes in a gap year between starting medical school and ending their college studies. Robert said that his experience as a scribe helped confirm his preference for emergency medicine and started to make him aware of some of the system issues associated with documentation in the electronic medical record (EMR):

So, I think the first thing is that definitely helped me gravitate towards emergency medicine practice, which will be essentially half my residency. I think being a scribe, you’re definitely the fly on the wall. And you’re involved with probably one of the, I don’t want to say one of the worst, probably one of the worst parts of a physician’s practice, which is the documentation, of course. And seeing some of the struggles with that, I think, in a way did open my mind. I wasn’t, I guess, I wasn’t aware of it at the time, it sort of subconsciously opened me up to sort of the issues with the system as far as like EMR and documentation early on, even though I may not have been as aware of it at that time.

Lucy worked as a social worker before deciding to go to medical school and also worked with vaccine development through clinical research. She described how her work experience as a social worker gave her an awareness of how policy shaped work in the health care setting and gave her experience advocating for clients, something she would ultimately do as a future physician exemplifying the principles of HSS:

Especially in terms of health system sciences working in social work, we did a lot of advocacy for our clients. And that was really the opening of the door to realizing how policy shaped everything we did in the access our clients had. And, so, I came into med school already knowing that, and becoming more interested as I started to understand the role of the physician in clinic.

Dianne worked as a patient aid in a group home for patients with disabilities and worked as a translator in a free clinic in her college town. Similar to Lucy, Dianne’s work experiences also gave her the opportunity to work with patients to confront barriers to health care, which she described as being important to her prior to entering medical school:
I worked with, like, a lot of different populations that I really enjoyed and like those, the barriers to getting health, I enjoyed like working with their, like against their barriers, or helping them confront the barriers to health care. So, that was important to me prior to entering medical school.

Martin, after being unsuccessful in two successive application cycles to medical school, gained some work experience for approximately three years in various roles. While two of his jobs were closely related to medicine, one was in an engineering department that would blow molded plastic bottles for Pepsi. For him, these work experiences gave him opportunities to learn practical skills for the job and the interpersonal skills needed to get the job done:

... So, I worked with a lot of different people. I had to learn a lot of skills, practical skills for the job, but then I also had to learn a lot of just interprofessional skills to be able to get the job done. So, I brought a lot of that to med school here. And like I said, while I think I would have been a fine doctor, if I’d gotten in the first time, I think that I will be a much better doctor for having not gotten in.

Like Martin, Lucy also felt like her full-time work experience as a social worker had given her the opportunity to build unique interpersonal skills. She suggested that her peers may not have had similar opportunities:

I think having worked at all was a huge benefit going into medical school because a lot of my colleagues have never really had, you know, sometimes tough jobs or interprofessional like discussions, or even conflicts, that they had to solve. So that was really beneficial.

Paul made a direct connection to his work experience in a hardware store throughout high school and in college, to the work of a physician. He described how working at the hardware store gave him exposure to helping people to solve problems by following multiple steps and trying to understand the situations they were trying to address:

I worked at a hardware store, all throughout high school, and even in college. And, so, I loved helping people solve problems and we do a lot with like plumbing, and electrical. And it's like really things that you had to have multiple steps to figure out with people, see, and to figure out exactly like, you know, what was the setup that they had in their home that they had, like, created, you know, created and needed to fix it.
While shadowing a family physician in his home town during college, Paul started making connections from the skills he had learned in the hardware store and the skills he would need as a physician:

So, I was just really impressed by that kind of, you know, rapport that he had with his patients. And he would have me sit with the patients and just talk with them. And then he would go, while he was like doing the orders for the last patient, and then he would come in, and then and it was just really nice, because I started to feel like, “oh, like this is just kind of like the hardware store where you just kind of like, sit down, listen, hear their problems”.

Abheer worked at Epic, a well-known Electronic Medical Record (EMR) company. For him, this experience was an opportunity to get insight into physician workflows, in ways that his other volunteering experiences had not:

… When I was working at Epic, we had the opportunity to work, to interface with a physician champion who would basically explained to us like workflows. That they like, how they went through their workflow. And then based on that, how they would like us to alter the EMR and what would be most helpful. Again, that kind of that experience kind of led me to believe, like, whereas a lot of my colleagues were interested in like the coding and the reasoning behind that, I found myself gravitating more towards, like, thinking about, I was always really curious as to, like, “oh, why is a physician doing it” or like, “why does he prefer this workflow versus this workflow”.

Among other work experiences, Mary worked as a Certified Nursing Assistant (CNA) in an oncology unit in a hospital, through a program designed to help people interested in health care get employed earlier at different facilities. Caitlin worked as a volunteer at a hospital, where her passion for medicine was confirmed, and Brianna worked in neurology and endocrinology labs while completing her studies.

For the most part, these work experiences were highlighted by participants as containing seminal moments that shaped their perspectives on the role of a physician. In particular, this main theme of experiencing the work environment gave rise to three subthemes. First, some participants were able to experience non-physician roles, and these experiences gave them an appreciation for the roles of non-physician health care workers, shaping their perspectives on the
role of a physician in ways that aligned with principles of HSS, insofar as an orientation towards interprofessional care to support patient outcomes. Second, some students gained a special understanding of the patient’s perspective and experience. And third, several students gained skills and perspective on how to effectively communicate with patients, as a consequence of these work experiences and the meaning participants assigned to those experiences. These three subthemes are discussed further below.

*Experiencing Non-Physician Roles*

Through their work experiences in non-physician roles, several participants formed perspectives on the role of a physician that aligned with HSS principles. This was particularly true with respect to a perspective on the role of a physician where there is an orientation toward interprofessional care in support of patient outcomes.

Mary described what it was like to work as a Certified Nursing Assistant (CNA). She described there being some degree of mistreatment. Also, she realized that CNAs could provide valuable information for physicians, given how much time they spend with patients in the hospital:

> You know, you experience like some degree of, like, mistreatment. I guess when you’re a CNA, and like people kind of don’t think that you know what you’re talking about, which is true to a degree. But I think that it’s important. I think the big takeaway for me is that, you know, as somebody that spent a lot of time with each of the patients, I kind of knew, like where the nurses that spent a lot of time with a small number of patients, you have to, like, you kind of know how they’re doing or how they’re changing qualitatively before like the medical team would, for example. And I think that’s like one of the big takeaways I had, is that it’s important to, it’s really important to ask, you know, the nursing staff or, you know, even the CNA, you know, “oh, how are they doing like compared to yesterday?” or, “have you noticed any changes?” because, there’s just like subtle things that you can pick up if you’re spending multiple hours with a patient, every day.
Mary also described this experience as giving her important early insight into the dynamics of how a health care team works. She noted, “it was a good, like, exposure to the medical field. It’s obviously very, you know, entry level. And, but, you get to see like how the dynamics of the healthcare team works”. Lucy also recognized how her experience as a social worker gave her insight into how different aspects of the health care team function, and gave her respect for the different aspects of the team:

Having worked in social work and social services, I have a perspective of different team members. So, like, I worked in a team with a physician as a non-physician. So, that really helps to understand how different aspects of the team function and respect for different aspects of the team.

Abheer’s work experience at Epic also exposed him to various health care team members, but also gave him a window of insight into the role of a physician, from the perspective of the physicians and other health care providers he consulted:

… it was the first snippet of understanding the role of a physician and understanding what, how they prioritize what they need to do when it comes to a workflow and how that workflow, you know, intermingles with other specialties and other kind of like, the mid-level providers. So, I, at that point, like we talked to physician providers, they weren’t the only ones we talked to. We talked to nursing staff and things, and other mid-level providers to see how we can, like, kind of like integrate everything. So, it’s kind of more of like a team-based approach.

In addition to working as a medical scribe, Duong also worked as a medical technician during his gap year. He describes how this hands-on experience gave him the opportunity to work as a part of the health care team:

About the job as being a tech, I get more hands on. This is not just like, you know, following somebody around documenting stuff on a computer. I get to do like some blood work, offloading the lifeline helicopter, going out, carrying traumas in, attending like, like helping out in traumas, like literally shootings and planes falling out of the sky, that kind of thing coming in… it goes pretty exciting getting more hands on. Getting to work as a team. Now, you just not like a separate part standing aside to take notes, but like you’d be an active part of it, going, you know, in there, jumping in, then help out and do stuff.
This experience working as part of the health care team contributed to shaping Duong’s perspective on the role of a physician. For Duong, unlike his other volunteer work, his hands-on work experience as a medical scribe also gave him the opportunity to see the way in which physicians interact with patients, as he worked in this non-physician role:

So, as a medical scribe I get to see, you know, being next to the doctor, you know, document documenting of the HPI, which includes the history, like history, physical exam, some of review of systems, that kind of thing. And at times, medical decision making. But although I shouldn’t be doing that. And then like, you know, keeping an eye on the lab orders, a lab result, and imaging orders and such. So, like being like more hands on, but mainly attached to the hip to a doc going from room to room to see patients and see how they talk to patient and do some procedures. It just more intimate than a regular like volunteer, volunteering work that I had got to do before.

Interestingly, Duong also subtly highlighted what he learnt non-physician health care team members should not be doing, when he noted, “and at times, medical decision making. But although I shouldn’t be doing that”.

Understanding the Patient Experience

The second subtheme of the main theme of experiencing the work environment prior to medical school centers on their understanding of the patient experience. These work experiences were identified as being formative in the development on their perspectives on the role of the physician. A perspective on the role of a physician where the physician should seek to understand the patient perspective, is aligned with the principles of HSS.

Dianne described how her experience as a caregiver patient aid in a group home for individuals with intellectual disabilities, gave her the opportunity to see some of the barriers that were affecting patients, and the anxiety that they had in going to appointments:

One of my first experiences during college was I worked as, I guess like, a caregiver patient aid, for individuals in a group home with disabilities. And, so, that was a really good exposure. I did do some like, I didn’t do many, many,
medical things. I took them to the doctor occasionally, and was able to see some of the barriers that they had to being able to represent themselves and their, their needs and the anxiety that came for some of them with going, just going to the doctor for routine visits.

Dianne also described how she realized what challenges her patients’ psychosocial and socio-economic circumstances presented in terms of their ability to access care:

When I was working with individuals with disabilities, they have really limited economic resources because they don’t have a way to earn income, other than what the government provides. And, also, like emotional intelligence. And makes it hard for them to communicate, and they can’t drive so they have transportation issues. There’s lots of barriers that they confront to getting care.

Similarly, Lucy perceived that her work experience as a social worker gave her perspective on the kinds of barriers that patients face in getting care. She felt that the perspective she gained from this work experience was often missing among her peers in medical school:

For people who do not have that prior experience, because I think after talking to some of my peers, that some people were like, “I never thought that transportation could be an issue”, or “I never thought that policy could influence people’s clinical experience to the amount that it does” and that’s huge, and super needed for young medical students.

Dianne also reflected on how her work interpreting at a free clinic gave her insight into some of the sociolinguistic and socio-economic barriers to care that individuals faced when trying to access health care: “I did a lot of interpreting at the free clinic in my college town and helped with their, helped them confront some of the barriers that they had to care, including language, but also getting social services and such.” She also noted that this work experience also provided her with perspective on how difficult it was for patients to afford medications and access higher levels of care that were not provided by the free clinic:

… It was good medical exposure, but it was also good exposure to the patient and like the social determinants of health and being able to think through barriers that they were having to things like, afford medications, and accessing higher levels of care that the free clinic didn’t provide, and such.

Dianne and Lucy gained perspective on patients’ socio-economic, sociolinguistic, and psychosocial barriers through their work experiences prior to medical school. Lucy also came to
understand the impact of policy on patients’ clinical experiences, in ways that she perceived many of her medical student peers did not. Gaining first-hand insight into the patient experience has shaped Dianne’s and Lucy’s perspectives on the role of the physician, in a way that aligns with the principles of HSS.

*Learning to Communicate with Patients*

For several participants in this study, working pre-medical school in non-physician roles helped shaped their perspectives on how to communicate with patients. Physicians exemplifying the principles of HSS provide the patient with an excellent patient experience by seeking to understand the patient’s perspective, accounting for psychosocial risk factors, and thereby effectively communicating with the patient. Participants in this study are better able to account for the patient’s perspective because of the meaning they have constructed from their work experiences in non-physician roles.

From Lucy’s social work experience, she learned just how important it is to patients’ healing, for providers to be present for patients and to listen to their stories:

Just sitting with my clients when I worked in social services… and listening to their stories because that was pretty influential, and just realizing that so much of healing is just being there for someone and listening.

Mary’s work experience as a CNA was particularly significant in shaping her views about how to communicate with patients. In particular, she learnt how to communicate with patients and how to have understanding for their emotions and their social circumstances:

I think the biggest thing is you learn how to talk to patients and kind of, like, handle stressful people, or understand the emotions people are going through in the situation where they end up in the hospital, and how the family dynamics work, and that sort of thing.
She also described some of non-verbal communication techniques she learned during her time as a CNA. Mary expressed how she learned to demonstrate empathy or indicate that she was paying attention:

You’ll have patients who have families that are very involved in their care. You’ll have patients who have families that are very agitated. And how you handle, like, walking into the room with an agitated patient or family member and try to, you know, show empathy on your face so that they know that you’re paying attention to them, or that you understand the stressful situation that they’re in. So, I think that it really helped me from a communication perspective in that way.

Dianne described how she became more aware of the different challenges that are faced by patients, through working as a patient aid in a home for people with intellectual disabilities, and how this experience shaped her view on how physicians should tailor their communication to their different patients:

… it just became, helped me become more aware of the different challenges that people face. Also, it’s something that I keep in mind when I’m communicating with patients. I think it’s really easy for us to communicate at a certain level that we’re used to communicating with everyone. But they wouldn’t understand half the things that I said, if I tried to do that with them. And, so, I think it’s really important for physicians to tailor their communication to treat the patient, not that you’re like speaking down to them or anything, but you have to speak on a level, of a level, that they’re going to understand and if, and, I think, that it’s also when that happens, it’s impact empowers patients to be able to care for themselves better, or at least take steps in that direction.

Interestingly, Dianne expressed that when physicians tailor their communication to patients, there is the possibility to empower patients to care for themselves, or take steps in that direction. This is consistent with a systems-perspective that if physicians communicate with patients in ways that are sensitive to their psychosocial circumstances, the result is that patients’ overall wellness can improve and, thus, reduce stress on the health care system as a whole.

Duong’s shared an experience he had as a medical technician in the Emergency Department (ED) when communication failed to be effective, and the negative outcome it had for him and the patient. He had been asked by an attending physician to order an electrocardiogram
(EKG) on a patient in the hallway of the E.D., as part of pre-surgical preparations. However, the patient had not been informed that she was being prepared for surgery. Duong went on to describe how this situation placed him in a precarious situation, where the surgical resident, who should have made the determination about whether the patient should be sent for surgery, had not yet evaluated the patient, the patient was agitated and concerned, and the attending physician was still convinced that the surgery resident would come to the same conclusion as he did. Duong identified this experience as a seminal moment in shaping his perceptive on the role of the physician. He described how, as a result of this incident, he saw communication as being central to establishing good flows of patient care:

I think communication is a big part and especially in emergency medicine. It’s like, it’s like a heart of emergency medicine. Because we do a lot of talking. Talk to, we talked to the patient. We talked to the hospital providers. We talked to the staff in the department, to consultants, talk to the medical students and residents. We do a lot of talking, in addition to the resuscitation that we do. So, it’s like a heart of EM. And I think communication could be better at [institution] and although that things can get hectic, the patient is super worried and anxious, and they came in to see you in, you know, what if they thought could be one of the worst moments in their life. And, you know, like being transparent in communication, I think, it’s going to go far in reassuring the patient, and to establishing a good flow of patient care.

Martin described how his work experience in an engineering department helped him to learn how to communicate with patients in ways that they could understand. Connecting to his own struggles in learning about machinery when he had no formal engineering experience or education, Martin expressed gaining an ability to communicate clearly and efficiently, in ways that patients could understand:

I want to be as straight line and pragmatic as I can, because I think that that makes it easier to explain things to patients. And I always try to, when I’m thinking about tests or procedures that I want to order… I think I got a lot of that just from working in some different industries and having to talk to people outside of it, you know, and also from having to be that person myself... I don’t I don’t want patients to think that I’m blowing smoke, or that I’m pulling the wool over their eyes, or I’m wasting their time. And I certainly don’t want them to think that I’m in this to make a lot of money. And I think that all three of those things can just be massively detrimental to a patient physician relationship.
Martin brought back these experiences to his perspective on the role of a physician. He articulated how good physician-patient communication can lead to a trusting relationship and, ultimately, better patient outcomes:

And I think that of all the many things that we learned about patient care, I think that being able to develop a trusting relationship with a patient, sometimes in as little as five minutes is maybe one of the more valuable things out there is if they trust you, then, sometimes, some of those hurdles, and explaining things, they go away. Sometimes they say, “you know what I trust you, go ahead”, and it can remove a lot of hitches in the roadway to getting the answers that you need. So, I mean, that’s a little bit more of a selfish reason. But, also, I don’t want people to think that they’re or feel like they’re completely in the dark, especially in the field that I’m going into where I will be cutting you open. And I don’t want people to be scared any more than they have to be. If I’m going to cut them open and root around in their insides trying to fix a problem, so, I want them to have some faith and to trust me and to feel that I am coming to help them in good faith for no other reason other than, they have a problem and I think I can fix it.

For several participants in this study, working in non-physician roles pre-medical school gave them unique opportunities to appreciate the patient’s perspective and see the value of effective physician-patient communication. The meaning participants constructed from these experiences have helped shaped their perspectives on the role of a physician, in a way that aligns with the principles of HSS.

**Making Connections with Lived Experiences**

The third theme relating to the category of engaging in experiences first hand relates to making connections with lived experiences. Some participants in this study reflected on how they connected their overall life experiences to their perspectives on the role of a physician. While these experiences were not strictly related to medicine, the meaning participants assigned to these experiences allowed them to apply their perspectives to their practice as student physicians. There are two subthemes related to making connection with lived experiences. First, some participants lived in financially constrained households, which contributed to a cost-
conscious orientation being embedded into these participants’ perspectives on the role of a physician, and fostered a commitment to cost-conscious care in practice. Secondly, participants connected the practical lessons they learned from their everyday lives, to their utilization of the health care system on behalf of their patients, and to their ability to empathize with, and connect to, the patient’s perspective. This cost-conscious orientation, and a commitment to understand the patient’s perspective, aligns with the principles of HSS. These two subthemes are discussed further below.

**Realizing the Financial Impacts of Health Care**

Duong, Martin, and Paul were all able to relate their own life experiences to their realization that there are serious financial considerations that physicians need to make when treating patients, with respect to how those costs will impact patients’ lives. Having a cost-conscious approach embedded into their perspectives on the role of a physician, aligns with the principles of HSS.

Duong described his journey to the United States (U.S.) as an immigrant and how he had experienced financial and social hardships in his country of birth. During his interview, he also mentioned growing up in the U.S. as “a typical immigrant family”, with the suggestion that he experienced a resource-limited upbringing. For Duong, these experiences made him much more aware of the cost implications of care. Duong highlighted that some physicians may find the time constraints for providing care in the E.D. as being a barrier to investigating the social and financial needs that patients may have. Duong considered it beneficial to address the social and financial barriers to care that patients may have, which is a perspective he gained through living through financial hardship himself:
I think being able to relate to people of low economic status, I think, because I, I don’t want to say that I didn’t like grow up poor per se, but it’s not good. You probably, you have been in Asia, and, you know, it is, was totally different. It is totally different back there. In terms of hierarchy and financial hierarchy, that kind of thing. But I think like coming from the more financially disadvantaged background helped me keep my eye open to those who was socially and financially disadvantaged because there are struggles that they, daily struggles, they had to go through that I may not comprehend and, you know, like, and we talk about social determinants of health, all the time, and especially in the E.D. Time is, because of this time constraint for some time, we just don’t take it into account. And, you know, and just by putting it out there, having a moment, just a brief moment to address it. These, you think, “is anything that would be in the way of you getting this medication or getting the treatment?” I think like being aware of it, as I, even as an E.D. doc is a helpful, I think.

Paul described how his family experienced financial constraints. Owing to his own experiences and his realization that the unforeseen expenses associated with health care could have ramifications in a family, Paul was committed to being sensitive to the cost of the medications he would prescribe to patients. In addition to exploring whether there were alternative medications that could be prescribed, Paul explained how he would use an app called ‘GoodRx’ to advise patients about where they could obtain the medications for the best price:

Yeah, so the best example of this, if you go to GoodRx it’s one of the medications called the Linezolid. And it is the perfect example of how crazy it can be. Because Linezolid would cost $60 at some pharmacies and $1,000 other pharmacies. And, so, it's the one I always, when anyone ever asks me about, you know, why you should use GoodRx, because it can be a difference of $900. And that's not a benign cost. I think about the cost to the patient a lot because my family, my dad worked in the cabinet industry for many years. My mom stayed home with us growing up, and money was tight. Not terribly, like we had three brothers and it wasn't like terrible, but it was not like we had a surplus. So, every little thing can make a big difference on whether or not, you know, you could do extra stuff. So, like the fun stuff as a kid or whatever, like that was kind of contingent on everything else.

Duong also explained the value of GoodRx in equipping physicians to be sensitive to the cost of medications. He related his own experiences of having to purchase diabetes medication for his mother, where he is able to get medications more affordably using coupons on the app rather than going through her insurance plan:
So, for emergency medicine, I think a lot of times we just discharge a patient with a certain medications. And some of them just don't have insurance. So, what I did was that I always have a GoodRx app on my phone. So, whenever the patient, you know, when I discharge the patient with some medications, yeah, ask about whether this is the regular medication that they use. Also, “I have an app right here”. Then, “I'm just looking”. “I can look at look up the medication really quick to see where's the ballpark of the medication of the price without insurance”. Because a lot of times patients come in good insurance, but sometimes the price on GoodRx is so much better than the price offered by insurance. And which is evidenced by the fact that, you know, I have insurance, but a certain medication, they just go out there and use GoodRx. Same thing for my mom with her diabetic medications. The insurance just don't cover enough. And I'm speaking in terms of a hundreds of dollars difference between the price, and which can be very significant.

As mentioned before, Martin worked in three different jobs for approximately three years before being accepted into medical school. During that time, Martin felt like he grew in maturity through the disappointment of having been unsuccessful in two application cycles to medical school. However, Martin made meaning made from his work experiences and expressed his view that he had become more pragmatic in his practice of medicine, as a consequence of these experiences. While he did not indicate that he experienced financial hardship himself, his pragmatic view of clinical practice had the important consequence of curtailing unnecessary costs to the patient and the system. Martin described a scenario where someone might come into the E.D. complaining of the overt symptoms of pancreatitis, and how there are multiple treatment options that would have different financial and other costs to the patient. He explained that for a Computed Tomography (C.T.) scan, for example, a patient might end up paying eight hundred dollars, be exposed to a dose of radiation, and be placed at risk of receiving contrast and his kidneys are not healthy. Alternatively, he explained, he could simply do an ultrasound of the patient’s belly and the cost might only be fifty dollars to the patient. He concluded this story by connecting his personal experiences to having made him more pragmatic and flexible:

I think I’ve become a lot more pragmatic when it comes to utilization in healthcare, in terms of patient care. But while at the same time, not to a like, and not overextending that... So, I think I’ve become a lot more pragmatic with that, where I think, you know, if I think back to what I was like, in the past, I may
have been like, “well, you know, that’s the test for it, we, we should make sure that we know what we’re treating”.

Duong shaped his perspective on the role of a physician from the meaning he made from his own experiences as an immigrant to the U.S., and Paul committed himself to being sensitive to the cost of care as he practiced as a future physician, because of his first-hand experience of living in a resource-limited home. For Martin, he felt that he had become more pragmatic in his care of patients because of his experiences in living through the disappointment of not getting into medical school in two application cycles, and through his experiences working in various jobs. The result for Duong, Paul, and Martin was that they embedded cost-consciousness as part of their view on the role of a physician, which aligns with the principles of HSS.

Connecting Personal Experiences to Practice

Several participants in this study connected their personal experiences to their practice as future physicians. For Garry, the personal experiences that he connected to his clinical practice, were associated with his first-hand experience as a family member to a closely related patient. Similarly, Paul connected his experiences as an accompanying family member in the health care system to his view on the role of physician. Yet, Martin was able to connect his non-medical field related experiences to his practice too. Paul also shared a story about his experience working in a hardware store and how his familiarity with particular kinds of machinery helped him to be able to bridge the gap between patient and physician.

Martin described how his own experience with not being accepted into medical school twice had a significant impact on him. For him, this was totally unexpected, and he had to reconcile his worldview with his reality. As a result, he expressed thinking often about the
unforeseen or unexpected consequences physicians may encounter as they care for patients, and his ability now to empathize with others and be able to see from their perspectives:

I feel like, I think a lot about ramifications and consequences and unforeseen circumstances that we may encounter. Whenever we come up with treatment plans or whenever we see patients and they have concerns, I think I do that more now than I did certainly before I had graduated college… I think I’ve experienced enough on my own to know that other people have as well. And it’s had an impact on me that I think I can, you know, mirror and see in other people.

Martin went on to explain how there have been patients he treated as a medical student where he has had shared life experiences. He described how his own experiences had given him an appreciation for how patients’ pasts or histories have an important place in shaping them. He also noted that he planned on engaging patients around their pasts when caring for them:

Now, there have been patients that I’ve treated where we’ve shared life experiences. And that makes it easy. There have been patients who I’ve treated who have been, like, I’ve had a certain course in life or experienced certain things that friends have experienced or family. And that makes it very easy to connect with them. But I think the biggest thing was to be able to understand that, you know, their past and their history is something that is, you know, can shape them. And being able to recognize what that is, and the value it has to them. And then also being able to engage them over that, even if I don’t know what it’s like.

Similarly, Paul shared a story about how he engaged a patient who had fallen while holding a chainsaw. As a consequence of his familiarity with chainsaws, he was able to bring his prior experience into his interaction with the patient, connecting with him on a human level:

… we had like a two-minute conversation about his chainsaw because it was the same kind of saw that I used to saw at my work and we would even talk like, "oh, it was a Oregon". It was silly in that kind of way. But it was a point of contact, and they got a really good history out of him because he appreciated me bringing back to something that was not necessarily fully medicine. And, so, I think that that’s one of the things I appreciate. I was just, so. these little points of like contact, or expressions of humanity that kind of just bridge the gap.

Connected to cost, Martin also reflected on his experiences and how these have caused him to find a healthy balance in utilizing the health care system on behalf of his patients:

So, I think that I’ve been able to find a healthy balance of utilization in the system. And I think that only just comes from experience of having to do that
with different parts and different machinery. And then, you know, different
people in departments and things like that, that I worked with outside. I mean, it
was just kind of like a trial run for the most important thing that I want to do in
my life, prior to when I got there.

Utilization, in the context that Martin shared, is an important concept that could mean, as
examples: utilizing a consultation service from another department to get more medical opinion
on a patient’s condition, utilizing health care equipment in order to run tests, sending samples to
labs, or committing time or financial resources in the care of a patient.

Paul and Martin’s descriptions reveal how they connected the meaning they made from
their personal experiences, to their clinical practice. This is an important finding. Given that the
experiences they connect to practice are not strictly related to medicine, it is ever more evident
that it was the meaning they made from their personal experiences that influenced their
perspectives on the role of a physician in the system, rather than the exact experiences.

Interacting with Formal Curricula

The second major category that dealt with how these medical students developed an
HSS-aligned perspective focused on their interaction with the formal curricula. When asked to
identify significant moments in their lives that stood out as having made a fundamental mark on
how they view the role of a physician, many participants specifically highlighted experiences that
occurred during their college years, when completing their undergraduate studies prior to entering
medical school. They also mentioned the importance of participating in HSS-related curricula
during medical school. This section, therefore, is about students’ interaction with formal
curricula, and how they were able to make meaning from their experiences related to their role as
physician. This category is divided into two main themes: (1) Learning through Health Systems
Science Curriculum, and (2) Combining Humanities Education and Global Exposure to Systems Issues.

**Learning Through Health Systems Science Curriculum**

Participants in this study expressed the ways in which they learnt about systems issues through the formal HSS curriculum. They also described how they connected what they learnt through the formal HSS curriculum, to their clinical rotations. For some students, their early exposure to the clinical environment was influential in shaping their perspectives on the role of a physician, in ways that aligned with HSS in respect to its sensitivity to the socio-ecologic determinants of health. I will present all of the findings related to this theme in four subthemes below, namely: Shaping Perspectives Through Early Exposure to the System, Becoming Aware Through Clinical Rotations, Seeing How the System Works Through COVID-19 Electives, Expressing Perceptions about Shortcomings of Curriculum.

**Shaping Perspectives Through Early Exposure to the System**

For some participants in this study, their exposure to the health care system in their first-year of medical school was an influential experience that helped shaped their perspectives on the system and their perspectives on the role of a physician. At the institution where all the participants of this study were enrolled as medical students, the Patient Navigation course forms part of the HSS curriculum in the first-year of medical school. During this formal education experience, students are paired with vulnerable patients and are based at various clinical sites. These value adding roles provide students with the opportunity to have early exposure to the
health care system, see the interprofessional teamwork dynamics, and be exposed to some of the barriers patients face in getting the health care they need.

While several students mentioned the Patient Navigation course during their interviews, Paul and Robert described how the course expanded their perspectives on the system, gave them a view of the patients’ perspective, and highlighted the importance of considering socio-ecologic factors when caring for patients. Paul described his experience at a free clinic, and how working in a resource limited area helped him to realize that the health system strains when it is overutilized:

… they, like, ran a really lean operation because it's all donation base. And, I remember one time they showed us their like, they paid for medications… So, like if they give this one person does like $200 meds and they just increased the, you know, their overall expenditures, and then they wouldn't be able to help as many people. So, I think that you really see it play out more in resource limited areas, whereas the bigger the amounts get, the harder it is to sometimes feel it.

Robert described his Patient Navigation experiences, and noted how these were powerful interactions that convinced him of the importance of considering the social determinants of health when caring for patients. He explained how one of his patients had uncontrolled diabetes and her condition was primarily impacted by her social conditions:

... I was responsible for taking care of two patients. The first was a diabetic who had very poor social support. And I remember… the diabetic with poor social support, and you could tell how much her, that played into her diabetes being well controlled. I saw her literally, in acute rehab, inpatient, outpatient, doing home visits, like every setting. It was very, the last one we saw, like she was not sure what to do, she ran out of her money, like her son wasn’t helping her, it was a really powerful family or patient interact. And just because you could see how none of these had to do with her diabetes, and her diabetes was still there. But there were so many things playing into why that wasn’t being controlled…

Paul also reflected on how the Patient Navigation course gave him the opportunity to see patients during home visits, which gave him a unique perspective on patients’ lives:

I really liked patient navigation. And that one was really cool. We used to do home visits. And, so, I really enjoyed going out into a patient’s home and just kind of seeing stuff about, you know, how they store their medicines and little things you just couldn’t get in the clinic. You know, “do they have a fire alarm?”,
that kind of stuff, but you can ask but it’s different to see... I remember one guy,
he was trying to quit alcohol use. And it’s like we saw it there. You can say,
“Okay, well, it looks like you’re still struggling with that” …

Lucy reported that her Patient Navigation experience solidified her belief in the importance of
health policy. She reflected on the patient she worked with and noted how this gave her the
opportunity to see how policy was impacting the patient experience, from a medical perspective:

My Patient Nav. experience as a whole… If anything, it like super, super
solidified for me what I had already believed about the importance of policy and
advocacy, realizing the lack of social supports in this area to access for her,
realizing how difficult, even though how hard she was trying, how difficult it was
for her to get access. I think all of that I knew, but it was the first time seeing it
from a medical perspective and not a social services perspective. So, that was
very powerful.

Robert discussed his realization that it is critical for physicians to consider the social determinants
of health (SDoH) when treating patients, and in addressing systemic issues that affect health. He
recognized the HSS curriculum as addressing this topic thoroughly and expressed his view that
the Patient Navigation course was a model for how students could be shown the importance of
SDoH:

… I think it’s one of the critical points that the health systems curriculum brings
up pretty thoroughly. And I think, I think yes, I think creating more of a mindset
that the social elements do affect that, I think will be important. I think also, and
showing that as well with patient navigation, I think showing it, sort of is the key
point. I think not just talking about it, but I think showing it in the patient
navigation sense, but even you know, when you’re in the hospital or in the
outpatient setting, how that affects them on clinical rotations.

Related to SDoH, Caitlin discussed her participation in a first-year HSS course, which had a
significant influence on her perspective on health care access. She had to present a poster on
health care access in a county in fairly close proximity to her medical school. Through an
interaction with someone whose father was from that county, she was shocked to learn how little
access people had to health care:

… It was kind of eye opening to see how little access people had. And then I was
at [institutional conference] presenting it when one of the people came up whose
dad lived in [County], and she said she had a heart attack. It took like 45 minutes
for the ambulance to get to them, not to the hospital, but just to get to them. And they called 9-1-1 like right away. Which is ridiculous. Like, you don’t think an ambulance is going to take 45 minutes. That’s not why you call an ambulance, it’s supposed to be there quick. And, so, I think I got that primary care access is not great country wide...

Health care access became an important concern for Caitlin after this “eye opening” experience that was facilitated through her participation in the HSS course. Caitlin described how she was considering doing fellowship training with the Indian Health Services, as part of her commitment to health care access.

**Becoming Aware Through Clinical Rotations**

During their interviews in this study, several participants reflected on how they gained insight into systems issues while on their clinical rotations in the latter part of their medical school education. The meaning students constructed from these experiences helped to shape their perspectives on the role of a physician, in ways that align with the principles of HSS.

Caitlin spoke about an Indian Health Services rotation she did at the end of her medical school training. She explained how the Indian Health Services offered entirely free care to patients of American Indian descent, yet the prevalence of poor diabetes’ test results (A1Cs), for example, were alarmingly high. Having this experience, Caitlin became convinced that access to health care is as serious an issue as the cost of care, and has taken the perspective that the role and responsibility of the physician is to bring health care to patients, rather than to expect patients to come to them:

I think that was really kind of eye opening about access, and like, kind of, what people are actually, people are doing; some other things we saw despite their care being free. There’s not a cost thing because any Indian Health Services, because if you go to an Indian Health Service and you are a Navajo, or a related Navajo, go to the Indian Health Services facility. It’s free. The medicines are free, so cost is not an issue. Access was the pure issue. And it is pretty amazing how much serious illness we saw… So, I think, kind of, working on getting patients, like
physicians to the patients in some form. Rather than patients to the physicians. I think part of our responsibility is to be in a place that they get to a little easier...

Mary identified her Health Equity Clerkship (HEQ) as being a formative experience for her, in terms of her perspective on the role of a physician. In particular, her experience impressed upon her that communities rely on their local physicians, and the extent to which physicians are available or integrated in the community can have a significant influence on the health of that community:

My HEQ was also like a formative experience in this area…. I think it was just like a, you know, it’s different from academics in that like the, this is like the only medical care people are receiving, you know, outside of going to a hospital. But all like these are like the doctors and their community. Um, and then I think, like, just like in medical school in general, like, you realize the importance of like the social determinants of health and how much, those are shaped by the community in which you happen to you practicing.

Robert also reflected on his HEQ as being an important clinical rotation where he became acutely aware of systemic issues impacting community health. He did his rotation in an area that he described as part of the “rust belt” where there was a significant amount of IV drug use, including heroin and fentanyl. As he worked on a project where he had to analyze the health system for that area, he realized that the health infrastructure for that area was totally insufficient. This led Robert to expanding his perspective about the significance of the health infrastructure and the socio-ecologic factors of an area, on population health:

… And I think that definitely sort of pushed me positively towards thinking about both how the health system as an infrastructure contributes to health problems, but also, again, sort of going back to the social determinants of health and how this was also an area that was, sort of, the, you know, part of the rust belt; so the jobs left and not, and definitely not having the same employment opportunities led to, you know, the opioid epidemic.

Patrick offered an interesting reflection regarding his unique Longitudinal Integrated Clerkship (LIC) experience. The regular block schedule clerkship has third-year medical students rotate from one specialty to the next, sometimes at various clinical sites. The LIC students experience all of their clerkships in a one-year program in a single health system, where they
work with the same patients, following them through various settings and specialties as they receive care. Patrick had the view that this experience allowed him to gain a systems-thinking perspective:

…I think maybe that helped me gain a little bit more of a systems-thinking perspective as well. So, I was really embedded in their system. And I followed patients throughout the year. So, I really got to know them and I think you’re able to as well with like just balancing the different clerkships and going from area to area in the hospital, you’re able to draw this more, maybe cohesive narrative of just a systems perspective, maybe, than you are in the block system...

Robert also reflected on a longitudinal Family Medicine clerkship experience, where he gained internal clarity on the role of social determinants of health in the care of patients. He had seen a patient who was trying to lose weight through dieting. The patient was transient due to his working circumstances, which negatively impacted his ability to change his eating habits:

…I think it also allowed me to appreciate the roles of the social determinants of health in a way. I sort of make it like a positive neutral, because I think while I was upset at the outcome, it made me realize like, “this is his work situation”, you know, it’s kind of difficult for him, you know, to, you know, go to the Planet Fitness five days a week and, and see, you know, when you’re working, and especially if you’re transient and other situations.

Brianna described how she became aware of system issues affecting patient care while she was on two away rotations during her third and fourth years of medical school. She recognized that strong for-profit focus at the hospitals she was visiting, resulted in staff being less available to assist patients, patients not getting adequate time invested in them in order to overcome their socio-linguistic barriers, and ultimately patients not getting the care that they needed because the hospital did not offer low profit services to uninsured patients:

I feel like the team rounding when we did it, was to get in, see what we need to see, get out. It wasn’t checking in with the patient to see what can we do for them… We didn’t take the time to make sure that they knew what was going on. We just tried to try to communicate the best we could and get out… I can also think of another institution where I had similar feelings, where just because of the amount of staff that was there, it was very difficult to get the patients everything they needed. Oftentimes, I felt like the patients weren’t getting what, the care they needed, just because of the, I guess, the financial security and supplies that were at that specific hospital I was at…
Brianna also discussed how her time on an Intensive Care Unit (ICU) rotation helped her to align her perspective on the role of a physician with the principles of HSS. She was able to empathize with a patient to whom she had failed to introduce herself. This experience helped influence her to show commitment to providing the patient with an excellent patient experience by seeking to understand the patient’s perspective, and thereby effectively communicating with the patient:

…I guess, kind of changed my perspective in the future on how I want to be a physician, and kind of made me refocus on my patient centered care, was when I was on an ICU rotation… So, I feel like that was a moment when I thought we focused on patient centered care and was like, despite what’s going on and how rushed things may be or what kind of stress are going on, you still have to know what’s going on with the patient from a personal perspective, and make sure that they understand what’s going on. Because I’m sure it’s like, if I was in their situation, I wouldn’t want the same thing to happen, to not know what’s going on, to not know who the people were, and to not be communicated with.

Several students became more aware of systems issues as they participated in their clinical rotations, in the latter parts of their medical school training. The meaning they constructed from these experiences influenced their perspectives on the role of a physician, in ways that align with the principles of HSS.

*Seeing How the System Works Through COVID-19 Electives*

Participants were able to see how the health care system works, through their involvement in COVID-19 electives. What started as students wanting to help out their local health care system during the COVID-19 pandemic, ending up being 17 student task forces. These task forces comprised of students from all levels, first-year medical students to fourth-year medical students. Later, these task forces became electives, for which students were awarded credit. These task forces ranged from assisting with telehealth screening, where students received calls from patients and screened them for COVID-19 using a script, to a medical engineering
workgroup, which planned for how the local health system would adapt and innovate, if it ended up with shortages of supplies, machinery or instrumentation.

Garry spoke highly of his experience in the COVID-19 electives, highlighting how it have him new exposure to parts of the local health care system:

Interfacing with the health care system repeatedly through all these different tasks has been invaluable source of insight in terms of understanding how a health care system works and how interconnected all these different departments really are, that we just had no experience to exposure to, as medical students or students before that… we really got to see how interconnected everything is and to see how a sort of like a spider web, where as if a strain is introduced to one component of the health care system, we were able to see the ripple effects kind of across the web… to participate in targeted responses at different junctures within the health care system, was really invaluable to see how that worked and to be able to participate in it.

Abheer also described how the COVID-19 elective expanded his understanding of the nature of the local health system beyond what he had already learned through the formal HSS curriculum during his medical school years:

I think the systems courses patient navigation and my entire career during med school here, you know, opened my eyes to all the different types of people that need to help a hospital run. And I think that this kind of went one step bigger and kind of showed me, these are all the things in the region or in the community that needs to be put together to help the hospital run, and then the hospital can help the community. So, it’s almost like a like a symbiotic relationship and for us to help the community, the community needs to help us as well. And it’s like, it’s like a give and take. Understanding that from a more macroscopic view is something that I do plan on bringing in as a physician.

Interestingly, Abheer expressed how he intended on bringing his expanded view of how a local health system relates to a local community, into his perspective on the role of physician. Abheer also described how participating in COVID-19 electives broadened his vision of the working components in a health system:

And they are able to, you know, meaningfully contribute in a way. The school is providing them an avenue to meaningfully contribute. I think that is incredible. But I think how changed me as provider is that, I think, it kind of opened my eyes a little more about how, you know, how many like, how many different parts or how many different people need to be involved to keep, to help the COVID patients and help the hospital with the pandemic. Whether it be like
supply chain or understanding supply chain, whether it be understanding manufacturers, and understanding and helping out the hospital in any way possible. I think that that’s really broaden my vision.

Robert also described how his involvement in the COVID-19 telehealth elective brought systems issues to the forefront of his thinking. He noted that he was incorporating systems thinking into his practice, though he thought that this was an evolving process:

… with my response with COVID, it was hard for me not to think of sort of how the grand system works overall, especially within the screening process I was a part of. And there were some issues came, that came up and I tried to suggest different, you know, suggestions on, you know, like, we can make this better. There was sort of a gap of patients we were reaching, so I think I’m incorporating it more, I think, it’s definitely a process. And I don’t think it’s, you know, being only exposed to it essentially since the beginning of medical school. I can’t say that I’m fluent in it yet, but I think it’s something I’m working on.

Garry’s participation as a student leader in these COVID-19 electives reinforced his systems-orientated perspective of the role of a physician, by giving him practical exposure to participating in targeted ways within “different junctures” of the health care system. Participating in the COVID-19 electives also reinforced Dianne’s awareness of the system. She was particularly impressed by how the COVID-19 pandemic helped to momentarily reduce access barriers for people without insurance in her local health system:

… it, kind of, reinforced things that I already knew about the system and that, um, you know, it’s really inter-tied to a lot of different things; in this case, like employment is really essential to being able to be a member or be taken care of by the health system. And something that was really nice about telehealth screening was that we weren’t asking for insurance information. And then, you know, I stopped screening.

After Dianne stopped screening, however, she discovered that her local health system was then only testing patients who had health insurance. This raised systems questions for her around the negative public health impact of not testing uninsured patients during the pandemic:

… Are we all of a sudden not offering screening to patients that don’t have insurance? And what effect does that have with patients that don’t have insurance all the sudden aren’t able to get tested? When really, like, we, we need to be testing patients to get a hold of the spread of the virus.
The public health need for testing during the COVID-19 pandemic, and Dianne’s close involvement in screening patients, highlighted for her the negative consequences of patients needing to have insurance in order to have access to care. Caitlin expressed feeling as though the COVID-19 pandemic had exposed some system errors, and that the health care system in the U.S. was being pushed to change as a consequence:

I think COVID is also going to be something that pushes a lot of us toward it too, because systems, health systems have had to completely revamp in the last two months in a way that we never thought would happen, and it’s kind of exposed some systems errors.

Dianne described one such system issue that was exposed through COVID-19, from her view working on telehealth screening. Through her description of the problem, she showed an acute awareness of the waste or redundancy in the system, with patients having to seek out a work excuse note from their Primary Care Physician (PCP), as the free COVID-19 screening service they received was not set up to provide an excuse note from work. She also highlighted that this system issue negatively impacted patient care, since a PCP would have to write a note, in spite of not providing the screening or making the diagnosis:

… I just felt like it was kind of a breakdown in the system… Generally, I think the rule was that they were supposed to tell them to ask their PCPs for notes and a lot of them also didn’t have PCP. So, you’re like sending them to this person that doesn’t exist. And it’s not a great time to establish care with a PCP when you can’t go into an office to see the person. And then you’re just immediately asking for a work excuse. Like, that doesn’t, it doesn’t really make much sense.

Robert also expressed frustration with the same system issue related to COVID-19 testing and the need for a work excuse note to come from the patients’ PCP. Mary also expressed similar sentiments to Dianne, who was impressed by how COVID-19 allowed patients to get free screening, but then became disheartened by how the positive gain was lost when patients started to be asked for insurance in order to be tested. Mary described how the COVID-19 pandemic had prompted huge investments in telehealth, which she felt would have a significant impact on how
care was delivered in the future. However, she expressed doubt that the system would continue to be as responsive, nimble, and flexible once the COVID-19 pandemic was over.

Mary reflected on how, over the course of her medical school education, she experienced a significant shift in her understanding of the importance of social determinants of health and how they affect patient care, but also her understanding of how the way the health care system is structured can influence the type of care people are able to receive in various scenarios. She noted how this shift in her understanding was reinforced by her involvement in a COVID-19 elective:

… then kind of reinforced during the COVID crisis of just, I guess, like how important non biological traits are in how we care for patients and how we deliver health care… a big like shift for me in medical school is just understanding the importance of what both, you know, social determinants of health, but also the impact of how we structure the health system and how that influences the type of care people are able to receive in different situations.

In toto, students' participation in COVID-19 electives highlighted systems issues to them and expanded or refined their views on how the health system functions. The meaning participants drew from their expanded view of the system, influenced their view of the role of the physician, within the context of the broader health care system.

**Expressing Perceptions about Shortcomings of Curriculum**

Although no students were asked to comment specifically on the effectiveness of the HSS curriculum, many independently offered their comments about the perceived shortcoming of the curriculum. In almost all cases, these responses came after I asked the question, “if the purpose of this research study is to understand how and why fourth-year medical students incorporate the principles of HSS into their perspectives on the role of a physician, what did I not ask you that I should have?”. Sometimes, instead of ending the questions with “what did I not ask you that I
should have?”, I ended with “what did we not talk about that we should have?” or some variation that closely resembled that question. Since the formal HSS curriculum was identified by participants as having an influence on the formation of their perspectives on the role of a physician, it is important to present their perspectives on the shortcomings of the curriculum.

Lucy explained her view that she was a proponent of HSS education, and she felt that it was largely positive. However, she expressed discontent with the amount of space given to students to be able to mold the HSS curriculum through their feedback on how to improve it:

… What we didn’t talk about is asking, “how do we improve our health system science curriculum?”. Because I think it’s great that we have it, and there’s a lot of positives to it. But I think there’s a lot of reasons why students do tend to resent it a little bit. And we’re never asked about that. We’re usually just asked about what we liked…

Paul echoed Lucy’s view that the HSS curriculum did not make enough space for gathering student feedback, in order to customize content according to their interests. Paul also expressed similar sentiments to Lucy, with respect to not feeling like students were engaged enough. For Paul, he viewed students as generally wanting to learn HSS, but that they might have become disengaged because the formal content was not addressed with the appropriate depth:

… it was almost like the other problem where it’s like, people really, really wanted to learn it, and they wanted to go deeper. And there’s kind of this like, maybe it’s a thing of a bygone era where like, people were very resistant initially. I think there still is some resistance. But I think that we’re kind of coming out of a generation that really does understand, like, understand how important it is. So, we should just really like, go deep. And like, get into some of the nitty gritty stuff...

Paul expressed his view that the HSS curriculum needed to go deeper, and that too much time was spent justifying why HSS was important.

Caitlin described the HSS content as being too theoretical or philosophical, rather than practical. Caitlin mentioned that more basic information about the system was needed in the curriculum, in order to make the content meaningful, especially when students have had little
exposure to the clinical environment. She also expressed the view that there was a lot of repetition in the curriculum:

… I know they’ve revamped it quite a bit since I took it. And I think that’s good, because I think that we got a lot of repetition and a lot of, like, I would have liked… we kind of got it more overarching themes, rather than actual detailed facts and information about how the system runs… I think we kind of skipped over some of the basics, which I think having that knowledge, and I’ve kind of gained some of that as I’ve gone along on my own, kind of mixed with some of the lectures. But I think having that is really important because we don’t get that anywhere else…

Patrick also conveyed his view that the HSS curriculum was too theoretical and not practical enough. Patrick highlighted how HSS could equip students to be “a force to be reckoned with” if they had practical knowledge about how to be involved in policy as physicians.

For Patrick, the HSS curriculum did not give him practical skills to be able to get involved in policy:

I think a lot of the curriculum in health systems science this year, and the elective, was maybe too theoretical and it could have focused more on the practical and, “how do I practically put these things into place?” And even things like, like I mentioned, like health policy, I think, could have stressed a little bit more and just, even in teaching medical students outside this elective about something like that, certainly a force to be reckoned with, I think, in enacting system change. And I don’t know that I learned a lot about that, how to be involved in policy as a physician in the future. I still don’t know a lot about that. And that’s something I need to now discover, but I could have been better prepped, maybe for some of that.

Lucy seemed to share Paul’s view that the HSS curriculum did not cover topics in enough depth in the first two years. She also echoed Patrick’s view that policy was not adequately covered in the first two years, and she suggested that it would have been beneficial to have policy speakers come in to speak with students:

I think what would be more beneficial use of that time is bringing in… a couple of policy speakers… in the first two years. It feels almost like the way that we’re taught to in the first few years is a little bit like, it’s a little dumbed down. And maybe it has to be, I don’t know.
Paul communicated some ideas about how students could be engaged more with respect to the how the physician can influence the system through policy if state representatives were invited to speak with medical students and give insight into what they can do to actually affect change in the policy arena.

Duong expressed his view that some practical “how to” concepts in the HSS curriculum needed to be repeated. He described his view that there was diversity in the topics that were presented in the HSS curriculum, but this may have taken away from students’ ability to fully grasp specific content areas:

… We learned a lot of things and, you know, and personally I forget, forget a lot of things. So, is that a certain “how you topics” that a person would like to be repeated, so that you get the most out of it. Like insurance, that kind of thing. … So, I think like a good question would be, like, “would there be any other topics that you would like to be repeated, or the theme that you would like to be repeated throughout your medical education, over the last four years?” Instead of versus the diversity of the topics that you get introduced to, but not necessarily fully grasp for your four years...

When asked about what specific topics he thought should be repeated, Duong highlighted the need to revisit insurance. Mary expressed her view that there was repetition in the HSS curriculum in highlighting systems errors, but that there lacked guidance on how future physicians could make tangible changes in the health system. She also expressed doubt that significant systems changes would come through HSS. Instead, she felt like a greater social political movement would be needed to affect major systemic changes in health care:

… you can say 100 million times that “oh, this is again another social determinants of health” and “yet again another inefficiency in the health care system”. But how, like, what can we actually do that will make concrete changes? I think that maybe that is, and I know there’s a greater forces disrupting our ability to make changes and everything, but I just I mean, I think it’s important. I don’t know if that, that if I think that if significant changes are actually going to happen though, I don’t think it’s going to come from health system science…

Patrick described how the HSS curriculum helped to give him mental models of how to think about systems issues in various circumstances. However, he too had reservations about
whether HSS would be successful in helping facilitate students becoming systems thinkers. He also alluded to the idea that the HSS curriculum has to be critically reviewed to identify areas where it could improve:

The Health System Science education… has certainly helped me have more of those, you know like I said, mental models and ability to appreciate some of these things. But it might not be the answer, because that is like implying that, it’s a lot more important than maybe it is, or it’s implying also that like it’s a universal truth that every medical student who goes through this is going to become the systems thinker. And I don’t think that that’s true. I just think that helps at least start that process a little bit more And, then, there’s even the discussion of, like, is it, has it been done well enough to do that to, you know, and like what are the flaws within just the curriculum itself? And it’s initiative of creating a systems thinker.

Duong more directly communicated his view on how effective the HSS curriculum had been in preparing him to understand the health care system, navigate it, and leverage it. He conveyed his view that, even without any formal HSS curriculum, students would learn about systems issues through their clinical experiences or when patients present system barriers in getting the care they need. Duong also reflected on his work experiences prior to medical school, as he questioned the need for HSS education in medical school. He mentioned his pre-medical school experiences of being a medical scribe and a medical technician, and his view that he did not have more or less knowledge or professional skills than his medical school colleagues, by the end of medical school. Duong suggested that perhaps, in the same way, students could simply learn about HSS in residency rather than in medical school, since all students would be equally prepared by the time they finished residency training anyway:

… Are we getting to the same point at the end of residency. In terms of systems thinking and system openness? Is the same thing with like medical scribe and being a tech in before medical school at the end of medical school kind of everyone got the same level kind of this similar level of knowledge and professional skill, regardless of what we did before medical school, so, you know, like having it right there at the beginning and corner having it before. Does it doesn’t matter at the end. So, yeah, so, like, how much of a system education is needed to get that outcome?
While Robert thought that the Patient Navigation course was helpful, he thought it was more effective for systems issues to come up more organically in the clinical environment. He recognized that for this to be effective, it is necessary that systems-minded physicians are present on rotations where students are learning:

But I definitely think patient navigation was helpful. But I think it’s nice to see it sort of organically come up on rotations. But I think a lot of that is having people that are systems minded, systems minded attending physicians on these rotations that are being the ones that are teaching the medical students. I think just encouraging that within your rotations within the system is important. If you want to perpetuate the sort of thought that sort of makes.

Robert compared his Patient Navigation experience with his experience in HSS lectures. He used an example about learning about the United Kingdom’s (U.K.) National Health Service (NHS) and comparing that with various other health systems, to highlight how he felt about the lectures not contributing to any shift in his perspective on the role of a physician, or on how the system functions:

… I felt like it was just a lot of people making opinions rather than sort of learning concrete things about these systems because, of course, the NHS is a great system to study, it’s definitely got pros. It has some cons as well. And then, of course, you comparing that to what has been done with the U.S. system with Obamacare. So, I, you know, I think the systems class, I think, for is the role of the physician, I feel like it didn’t move me much as far as sort of thinking about the system elements as much. To be quite frank, I don’t think it left me with that negative impression, but I just don’t think it moved me.

Not all participants felt as positively about the Patient Navigation course. Lucy, who had worked as a social worker before entering medical school, explained her reservations about the course. Importantly, Lucy highlighted how she was adjusting to a new area as a new medical student herself, and that she felt as though she was not able to give her vulnerable patient the kind of attention she needed:

I was a little frustrated early on because I was like, one, I literally just left this profession and I was getting paid to do this work. Two, I was new to the area. And I was like, it took me a long time as an employee going through employee training to learn how to navigate the system in [area], and I was just plopped here as a medical student with a ton of other things to worry about: my classes, my
loans, “do I fit imposter syndrome?” All of that stuff. And then was asked to navigate this new system for a patient who was particularly vulnerable. And I just felt like that wasn’t fair to that patient at all…

Lucy also communicated her view that the execution or delivery of the HSS lectures could have been improved. She also reflected on whether the Translating Health Systems course may have been more effective for her, because of her shifted perspective that had come with a greater level of clinical exposure by that time:

But the execution of the sessions, sometimes could leave a lot to be desired. If, like, I think it’s excellent that we had a bunch of people from social groups that worked with homeless populations, but the groups that came in to talk about, to talk to us about it, weren’t really prepared to do so. And I, for that particular session, it completely devolved into a debate as a whole, on the benefit of social services. And I think it just, I don’t know, I don’t have a good… I think that the… translating to health systems [was] done a lot better than the courses as a whole. And maybe that’s because we had more clinical perspective, but it seems like a lot of time is spent justifying why we need systems.

In addition to highlighting that there was significant time spent in the HSS lectures justifying why systems education is needed, Lucy also provided other information about how the execution of the HSS sessions may have been lacking in effectiveness.

In reflecting on what he learned from a pharmacist while on his Health Equity Clerkship (HEQ) rotation, Paul described some ideas he had about how the HSS sessions might have been more practical, rather than superficial. He suggested that it might have been beneficial to bring pharmaceutical companies into lectures with students and have students ask them directly about how to reduce the costs of medicine.

Lucy recognized that HSS brought about fundamental shifts in perspective for some of her classmates, but that it was more a compliment to her existing interest in advocating through policy, rather than the factor that prompted her interest in advocacy through policy:

I wonder, while I was absolutely influenced by [Medical School’s] Health System Science curriculum and I found it to be super helpful in shaping my perspective on things, I did enter medicine, knowing that I already wanted to do that. So, it was a great compliment that fell into my lap. Whereas, I think I often wonder if the people who entered medicine without that being on their radar at
all, how much that has influenced them and changed them. I would guess quite a bit because I know people who weren't thinking about it at all, and had some like frame shifting perspective changes through that course.

Brianna also pointed to how it was only once she had finished with medical school that she could greater appreciate the influence the HSS curriculum has had on her perspective:

… I feel like now in hindsight, I feel like these concepts kind of applied to a lot more than I expected, in a much wider variety of systems problems than I expected. So, I feel like as time goes on, and I have now realized how to apply those systems concepts in different ways, kind of goals have aligned more and objectives have aligned more.

There was an underlying suggestion in Brianna’s comments that she did not fully appreciate the value of the HSS curriculum at the times that she was initially being exposed to it. She mentioned this more explicitly at another time in her interview:

I don’t know if like the classes at the time really resonated. I think it’s, oftentimes it was hard to kind of see the big picture when you’re sitting in a lecture room for two hours. I know they tried the best to make it as kind of productive and kind of applicable as possible. But it’s hard to apply that in a two-hour session.

Participants in general shared these kinds of mixed feelings about the formal HSS curriculum, even though they recognized it being influential in their ability to apply systems-thinking, and in the formation of their perspectives on the role of a physician. Dianne, also, did not speak negatively about her experience with the Patient Navigation course, but highlighted how volunteering at a local free clinic was more important to her, in her recognition of the importance of social determinants of health in patient care:

… … I feel like that was probably much more important to me than my patient navigation experience was, in thinking about the social determinants of health and the, and barriers that patients face getting care. It was, it was evident. It’s evident with almost every patient that there’s some type of barrier that they’re facing. And it can be frustrating to know like, what the right thing is and what you would do under the best circumstances, but then have to say, “well, that’s, that’s not an option here”…

Students in this study independently offered ideas about how they thought the HSS curriculum could be improved. They discussed their views that the content was sometimes too
theoretical and not practical enough. Students also communicated that it felt to them that too much time was spent in formal lectures justifying why HSS needed to be studied, rather than reviewing topics in depth. Participants expressed their views that there were insufficient opportunities to tailor the content according to the interests of the student body, or to provide feedback about how to approach topics differently. Some participants also mentioned that the formal HSS sessions could have been executed more effectively, and during their interviews, students communicated their ideas about how they thought this could be done differently. Some participants also noted that there was a diversity of topics in the HSS curriculum, but insufficient opportunities for students to fully master any one area in the systems curriculum.

**Combining Humanities Education and Global Exposure to Systems Issues**

Relating humanities to their experiences with global exposure to systems issues was key for several of participants in this study. This pertains to the students who had done global trips, especially for Garry, Lucy, and Paul. In all cases, their humanities education was connected to global trips and took place during their undergraduate years. Interestingly, many participants were drawn to their medical school because of its strong emphasis on the humanities. I present the findings from this theme in four subthemes.

First, I submit how students’ global educational trips deeply shaped their perspectives on the role of the physician by promoting awareness of self and others, and by fostering a more permeating perspective. Next, I show how students were able to foster an appreciation for other ways of knowing as a consequence of the meaning they constructed from their experiences on global educational trips. Third, I present how students were able to experience systems issues more acutely when participating in global educational experiences, and how the meaning they made from these experiences deeply influenced their perspectives on the role of a physician.
Finally, I offer findings related to how students’ global educational experiences had long lasting influences on them in their practice as student physicians, and on their perspectives on the role of a physician.

**Promoting Awareness and a More Permeating Perspective**

For some participants in this study, namely for Paul, Lucy, and Garry, their global educational trips deeply shaped their perspectives on the role of the physician by promoting awareness of self and others, and by fostering a more permeating perspective. Importantly, these global trips all took place within the broader context of a humanities-type education or course. Participants connected meaning they constructed from their experiences, to their perspectives about the role of a physician.

Garry did a minor in anthropology in his undergraduate degree studies. He was part of a merit-based scholarship program where cohorts of selected students learn together about leadership, with a strong focus on service. The influence of his involvement in this merit-based scholarship program is discussed in the third section of this chapter. Important here, however, is Garry’s view that his anthropology classes and the connected time he spent doing anthropological research in Ecuador, was significant in the formation of his perspective on the role of a physician, especially as it relates to working with people of different backgrounds:

… I think a large part of the purpose of one of the lessons that I took from my anthropological education was the ability and framework to deconstruct the assumptions that are hard-baked into the cultural milieu that you’re in, and to identify them to realize their shortcomings, and then to identify different holdings and other cultural and societal milieus. And that was something that I think is really critically important, especially if… you want to work with people who have vastly different backgrounds than you.

Fascinatingly, Garry saw his anthropological education as having equipped him, and given him a framework, to critically reflect on the assumptions that are embedded in a culture. He expressed
how valuable this education is when working with people of different backgrounds, in the context of working as a physician. Later in his interview, Garry drew the direct connection between what he learnt through his anthropological education and the role of a physician in the physician-doctor relationship:

An effective doctor-patient relationship that’s going to have the best outcomes is with a physician who’s going to be able to understand that, and kind of drop and, kind of, construct those bridges where they need to be constructed. And, so, that was one of the things I really took out of my anthro education, which I’m really thankful for.

Lucy described her trip to El Salvador during her undergraduate studies as being a “transformation” with a “perspective shift”. In particular, she become more aware of her own privilege in comparison to others, even as a working-class family in the United States:

… it was a huge perspective shift for me at the time because I think… And it’s, it’s awful because it took me until 20 years old to recognize that, like, there are, the majority of people in the world do not have access to the same kind of education, let alone the same resources that I had even as, like a working-class family in the United States. So that was that was perspective shifting. Absolutely.

Lucy went on to describe how her perspective shift in realizing her relative privilege, through her trip to El Salvador, did not stop there. After the trip, she explained, she reflected more on the volunteer work that she and her classmates had done, and became more critical about what the best way to help disadvantaged communities might be:

… And, like, then they would hire construction workers to actually come in later and like kind of fix the mess that we left there as 20-year olds that don’t know what we’re doing. So, I think that the transformation happened immediately with a perspective shift on, “holy crap, that this is like the majority of the world”. And then it happened again later when I realized like, what were we doing, you know, and what is my role in all this, and what is the right way to help.

By the time that Lucy went on a trip to Uganda, as part of a course on ‘Christianity and Philosophy in Africa’, she started to see some striking similarities between the colonialization she was learning about in class, and the work they were doing as students in Uganda:

… I was primed by the fact that we were at on a course about colonization, that probably helped. Um, and I was surprised. I was like, “does anyone else see the
parallels here?” and it was that. When we would do our volunteer work and it was either that it would be through a hospital or through an NGO that was run by Americans, and I just remember thinking like “the work that we’re doing, I hope is helpful” and “I hope is ultimately what the community asked for, but it just seems like we’re coming to Uganda and we’re working with all white people here” and I just like, I wonder “are we truly asking the community, what they want, and what they’re, what, how we can help them?” “Because otherwise, it seems to be like very much a parallel to what we’re learning in this class”. And the irony there just was striking to me, but no one really talked about it. I don’t know.

Even though Lucy’s Honors class does not appear to have deliberately provoked students to think about their volunteer efforts as a type of neo-colonialism, it is indeed interesting that the combination of this global experience and a humanities course provided the experiences for Lucy to construct that meaning from it. Like Garry, Lucy’s global educational trips appeared to provide unique exposure that resulted in a more permeating perspective. Of note, Garry’s anthropological education provided him with the framework and ability to deconstruct assumptions that are embedded in cultures. Both Lucy and Garry bring these outlooks into their perspectives on the role of a physician.

**Fostering an Appreciation for Other Ways of Knowing**

For several participants in this study, their humanities education, and connected global educational trips, had fostered an appreciation for other ways of knowing. This appreciation is incorporated into participants’ perspectives on the role of a physician, in ways that align with the principles of HSS.

Garry described how he did three months of ethnographic anthropological research in Ecuador. His research focused on how the physician-patient relationship, in the context of the treatment of diabetes. He indicated that patients had their own cultural understandings and
alternative understandings of the disease process, and how they were interacting with physicians who were trained in Western medicine:

... many of their patients didn’t have more than primary or secondary school education, and understood their disease processes clearly differently, which was strongly molded by cultural understandings and alternative understandings of their disease process, not invalid ones, but just not Western biomedicine ones. And, so, I was really interested in, kind of, how that works in the clinic office. And, so, I spent a lot of my time doing that.

Garry’s description of the research he did in Ecuador was most interesting. He highlighted that patients’ cultural understandings and alternative understandings of their disease process were not invalid, only different from Western biomedical understandings of the disease process. Garry did not try to invalidate patients’ alternative ways of knowing. Garry’s research in Ecuador opened up further inquiry into other ways of knowing, like ethnobotany, which fundamentally influenced his perspective on the role of a physician, particularly with respect to the physician-patient relationship:

And then also, you know, I read a lot about like ethnobotany and all these other kinds of founts of knowledge, which aren’t fully represented in western biomedicine. There’s some that are, like a lot of chemo drugs and stuff like that are derived from plants and stuff like that, but a lot isn’t. But they’ve worked for people for, you know, hundreds, if not thousands, of years and recognizing that there are bodies of knowledge outside of those I’m taught in, that they’re just as valid, but in a different way. I think it is also an important understanding when coming in, meeting your patients where they are.

Through her experiences in Uganda, Lucy also expressed appreciation for non-western ideas or ways of knowing. In particular, she came to question the notion that Western ideas about how to assist developing countries are necessarily superior to other ideas:

I have very mixed emotions and opinions on global health. Just because I, you know, worry a little bit about the, just the, the notion that the Western idea is, is the way to do it. And that we’re dropping into a community and deciding what the community needs and not letting the community tell us what they need.

It is interesting that the formal education in which Garry participated, in Ecuador, was really about reifying the cultural background and cultural heritage of the people in Salango, Ecuador:
So, the work that they were doing down there was in part to put to paper and reified the cultural background and cultural heritage of the people they were working with, as kind of a bulwark against increasing development, and other encroachments, on the part of various players in the area.

Of note, while contributing, through research, to this endeavor of reifying the cultural background and cultural heritage of the people in this area, Garry himself learnt to appreciate other ways of knowing.

**Experiencing Systems Issues Through Global Exposure**

While systems issues are present in U.S. health care, participants in this study were able to experience systems issues more acutely when participating in global educational experiences. In developing countries, the systems issues tended to be more exaggerated and thus more noticeable to students. Experiencing these systems issues influenced participants’ perspectives on the system, and the role of a physician within it.

Paul described how he spent time in Zambia on two occasions. Given the way the health care system is funded through donations in Zambia and its limited resources, he was able to connect how, for example, ordering unnecessary x-rays places undue pressure on the system:

… if you spend all the money on one area it takes from other areas. So, they do a lot with like feeding programs, that kind of stuff. So, like, if you spend all your money on like unnecessary x-rays, like it has to come somewhere else from their system. And, so, they can’t put as much towards their feeding programs, which also like impact a huge number of people.

Paul explained how he changed his behavior in the clinical environment in the U.S. because of his expanded perspective on the system, and his awareness of the implications of physician orders on the resources of the system:

… when we’re on the wards, it’s very easy to be like, “oh, like it’s just like another click”, like never is… sometimes people get into this mindset of "it never hurts", but it actually does. It’s very costly to the patient and the whole system … And so like, I definitely think that coming back, I really, kind of first year, meant
like, “I need to make sure that I’m trying to go after a diagnosis and not go after, like, big giant methods that may be not appropriate”. So, you run the test based off of your most likely diagnoses. And you really have to think about, “what am I actually looking for?”

During her time in Uganda, Lucy realized the issues around not approaching problems with systems-thinking. She described how she and her college classmates volunteered while in Uganda by raising money to buy basic necessities for families camped outside of a hospital. The families were present because they had to cook for their sick family members. Lucy identified this experience in Uganda as perhaps being her first seminal experience “dabbling with a systems-thinking perspective”:

… And I can’t help but wonder, looking back at it, was that like really the best way to approach that? Like maybe now, if I was involved in that, I would say, like, maybe we can set up some agreement with the staff or hire a chef that can cook for everybody. And then you provide a job and services for families and not giving them more work, essentially… But, also, I think I started thinking that way because I really had a lot of mixed emotions and, I think, I was one of the few people that like felt uneasy about what we’re doing… So, I think that was maybe my first, looking back, my first, like dabbling in a systems-thinking perspective.

Paul also started to recognize the value of systems thinking, in the context of outside organizations attempting to address immediate needs in a system foreign to them, and how that could have negative unintended consequences. He described how he visited Rome for six months as part of a study abroad course in college where he was on the Pontifical Council of Justice and Peace, and the perspective he gained from that experience:

… And I was working on with them like editing a document called ‘land and food’, which is like responsible use of like farming and that kind of stuff to help support these communities. And, so, it got into a lot of these like interesting dynamics where like, a lot of times, like, if there’s an area struggling with food security, they would go ahead and it was like, “ship a bunch of food”, but then it would like collapse their farming infrastructure, because they didn’t anticipate how that would affect the local economy of the area.

While systems issues are present in U.S. health care, Paul and Lucy were struck by the exaggerated conditions in the global environments in which they found themselves as they
participated in formal education programs. From these experiences, they constructed perspectives on the role of a physician in the context of the system.

Enduring Motivations in Practice

For these three participants in this study who had global educational experiences, such experiences had long lasting influences on them in their practice as student physicians, and on their perspectives on the role of a physician. For Garry and Lucy, they shaped their career paths with connections they were making to their global experiences. Paul articulated his perspective on the responsibility of a physician in the context of the system, as a consequence of the meaning he assigned to his experiences in Zambia. These perspectives align with the principles of HSS.

Garry described how he thought that his anthropological education, which included a global trip to Ecuador, skirted him towards a desire to work with migrants and refugees in his work as a physician:

And, so, it was like academic, but it was also, it had a purpose of serving the people who were the subjects of it, and, so, that’s something that I still kind of pull today in medicine, and something I’m really interested in working with migrants and refugees in particular. And that’s something that I’ve spent a lot of time on here in medical school, and I’m pretty sure that my first one of the experiences that most skirted me towards that was this working in anthropology in undergrad.

He mentioned that he chose a residency program where he could pursue this interest in working with migrant and refugee populations:

I’m lucky enough to be going to (location) where there’s a large focus on working with medically underserved. You can actually build your clinic around like refugees and immigrants, which I’m looking at doing. So, I kind of viewed that as a stepping stone. I’ve been brushing up on my Spanish, Arabic, and French a little bit more now. So, I’m hoping that can start to, sort of, start to do this in certain ways. So, it’s more of a stepping stone to get there.
Based on what Garry communicated in his interview, he clearly intends to pursue his desire to work with these populations well into his career. Lucy also shaped her career path, in some ways, based on her global experiences. She mentioned that she had taken up a position as a lead clinical coordinator on a Dengue vaccine trial, something she was, in part, interested in because she had contracted Dengue when visiting El Salvador: “So, I got Dengue when I was in El Salvador, which is also part of why I wanted like I was interested in that particular position. So, I was the lead Clinical Coordinator on the back or on the Dengue vaccine trial.”

For Paul, his experiences in Zambia resulted in some technical skills, through learning about how to do an effective physical exam. Paul retold a story about a patient interaction he had in Zambia where a mother presented her baby with a ten-centimeter mass for physical exam. More importantly, his view of how this new skill could shape his interaction with the system, is noteworthy:

… a really good solid physical exam can save you a lot of money both for you, the system, and also just a lot of hassle. So, this stuff is not comfortable for patients, all the tests. MRIs are a whole process. And, so, I think that changed when I came back, because you really started to see like, okay, like, this is not free, this is actually a lot a lot of money. But it's also just not responsible to just, to get the wide net all the time. So, I think that definitely is the biggest takeaway.

At different times during our interview, Paul organically described ways in which he presently commits himself to cost-conscious care, and how this orientation is embedded into his perspective on the role of a physician. His experiences in Zambia had an enduring influence on how he practices, and how he views the role of a physician in the context of the system.

Shaping Perspectives Through Social Networks

Participants’ perspectives on the role of the physician were fundamentally shaped through the influence of their social networks. This section is about identifying the social
networks that were key in influencing students’ perspectives on the role of the physician, and describing how they influenced students’ worldviews in ways that aligned with the principles of HSS.

This section begins by presenting findings about the ways in which role models shaped students’ perspectives on the role of a physician. The second part of this section offers findings related to how students’ systems orientation was reinforced through different support networks throughout their lives.

**Being Influenced by Role Models**

Participants in this study reflected on how influential their role models have been in shaping their perspectives on the role of a physician. Students shared experiences that they had with exemplary physicians. These physicians inspired students to form perspectives on the view of the system, the ways to approach patient care, the importance of an interprofessional orientation to care, the need to practice cost-conscious care, and the value of physicians being integrated into the community where they practice. Students also recognized the important role that communicators of scientific knowledge have played in shaping their perspectives on the role of a physician. All of these specific findings are discussed in the three sub-themes below, namely: Learning from Exemplary Physicians, Being Molded by Communicators of Scientific Knowledge, and Mirroring Physician Models.

**Learning from Exemplary Physicians**

Patrick, Lucy, Robert, Abheer, Mary, Paul, Caitlin, and Martin all described how they learned to adopt an HSS-aligned perspective on the role of a physician, through exemplary
physicians. In discussing with Patrick about how he had come to embrace the principles of HSS, he captured the influence of role models in broad terms:

I think I’ve worked with a lot of really amazing attendings and residents that have had that be a very important aspect of medical care to them, which I think is something I’ve gone to learn from them, and how they look at it, and how they view the differences, and what’s important, and what’s not. Just, kind of, the role models and the people I’ve had the opportunity to learn from to really enforce the importance of that to me.

When asked to further elaborate on the characteristics that exemplary physician models have demonstrated, and which of these characteristics have influenced his view on the role of a physician, Patrick underlined how exemplary physicians communicated with patients. He also emphasized how they communicated within the medical team, and how they conducted themselves as educators:

… one of the things I really paid attention to, I think, in particular, are things like, ability to communicate, both within medical team and both as the physician and to patients as well. So, you know, their abilities to have great bedside manner and talk to a patient like they’re a person, and really explain things to them and answer their questions, be there for them. That was something that I, you know, that they modeled for me as a student. And then on the team of the medical team, you know, just how they lead rounds, or how they set expectations for everyone when we all first met as a team for the first time, or made you feel comfortable in order to ask questions and show vulnerability…

Lucy and Robert described interactions with physicians that were particularly influential in shaping each of their own perspectives on the role of a physician. These interactions were directly around systems issues. Lucy spoke about one of her third-year clerkships, where she had an attending physician who gave her the opportunity to work with a patient who was experiencing barriers to appropriate care. The patient’s insurance company would not approve paying for her to be discharged into a rehabilitation unit within a Skilled Nursing Facility (SNF). Unlike other physicians who only assign medical students to patients they might find more clinically interesting, Lucy’s attending physician gave her the opportunity to advocate for this patient in addressing this system issue:
… it was this month long, on my entire internal medicine service, battle with her insurance company. And I remember, I was lucky enough to have an attending that really involved me in that process. Because I think sometimes attendings will like shelter med students from that because it’s boring.

Robert was able to learn from a pulmonary fellow about how to navigate systems issues. Robert viewed this fellow as a role model, who actually convinced him to do an emergency medicine-internal medicine residency combination. Robert recalled how this fellow worked with patients who were also prisoners, and how his discharge planning carefully considered the systems issues that would impact this population:

… he’s a great, great guy. Very great patient demeanor. He did often consider things with discharge planning that I may not have, like considered, sort of, like, patient background, sort of, how we’re going to treat these, treat patients based on their home setting. Additionally, while I was with him, I ended up seeing… patient prisoners were some of his patients in clinic while I was there. So, that was a different experience. I hadn’t had up until that point. How he approached the situation, how he approached follow-up in those situations because obviously, it’s not easy to have, you know, there’s a lot of elements to have a prisoner get from the prison to the health system and back… so, yeah, he was a huge influence.

Discharge planning that accounts for the specific social circumstances of the patient, is considered a systems-conscious practice. Lucy described how she was always surprised when attending physicians accounted for factors influencing the care of a patient that were outside of the pathophysiology and clinical treatment of medicine. She recognized two physicians who practiced this kind of systems-conscious medicine, and how they represented role models for the physician she wants to be:

At first, I was always surprised when the attendings on our team would take time to talk about things outside of pathophysiology and clinical treatment of medicine… Like we really, when we rounded on patients, we talked about them in a very holistic way, not just their immediate clinical needs, but, “how can we get them out of here?” “What will they need when they get home?” “What policies are dictating them staying here?”, even at a hospital level or broader. So, that was hugely positive because those two in particular, are people that I think of as the kind of physicians I want to be.
Lucy described working with these two physicians as a “transformational moment” for her, when filling out her Journey Map (see Appendix B). She highlighted how they were just teaching in the way they normally would with medical students, but that this included a review of the needs of the patients in a systems-orientated manner:

They would ask the medical students to reflect on like what, almost, do like a needs assessment, but, like, for, like, systems, in, like, a systems way. Like, “what will this patient needs to be discharged beyond the clinical?”… And that again was almost, it was identified as like a transformational moment. And they were just teaching, which they would be doing anyway, but they just took a moment and added that component.

Participants in this study also recognized how exemplary physicians influenced them to incorporate an interprofessional orientation to patient care into their own perspectives on the role of a physician. Abheer highlighted the faculty with whom he worked in his third and fourth years of medical school as having shaped his understanding of how he should behave as a physician, especially in the context of a broader medical care team:

… During my third- and fourth-year, I had nothing but like incredible, like leaders, and incredible role models throughout, you know, regardless of what specialty that we have had. And seeing how they, seeing how those attendings and those residents served as like role models, and like examples of how to carry myself, how to conduct myself, how to work in a team… I think that’s what really led me to understanding the role of physician and how to like work with other like mid-level providers and other people in the hospital.

Although not hugely influential, Lucy did mention how, when she worked as a social worker, she worked with a physician who did not treat non-physician health care workers well. This negative model did convince her that she would, as a physician, always treat all members of the health care team with respect:

... I think at the time, I realized that this is just like, not the nicest person, and no big categorization to the profession. But I think I did realize there that I, especially coming from social services, that I would never want to be that person. Like, it, that, however, the lowest person on the totem pole very much deserves respect, regardless of who they are, what they’re bringing to the table.
Many participants in this study described the ways in which physician role models influenced their view on the role of a physician, in relation to patient care. Paul mentioned a physician who he worked with during his longitudinal Family Medicine Clerkship. He was impressed with how the physician would prioritize the patients’ concerns over the need to stay on schedule. He highlighted the positive relationship the physician had with his patients and their families:

This is the doctor I want to be. The doctor who, my family medicine rotation, which is a longitudinal, so, like, once or twice a month. I would go spend a clinic day with him and his patients he had been seeing for… he, like, most of his patients, he saw the grandchild, the child and the grandma. Like, he saw the whole family. And half the patients just came in to chat with him. And it was just nice that he took the time to address their concerns and prioritize that over looking at how backed up his clinic schedule was going to get...

Mary reflected on her experience working with an exemplary physician in a rural community.

While not necessarily a seminal moment in shaping Mary’s perspective on the role of a physician, she did remark that working with this physician helped her to see the positive impact a physician can have when integrated into a community:

… he was, like, very committed to his patients, even if was, it was… he was very… he had a responsibility. He had a feeling that it was, like, his responsibility to, like, take care of the people in his community who were, you know, it’s on average, like a less educated, like poorer area. And I think that he personally had felt that calling…. And it was just like, kind of, more of a, he was just more integrated into his community. And I think his patients really respected him for that.

Like Mary, Paul also had positive experiences with physicians who were integrated into the local community. He viewed this behavior as exemplary, and his own perspective on the role of a physician reflected an orientation towards population health through community integration.

During his college years, Paul shadowed a family doctor in his local community. He spoke about how the physicians from that practice were integrated in the community, attending local football games.
Dianne mentioned the importance of her clinical skills advisor in a Foundations of Patient Centered Care (FPCC) longitudinal course, which is integrated with other first- and second-year courses. Students have opportunities to observe their FPCC advisors in clinic and to learn from them in teaching sessions. Dianne explained that it was through the lessons, during patient appointments, and during one-on-one meetings with her FPCC advisor, that she was able to “shape [her] opinion” about how to approach patient care:

… she helped shape my opinion. And it wasn’t really ever, like, that she was pushing her thoughts on us, but, you know, watching her care for patients was always a good example of like, what, how I felt. I would also like to do things, and then she asked questions to provoke thought and reflection, and I found that really helpful.

Interestingly, Dianne’s FPCC advisor asked her questions that provoked thought and reflection, which Dianne found helpful in shaping her perspective. During his Health Equity Clerkship (HEQ), which he referred to as his “underserved rotation”, Paul learnt about the value of a physician placing her/his patient in the broader context of their family lives. He learnt this from an exemplary family doctor who carefully connected the details of his patients’ lives, in order to understand an entire family’s household environment:

… he was just one of those people that had a real good sense of the family. And like, he would go ahead and he would have this like, grandmother come in the morning and then have like, the great grandson or grandson come into the afternoon, and he would be able to connect the dots between the family’s story… And he can, you know, ask, you know, what’s your household stress and, so, he would be able to pick up these things throughout the day about the patients and their larger context. And, so, he was really a good influence for me.

Paul also mentioned an exemplary physician who inspired him to work on his communication with patients, in order to connect with them:

… he was another one of these people that really good communication ability, and just had a real sense of what was happening around the area... And he was pick up on these little, like, things that were important to the patient. But he also just had like intimate knowledge of, in fact, he was one of those people that have always said… I want to learn to a sport. I don’t follow any sports at all. But he would talk baseball with his patients, and they loved that he would talk baseball
with them… So, he, kind of, inspired me to really work on my communication, but also to think of little things that can help you relate to a patient.

Dianne described how she learnt from exemplary physicians through clinical experiences. She mentioned becoming more aware of the barriers that patients face, through her work with internal medicine hospitalists in the inpatient setting, and through her work with a family medicine preceptor in the clinic. Dianne also expressed her view that her perspectives on patient care were shaped mostly through clinical experiences with exemplary physicians, rather than through lectures.

Caitlin also talked about learning from an exemplary physician in the clinical setting. She highlighted a near-peer who greatly influenced her perspective on the role of a physician, with respect to patient-centered care. In particular, she stressed how the resident she worked with was exemplary in considering all the costs of care to the patient, when deciding on a course of care:

... For him, it’s, “how do I treat this patient, the best way I possibly can?” And like cost, taking everything into account: cost, and poking, family, and everything. And he is also the first to admit if he did something wrong. So, I think working with him has been really beneficial… he is very aware that he doesn’t know everything, and I think he is the one that I have definitely taken a lot and learnt a lot from.

Interestingly, Caitlin pointed to the conversations that she would have with this exemplary physician in training. She described these conversations in greater detail at another time during her interview. These conversations helped shape her perspective on the role of a physician, especially with respect to cost-conscious care:

… I think he was one that really got me also on this cost thing: endpoints and things like that. Always, kind of, double checking. Like, we had a couple patients where we were like, “why?”. We had conversation that they were still getting, like, what, “why are they still getting the treatment?” And like, “why? What is the reasoning behind what we’re doing here?” And he was always willing to sit down and have those conversations with me. And we had really good ones …
Lucy pointed out that physicians who are negative examples of how to care for patients, were almost as influential as those who were positive role models. She mentioned being on the wards, and working with physicians who were bad educators, who did the bare minimum for patient care, and who were not good patient advocates. She explained that these physicians convinced her of the kind of physician she did not want to be:

… Honestly, there’s a lot of doctors that I worked with that were examples of who I didn’t want to be. There were some that were bad educators and there were some that weren’t good patient advocates who just like did the bare minimum of what they needed for patient care. And that was almost as influential as the positives.

In alignment with Lucy, Patrick described his view that both positive physician role models and those who exhibit undesirable behaviors, could have an influence in shaping a student’s perspective on the role of a physician. In particular, he viewed experiences with negative physician models as possibly giving students opportunities to confirm what behaviors they would not want to adopt in their practice as physicians:

I think they are essentially models for the behavior, I guess, as physicians and that is definitely an influence on just the perspectives that you gain, and I’m thinking of it more on the positive side of things. Like, people who I want to emulate in the future. But I guess it could also be you picking out the things you don’t like. And people as well. Which might be more of like the hidden curriculum.

Martin appreciated the ways in which one of his physician role models taught him how to make practical use of the skills he learned in medical school, through his example. He hailed his watching of this exemplary physician as possibly the most valuable thing that he got out of medical school:

He told me a lot about what it is like to actually implement medicine and actually practice it, like practical use of the skills that we learn in our clerkships, and the knowledge that we learned in our didactic years and stuff. I think that watching him practice was maybe one of the most valuable things that I got out of medical school. But, then, also being able to go and speak with him. And just ask him anything and to, to hear what he had to say about it… Really just a massively influential role model for me, and certainly someone who without, my medical
school experience would have been lesser, and my residency application experience would have been really paltry.

It is noteworthy that Martin mentioned the value of being able to engage openly in conversation with this exemplary physician. Martin also had another physician role model who he recognized as having an influence in shaping his perspective on the role of a physician, with respect to patient interactions:

Another person who was very influential in my residency applications just was, I guess, a stone-cold stud in the operating room, nothing freaked him out. I mean, he was always, he always maintained immense composure, had impeccable rapport with patients, something that I try to model, and something that I want to continue too… The way that he manages residents, and the relationship that he develops with them, I think is, you know, promotes education, but it’s also very collegial. It’s not… the hierarchy is recognized. And it’s, you know, it’s well known, but it’s never, it’s something that he commands, he doesn’t demand that; it’s something that, through his actions he receives. And he has an excellent relationship with the residents.

It is also evident that Martin was impressed by how this exemplary physician role model managed the physician health care team, and how he was respected by residents. The rapport this exemplary physician demonstrated with his patients, shaped Martin’s perspective on the role of a physician in a way that aligns with the HSS principle of physicians committing to improving the patient experience.

**Being Molded by Communicators of Scientific Knowledge**

Garry, Brianna, Paul, and Caitlin recognized the role played by communicators of scientific knowledge, in shaping their perspectives on the role of a physician. For Garry, he recognized that his perspective had been shaped by the influence of his father, who is a chemist. He also reflected on the significant influence of several physician anthropologists and prominently published physician advocates. Brianna, whose father is a trauma surgeon, highlighted how her father was a communicator of scientific knowledge to her, and how the
example of how he approached his work molded her perspective on the role of a physician. Paul mentioned how his perspective on the role of a physician was shaped through the examples of a local physician from his community, and his dad who was trained as an Emergency Medical Technician (EMT). For Caitlin, her strong interest in working with underserved populations was fostered through the influence of her physician parents, who both started their careers working in with the Indian Health Service. The influence of all of these communicators of scientific knowledge on participants’ perspectives on the role of a physician, are described below.

Garry reported having prominent memories from his childhood, where his father engaged with him and his peers around science. He drew meaning from these experiences, concluding that they fostered in him a joy of academic pursuits. It was from these experiences that Garry recognized the central role of communicators of scientific knowledge in society:

So, one of my more prominent memories from my early years, was my dad did Mr. Science at my school. So, he would come in and do all sorts of tricks and, you know, sort of things that made seven-year olds go wild: changing liquids, changing colors of liquids using acid-based iterations and, you know, these sorts of things… setting things on fire. And, so, the things that… and one of them, I was placed into a soap bubble in preschool, and I was the only person to ever be known to be placed entirely into a soap bubble. So, what I, what I really remember from that is the joy of academic pursuits. In this case, that came out of that. The importance of curiosity and kind of exploring the world around you, and then also later on, the importance of those people who play important roles as communicators of scientific and medical knowledge to the public.

Garry described communicators of scientific knowledge broadly as being people who champion scientific inquiry and connect with a wide audience about this, in support of society. He emphasized again the role his dad played in influencing his own perspectives, and mentioned how Dr. Anthony Fauci, the director of the National Institute of Allergy and Infectious Disease, had been an example of a communicator of scientific knowledge to the U.S. public during the COVID-19 pandemic:

So, my dad was example of that for chemistry. But you have people like, you know, Dr. Fauci now. But, you know, you have this whole kind of repertoire of physicians and scientists, whose job it is to communicate the reasoning behind
the importance of scientific inquiry, and the results that come of it, and translating these concepts down, such that everyone can understand it and can apply the principles to their lives, and make their lives better, make societies like improved, you know. Things like this.

Like Garry, Paul also highlighted the relationship communicators of scientific knowledge have with the community, as he reflected on the influence of a physician who he shadowed in high school and college:

… he did, and partly because he was also, like, I used to, a lot of the family doctors I had as a kid were also members of my local church. So, you would see them in multiple contexts and a lot of them had kids that went to high school. So, you would see these people at the school events, you’d see them at church, that kind of stuff. So, that, kind of, like, always around you. I worked at the hardware store, like, some of them will come in and rent stuff. So, you just see them in the community.

In her engagement with an American physician working in a community in Uganda, Lucy described how she started to become convinced that physicians could emerge from various academic backgrounds, which ultimately inspired her to pursue medicine in spite of being a philosophy major herself:

… she was a philosophy major. And she had no science, and she was telling me about how she did a post bac. And I think at that point. I was just like, “oh, wow! Anyone… like you don’t have to be like biology from, you know, second grade to be a physician”. So, I think that was really instrumental in my seeing that a physician could have come from a different background and still get there, because… I think that that was the planting of the seed for sure.

For other participants in this study, communicators of scientific knowledge were physician parents. For Brianna, her father’s passion for medicine inspired her to pursue a career as a physician:

Yeah, I think it’s interesting because I feel like a lot of people when they know people in the medical field, they’re like, “oh, don’t do it. It’s a mess”. But my dad is just so passionate. He is, he still practices. He’s so passionate about what he does that it was, I think you need to be unique. And I didn’t realize how unique it was to see someone who loves their job so much, and just doesn’t do it because it’s their job. They do it because they’re passionate, and they feel like they’re making a difference. And I feel like that was something that I was like, “oh, that’s something I want”. But I didn’t realize how hard that is for people to get sometimes.
Interestingly, once Brianna entered medical school, she realized the impact of systemic issues that make it difficult for others to practice medicine purely out of a passion for making a positive difference. Several times during our interview, Brianna contrasted a “business focus” to a focus on the patient. Although difficult to detect during residency interviews or on away rotations, she claimed, Brianna tried to steer away from choosing residencies that were aggressive about revenue generation. Caitlin, too, gained perspective on how the U.S. health care system was failing physicians and patients, through the influence of her parents who are both physicians. She explained, “I also heard about it from their point of view in the house. My dad’s system has failed in ways and my mom, they work in different hospital systems, so I’ve kind of gotten three hospital systems worth of information on systems failures”. Caitlin combined her own experiences with systems failures with those she learned about through her parents. These experiences, cumulatively, shaped Caitlin’s perspective on the role of a physician in ways that align with the principles of HSS. Indeed, Caitlin articulated motivations for advocating for underserved patients, in ways that might counteract the failings of the health system:

PARTLY BEING BORN ON THE RESERVATION AND LIKE HAVING THAT BACKGROUND, I THINK KNOWING THAT, THAT’S KIND OF LIKE WHAT PEOPLE LIVE LIKE. AND I’VE GROWN UP WITH LEARNING ABOUT THAT CULTURE AND KNOWING THAT THEY’RE AN UNDERSERVED POPULATION AND KNOWING THAT THAT PLAYS A ROLE IN IT… I THINK LONG TERM, RESIDENCY, BUT, I THINK, I MIGHT, MY DAD DID RESIDENCY, AND THEN INDIAN HEALTH SERVICES, AND THEN FELLOWSHIP. SO, I WOULD NOT BE SURPRISED IF I END UP DOING SOMETHING SIMILAR.

In addition to the influence of her physician parents in shaping her perspective on the role of a physician, Caitlin also noted that she would not be surprised if she mirrored the career pathway taken by her father. Like Caitlin, Paul also saw communicators of scientific knowledge as having shaped his perspective of the role of a physician as an advocate opposing system failures. Paul recognized Dr. Mona Hanna-Attisha and Dr. Paul Farmer, a medical anthropologist, as having deeply influenced his perspective on the role of a physician as an advocate:

… THE ROLE AND PREVALENCE AND PRESENCE OF THESE SORT OF COMBINED PHYSICIAN-ADVOCATES. THAT REALLY INSPIRED ME AND THAT SORT OF BECAME WHAT I WANT TO DO. DR.
Mona Hanna-Attisha up in Flint, Michigan, who is the pediatrician who kind of whistle blew the lead crisis up there. I read her book and I adore her. She’s phenomenal. I just finished Paul Farmer’s book, like probably two or three weeks ago. And absolutely loved it. And so, learning about this thread of physicians and their outlook on their role shaped how I view my role and what I want my role to be in the future.

Of note, Garry’s perspective on the role of the physician was molded through the published works of these communicators of scientific knowledge. Brianna’s perspective on the role of the physician was shaped differently. For her, seeing her father advocating for his patients through his actions, inspired Brianna to have a patient-centered orientation embedded in her perspective on the role of a physician:

… I think seeing someone who’s so passionate about providing the best patient care. And this is, I think, trickled down to me even more during medical school, as I kind of like talk with him about it, and hear his stories, and just knowing that, like, even through my experiences, kind of shadowing him throughout like my childhood, just going into the hospital with him and seeing that nothing is ever too beneath him to optimize patient care. Whether it’s changing out the bed linens because they’ve been soiled, or cleaning up the patient’s room because something is in there and needs to be taken out. Um, making sure that the patient has what they need… I think it also taught me that hard work pays off to something you love. And that hard work is what the patient deserves. And you shouldn’t be afraid to kind of give a lot of your time because it’s going to be all worth it to kind of give these patients what they deserve.

Intriguingly, Brianna highlighted the role of dialogue with her father as being key in shaping her perspectives, and on her choice to pursue a surgical field. Paul also recognized his father as being a person of influence on his perspective on the role of a physician. Indeed, Paul’s father facilitated early exposure to the medical environment for Paul, when he enrolled him in a first-aid course. Also, Paul’s work as an Emergency Medical Technician (EMT), and his care for Paul’s grandfather, highlighted the importance of a non-physician communicator of scientific knowledge:

… he was an EMT and he would do that kind of stuff. And then he got me into that first course. And then he’d also do a lot with my grandpa and that kind of stuff. And it was one of those things where like, you know, you’re going to have your physician and all that kind of stuff. But he also had like, the family member that would come in and check his blood pressure and check on him and report
back as well, is an important role too. I think that did more first off a lot of times at all the appointments because, like, he knew the history.

Participants in this study highlighted the important role communicators of scientific knowledge played in shaping their perspectives on the role of a physician. In particular, these physicians, parents, and prominently published physician advocates, helped to mold the choices Brianna, Caitlin, Lucy, Garry, and Paul made in their career pathways as future physicians.

**Reinforcing Systems Orientation Through Social Networks**

For participants in this study, their social networks reinforced the systems orientation embedded in their perspectives on the role of a physician. Involvement in like-minded cohorts, like school clubs and professional organizations, as examples, influenced students’ perspectives on the role of a physician in ways that aligned with the principles of HSS. Garry articulated how being in an environment where there is a shared and common understanding of the role of a physician, reinforces that understanding and solidifies it. Participants also highlighted how the values that have become embedded into their worldviews, through their participation in their social networks, have endured into medical school and have supported a systems orientation in their perspectives on the role of a physician. Students internalized values that were connected to their religious backgrounds and upbringing, as examples. The specific findings related to this theme are discussed below under four sub-themes. These sub-themes are organized under the headings: Participating in Like-Minded Cohorts, Enduring Values, Recognizing the Influence of Community, and Recognizing the Influence of Politics, the Media, and Popular Culture.
Participating in Like-Minded Cohorts

Participating in like-minded cohorts had a fundamental influence on Garry, Paul, and Brianna’s perspectives on the role of a physician. Garry described the profound influence of participating in a cohort of selected students in a merit-based scholarship program, where students learned together about leadership, with a strong focus on service. Garry’s experiences in this cohort of students who were together for four-years, is of particular interest in this sub-theme. However, Garry also mentioned the influence of a student club focused on social justice in medicine, while doing his undergraduate studies. Brianna and Garry also reflected on the influence of student clubs that they participated in during medical school. Paul mentioned that his involvement in a regional organization helped to solidify his decision to pursue Family Medicine. The specific details of these findings are described below.

Garry described the nature of the cohort in which he participated. He noted that there was a lot of social pressure to work on advocacy and service in the community, and that the students in the cohort pursued this mission through their own areas of interest or study:

… There’s a lot of social pressure to work on advocacy and service in the community. But I think most importantly, I should have touched upon this, is that every student who was involved in this, many of whom are my best friends, were disproportionately focused on whatever they are interested in, as a means of advocacy… And so, I spent four years and, like, very, very close contact with these people. And that was culture and that was very, very prominent and that was something that I think really, really rubbed off on me. And it’s something that, candidly, in medical school, I think, has sort of gotten away from me, and that I’ve sort of had to sustain it on my own, and find people who view the mission the same way as I do.

Interestingly, Garry emphasizes the influence that participating in this cohort had on his perspective, and noted that he had to find people in the medical school who had similar perspectives about “the mission”. When asked about how exactly this cohort influenced Garry’s perspectives on the role of the physician, he explained that it cultivated “altruistic leadership
service-orientated impulses” that were relevant to all members of the cohort, irrespective of their field of study:

I think their influence was to cultivate altruistic leadership service-oriented impulses within the people that they’ve worked with. And then to provide a coherent framework and justification for the channeling of those impulses into positive and productive ends. Like, we talked a lot about models of leadership and how, you know, how to, qualities of leadership, how to cultivate them. Models of leadership, how to orient your knowledge, skills, interests, into a framework for the greater good. Whether those interests be, for me in medicine, for other people, in micro finance and lending, for other people, in humanities, for the people in engineering, so on and so forth. They created a coherent positive framework for the channeling of those impulses which they also focused on cultivating.

Garry also described the forums in which the cohort would interact with each other, and how the administrators of the program would facilitate individual advising sessions for each person in the cohort. In these advising sessions, Garry explained, there was an emphasis on framing one’s interests in terms of service for others:

… we talked about our interests, we would talk about, you know, why we were interested, to how we were interested, in which, in what way is what was our ultimate goal in these interests. Again, always sort of with the undercurrent of service, and service for other people. So, it was kind of a combination. So, it was didactic, some of them were the conversations. I probably had fewer conversations than some of the other people in the cohort because, again, I think others were more mature than me in this respect...

Garry described the individual advising sessions that he had over the course of the four years that he was in the program. He indicated that the sessions often focused on interrogating student proposals for what they wanted to do during summer service trips. He described the ways in which he was challenged by the facilitator through these conversations:

… he would really challenge us on our vision and our choice of implementation methods. And one of the sayings that always sort of comes back to me, and we always kind of lampooned it in college, but now it again makes more sense, is, "you can’t blow on an uncertain trumpet" was one of the things that was always like taught to us. One of those, sort of, aphorisms. Another one was, "think globally act locally". Like all these sorts of aphorisms which are, sort of, may sound cheesy when you hear in the first couple times, then you actually get involved in them, and you’re like, “oh, okay, I see. I see what you’re thinking now”. And so that’s what we were really challenged to do in those individual
mentoring sessions, where we had our plans for the Summer or plans for doing things from campus... And they push back on us on them, which is good. And again, I appreciate it more now retrospectively than in the moment...

Garry described how his experiences in those individual advising sessions have resulted in an enduring practice that he now implements for himself. Garry approaches his work as a future physician differently because of his experiences in his college cohort. He described a wide range of questions he now asks himself as he approaches his work as a future-physician:

I needed to be challenged in that way. And, so, I appreciate it. Again, more retrospectively than in the moment. But that’s something. Those are lessons that I always kind of keep in mind now. Like, is my, you know, what is my vision? Am I the one who’s maximunly equipped to do this? What, and, if so, then what am I actually equipped to accomplish? Is this a place where you can make the most impact? Is this the most financially feasible use of the funds that you would do for this? etc. etc. These are questions that occurred to me now because of that experience. And for that reason, I think that I’m better for it.

Interestingly, Garry’s enduring approach has aligned his practice with the principles of HSS. In particular, his approach results in a cost-conscious, value-based, interprofessional, and systems-conscious framework for action. Indeed, Garry retold a story about when one of the leaders of the program he was in, challenged the cohort of students to take a systems-orientated approach to their work. Garry explained how this leader challenged students not to be teachers, but to “build schools and build curricula”:

… The idea being that your role as a leader should be in your, your skills, expertise, and role as a leader in the future, should be to build the systems by which thousands of children are taught, not to be a teacher that a single, by which a single child is taught, in short. And this was distressing to a lot of us who had a lot of, you know, experience working in these roles like, you know, and derived a lot of joy out of that work… And, so, we had a hearty discussion around that, to say the least…

Noteworthy is Garry’s mention of how this resulted in a hearty discussion with his peers.

Brianna described how she became involved in a club or organization during her time in medical school, and how was able to act in support of underserved in medicine. Through her involved in this club, Brianna was able to arrange for food waste from the cafeterias, and
integrated the grounds staff from her medical school and the community garden on campus, and set up a system where this food waste was directed to community gardens for composting. Brianna noted how this experience was a precursor to her findings other potential areas to make systemic change:

… it was kind of cool to like repurpose the food that was just, could have been used, or just with scraps, and then repurposing into something that could be used in the community garden, to kind of help nourish the gardens that were there. The produce is eventually given to either food banks or to people who own the plots. So, I think I'm just interested in finding where there were potential areas to expand things or to improve things and how to, how do you go about doing that.

Brianna’s involvement in this club with other like-minded individuals, allowed her to tangibly contribute to patients and people in her local health system and community. She indicated that after medical school, she planned on pursuing this interest further as a systems-based initiative, integrating food security questions into the Electronic Medical Record (EMR):

Right now, there’s a project to integrate food insecurity questionnaires into the EMR, and how that’s a systems idea. And although I feel like my time is so short, with [Medical School] with me graduating, and there's not much I can actually do in this timeframe, I feel like getting those ideas and having those tools is now something that I can bring to my next institution, on implementing these food insecurity initiatives into a new health care system that I'm in.

Paul also described how his participation in a regional professional organization helped to solidify his interest in pursuing Family Medicine. While filling out his Journey Map (see Appendix B), Paul recognized his involvement with the Pennsylvania Academy of Family Physicians (PAFP) as standing out in shaping his perspective on the role of a physician. He noted, “I would say maybe another point up here for this… being involved in the PAFP and kind of solidifying Family Medicine”.

Garry’s described how he first became involved in a club, during his undergraduate years, that had a focus on social justice in medicine and how this influenced his view on the role of physician as advocate:
… And it was, sort of, between participation in that club and learning about, you know, Paul Farmer and all these combination physician-advocates, even though they're not really dichotomous and shouldn't have to be labeled as such, but learning the ways in which physicians have advocated for medically underserved or otherwise underprivileged communities, combined with learning about a massively underprivileged community, really tied the two together for me.

While Garry’s participation in this club was not exclusive in shaping his perspective on the role of a physician as advocate, he highlighted it as having contributed.

**Enduring Values**

Garry, Mary, and Dianne described values that were integral to their worldviews, which endured into medical and have become integrated into their perspectives on the role of a physician. Dianne described how key her religious background was in orientating her perspectives on her own role as a physician. While Mary mentioned her religious background as a Protestant Christian and explored the idea that her moral framework may have been derived from early religious experiences, she tended to emphasize her moral guiding framework as separate, and as being the most important aspect in shaping her perspectives on her role as a physician. Mary also reflected on the values that she learned from her father and grandfather, which became integrated into her perspective on the role of a physician. Garry highlighted how his time in a cohort of selected students in a merit-based scholarship program, ingrained a “service” orientation into his perspective on the role of a physician.

In the beginning of Dianne’s interview, she highlighted her religious background. She noted how this background shaped her worldview and her thoughts about medicine. She also highlighted how she enjoyed working with people to overcome barriers to healthcare:

I enjoyed like working with their like against their barriers or helping them confront the barriers to healthcare. So, that was important to me prior to entering medical school. And I’m from a religious background, was a huge emphasis on social justice and peacemaking, and I think that has really helped shape my
worldview and my some of my thoughts about medicine, outside of like the science of medicine.

She also noted how her Mennonite background has etched into her perspective a deep-seated commitment to serving the poor and ostracized in the community:

Yeah, I am Mennonite, so I, but not in the conservatives Mennonite fashion of like wearing different dress and not driving cars or anything like that. I’m part of, like, the more liberal Mennonite church which has an emphasis on pacifism, and we’re Anabaptists, so baptizing as, um, as adults, or like it mostly teenagers. And then I went to a Mennonite college, and a big emphasis that they taught a lot about that was social justice, according to like in the lens of Christianity, and following like the steps of Jesus, and that he served the poor and the ostracized in the community. And so that’s really important to me in the way that I live my life, that I keep those people in mind and am working to make things better for them.

When asked about why she volunteered to enroll in a COVID-19 elective, in spite of not needing any additional credits, she described how she was motivated by her belief that she was fulfilling a higher purpose:

I’ve always volunteered and a lot. I grew up with a mindset that we were here. We were placed on earth to serve others. So, for me to just like sitting around my house and watch Netflix all day, which I still do a lot of but I needed something to give me a little bit more purpose than just sitting around my house and, you know, caring for patients, and in this instance volunteering to care for patients is something that makes me feel like my existence has purpose.

Mary also described her religious background, having grown up in an Evangelical household, and how that has influenced her actions to some extent. She did conclude that she did not think that her religious background was a huge motivator for her doing what she perceived to be “the right thing”:

I mean, I grew up in like a very like Protestant, you know, Evangelical household. And there is, like, a “do the right thing”, kind of, you know, “don’t like that” or “no sin”, or something like that. And I think there, so, there’s like definitely a degree to which, like, I probably feel some residual guilt for not doing what I perceived to be the right thing. Um, but I actually, I don’t think that’s really like a huge motivator for me.
In her interview, Mary wrestled with the extent to which her religious background had influenced her decision to volunteer for one of the COVID-19 electives. She reflected on the influence of her family values, personality traits, personal ethos, and an orientation towards serving others:

I think that some people are just, I do think, to a degree it is a personality trait. Um, I think that some people feel more of like, I don’t know… need to feel like they’re serving or contributing in a certain way… I feel like, I do feel in general like a person that, you know, I used to be like religious growing up and I honestly don’t know if there’s like some impact there that I felt. I think like from a younger age, like, I don’t know if it was like a family thing, where you really supposed to “do the right thing”, or “do you feel, like, good about what you did in that situation?”, or, “are you living up to the person that you want to be?” And I think that I tried to make choices in my life that reflect like the type of person that I want to be. And I think that whether it was kind of like I want, I just want to be proud of myself, I guess, and I want to feel like the things that, and maybe that’s selfish to a degree, but I wanna, I do think that I personally don’t feel happy with myself if I’m just going about my life. I feel like I gain satisfaction, I guess, to degree through doing things that I feel are like maybe the harder, but more like, I don’t know if it’s a personal ethos. It’s just, like, I feel like when you have the opportunity to serve in some way and to help people or help your community, in a certain way, then I want to be the person that does that thing.

Mary continued to explore what influences in her life experiences caused her to have an orientation to serving her community as a physician. Although still uncomfortable with framing her motivations for serving others as being a “higher purpose”, she did see her work as a physician as a “personal calling”, something bigger than herself:

… I want to be the person that will serve other people or will be maybe a little more like personally self-sacrificial. And I think you have to kind of avoid the martyr complex in that situation. I think that you have to understand that it’s a choice that you’re making for yourself. Um, but it is like something that I think is, except… it’s what brings me, like, satisfaction and I want to be like content with the thing, the choices that I made in life. And I don’t want to feel like I just like took the easy way out, or like just did the bare minimum to skate by. And I think that as a physician, especially, you’re able to serve in so many ways. And in a way, you have to control that, so that it’s still like healthy for yourself and your life, and you don’t get too bogged down. But I do think that, for me personally, maybe it is like a personal calling, I guess, I don’t know. Or, but I don’t think it’s like, I don’t think it makes me better than someone else. I think that I just personally am not satisfied or happy with how I’m living unless I am working towards something that’s bigger than myself.
In reflecting on whether there were any specific experiences in her past that may have positioned her to want to participate in the COVID-19 electives, Mary framed her response around morality, and about wanting to contribute to “the team”:

I don’t know if it’s morally wrong to not participate, I think that it’s somewhat ambiguous and people can make different decisions for different reasons. I personally felt like I should try to contribute in any way that I could because I felt like, for me it was important to, kind of, be a part of the team and I feel like this is what I signed up for to a degree. And I felt like it was important to, I felt like I would be letting, like, I don’t know, my team down to an extent, if I didn’t help, and if I had the ability to. And I didn’t want to be a wasted resource that wasn’t being used. Again, and I didn’t even know if we would be able to add anything meaningful. Initially, I just wanted to be, I guess, you know, a person out there doing something positive in a situation. And I think that I don’t know why I felt like I had an obligation to do it. I just did. I felt like I should be a person trying…

When considering her intentions for volunteering for a COVID-19 elective, Mary again implied a moral obligation to contribute when she noted “if you can contribute, you should be”. This emphasis on morality, from Mary, was not explicitly framed as a religious influence. She highlighted the respect she had for her father for making a morally-charged choice to remain loyal to his current client base, rather than pursuing earning more money for himself, in his work as a financial advisor. Mary had indicated that her father had been a significant influence on her worldview, which impacts her perspective on the role of a physician. In answering a question about the manner in which her father influenced her worldview, Mary mentioned car rides that her father and grandfather would take together and how these trips helped form her perspective on morality:

We would go on like these like Saturday morning like rides and just talk about, like, life and stuff. And I just think, like, from those experiences, I think, is probably what helped kind of form like my ideas on, like, that type of moral, like, issue and stuff. And just like how I see the world in general, most likely.

Of note, Mary highlighted the role of dialogue as her father and grandfather spoke with each other during these car rides. Mary indicated that while she just listened at first, she participated in these conversations once she got older:
… we just like sit in the backseat and drink hot chocolate and listen to whatever Dad and Grandpa were talking about... And you, like, learn to pick up on like, I guess, like different values that they have, probably subliminally, and then I think that eventually like impacts, like how you view like what’s the right thing to do or, you know? And then I played a lot of sports growing up in college. And I think, like, kind of like your obligation to… I played soccer. So, I think like you kind of have a little bit of like, oh, you know, what kind of team player are you, I guess…

It is interesting to note Mary’s connection to soccer and her father’s and grandfather’s playing of sports. Mary spoke about her motivations for volunteering in a COVID-19 elective in order to be “part of the team”, and because it was a matter of morality. Mary reflected on the significant influence these two men had on her worldview, and these perspectives appear to have endured in Mary’s context as a future physician.

Garry described how his time as part of a cohort of selected students in a merit-based scholarship program, ingrained a “service” orientation into his perspective on the role of a physician that was deeply formative to him:

But that was deeply, deeply formative to me, understanding that your work is not an end of itself, nor is it a means towards you know personal fulfillment - betterment - this sort of thing. Although if you do that, that’s nice, but you have a responsibility. Because of, you know, the talents you’ve been given, and the privileges that you’ve experienced, to go out and serve. And that is the intent of your education. Here is the intent of your job, moving forward, so on and so forth. And that really resonated with me. And it’s something that I think about very, very frequently, and certainly has played a very, very large role in how I see my role as a physician.

Garry used some language which suggested that there may have been an underlying religious influence in his perspective. Specifically, his comment about “the talents you’ve been given”. When asked about this, Garry noted, “I don't identify strongly with the religious milieu in which I was raised, which is part of the reason that I've sort of been estranged from the church for a lot of different reasons”. He described serving in the community as a personal duty for him:

My motivation is that I have been given a lot of gifts and it is incumbent upon me not, not divinely incumbent, but like personally incumbent on me to serve because of that, and pay it back. Because there’s a lot of places where that could
be used, and should be used. And a very strong sense of community. And
obligations to that community in a broad sense.

Interestingly, Garry had described the program he was in, as having cultivated altruistic
leadership service-oriented impulses. For Garry, that the “coherent framework and justification
for the channeling of those impulses into positive and productive ends” endured and is
incorporated into Garry’s perspective on the role of a physician.

**Recognizing the Influence of Community**

For Paul and Mary, the communities in which they grew up, reinforced the systems-
orientation in their perspectives on the role of a physician. The meaning Paul made from his first-
hand experiences caring for his grandfather, who was a member of the deaf community, shaped
his perspective on the role of the physician in ways that align with the principles of HSS. Paul’s
experiences in his community have resulted in a focus in his perspective on the role of the
physician, on the social determinants of health and understanding the patient perspective, in order
to drive better patient outcomes. Mary reflected on first-hand experiences that ultimately
reinforced that patients do not exist in isolation from the communities to which they belong.

Through the meaning Paul made from his own experiences growing up in the deaf
community, he realized the importance of community and recognized how interconnected a
patient is to their community. Reflecting on a time when his family was caring for his
grandfather, Paul noted how important it was for the physician to acknowledge that a patients’
ilness affects more than the patient alone:

… I think the deaf community is really strong. And, so, what happens with one
person in the deaf community, a lot of the other people in that community are
kind of like synced into it. So, I think that that’s always been something that I’ve
thought about. So, just the way that patients exist in community is important.
And to understand that, so for us, I mean, especially like, we were really close
my grandpa. And then, like, this deaf culture as a whole like, people that would
engage us as a family when we weren’t the main patient. He would always recognize too, because it was okay that they don’t just care about what, about the patient, they care about what’s important to the patient, which is the family members. So, simple things like physicians acknowledging who else was in the room, that kind of stuff, which is not necessarily an aspect by itself, but it’s something that kind of plays out there.

It is interesting that Paul incorporated the meaning from his experiences, into his perspective on the role of a physician. With Paul choosing to go into Family and Community Medicine, he may have had this focus on the community for that reason. However, his first-hand experiences in the deaf community seemed to be central to how this aspect of his perspective on the role of a physician was formed, prior to his decision to pursue that specialty. Paul recognized that physicians have so little time in appointments to affect real change in their patients’ lives, which is why it is so important for them to be active in the communities in which they practice. Paul also alluded to how this community-oriented perspective aligns with the principles of HSS, focusing on the social determinants of health and understanding the patient perspective, in order to drive better patient outcomes:

… by engaging the community, you impact way more individuals at once, and you’re impacting them, where they’re going to spend most of their time… it’s very important because that’s where you’re going to have the most impact on your patients. And I also just think the social determinants of health, that kind of stuff, like it weighs so much more: food security, feeling safe, access to health care system, and general health literacy, all that stuff carries just as much weight, and I think a lot of times way, way more weight than just, you know, the disease process itself…

For Mary, her worldview was shaped by a strong sense of community through her upbringing. As part of a broader conversation exploring why she felt that she had some type of moral obligation to volunteer for a COVID-19 elective when she did not need credit, Mary reported feeling “deeply” that she was obliged to make decisions that would align with the values espoused by her family. She reflected on how there was a belief in her community, that a family shares the success of the generations that follow after them:
... I think there was, like, a kind of a sense of like that you, kind of, like owed it to your family, a little bit, to do well in life. And I think there was, like, a lot of, like, feeling that, like, you’re, kind of, it’s not just about, like, your personal success, it’s, kind of, about, like, what you’re contributing to, like, when it’s, I don’t know. I mean, there’s definitely only like a feeling that you’ve had, that it wasn’t just about, like, how you personally, you did, it was, like, more connected to, like, a greater… if, maybe trajectory, is like from your family. But also like in terms of obligations, you had to like the people around you, and I don’t know if that’s even related. I just know that that was like something that’s I feel deeply… I think that’s like a deeply kind of moral feeling I have in that way.

This background has important implications for Mary’s perspective on the role of a physician. As a physician, Mary will have personal familiarity with the interconnectedness of the patient and the community from where they come. She articulated her perspective on the role of a physician within the community, expressing her view that it is the responsibility of a physician to know the communities they are serving:

You’re also somewhat of a community figure. People, like, know who the doctors are in their area, and there’s like a certain level of, I think, responsibility that you have to whatever community that you’re working in to, kind of, maybe, identify bigger, more systemic issues such as, for example, if you’re working in like a food desert and that’s impacting the care of your patients, or your ability for patients to access like healthy food, and which obviously impacts your health. I don’t think you can separate that out from your practice of medicine. I think that it’s important to pay attention to the, you know, like the other determinants of health that are outside of just like the more biological determinants. And then it’s important that you know your community…

From the meaning she drew from her own experiences within her community, she then articulated her view that physicians should be acutely aware of a patient’s community, recognizing that their community affects how they live and, ultimately, their health outcomes.

Recognizing the Influence of Politics, the Media, and Popular Culture

Lucy, Caitlin, Garry, Duong, Garry, and Martin recognized the political context in which they were forming their perspectives on the role of the physician, the presence of political issues in the media, and the influence of television shows in shaping their perspectives. Through their
mentioning of the political context in which their perspectives were being formed, there is a suggestion that politics played a shaping role as they formed their perspectives on the role of a physician. Participants recognized television shows as being influential in their decision to pursue medicine as a career, their views about the role of a physician prior to medical school, and their ideas about how to act during a public health crisis.

Lucy mentioned how her work experience as a social worker had emphasized for her the influence of policy on patient care. However, it was while volunteering for a political campaign in 2016 that she learned about organized medicine and the American Medical Association (AMA) and organized medicine through that:

… it was also 2016, so it was during a really politically influential time. So, I was volunteering with a campaign, and it’s probably obvious which one. And I, I’m kind of, we were talking to some of the people in that campaign team and I found out of, like, I heard about the AMA and organized medicine through that. So pretty early on, I started to learn more about AMA and resolution writing.

During her interview, Lucy described having been active in writing resolutions through the AMA, and how some of her resolutions have been adopted. Caitlin expressed her thought that the COVID-19 pandemic exposed the public to some of the systemic issues in the U.S. health care system. However, she also highlighted the political context in which she learned in medical school as a precursor to COVID-19, and how changes in the how the Obama and Trump administrations approached health care also exposed her to systems issues:

I think for me and a lot of my friends, we’ve gone through a medical education during a time where, like, politically things were going all over the place of medical systems and things like that. We came in with Obama, and Obamacare, and then Trump. There’s just so much politically going on. And then with COVID and the system, and kind of having to change and showing us the issues. We’ve just been so those exposed to the system, and what the system is, and where the problems are. Maybe it’s just been such a, even without the education, it’s been something that’s been so active outside of the hospital, in the news, that it’s kind of forced us to take a look at it and pay attention.

In describing the work that he did with Syrian refugees during his medical school, Garry also highlighted the political context in which his work was performed, when he mentioned that there
was contention around the question of refugees and immigration around the time that he was involved in that work. Garry also mentioned the coverage of the Syrian refugee crisis in the media, when describing his involvement in a club during the time of his undergraduate studies:

Towards the end of undergraduate, I got involved with a club at [University] called Social Justice and American Medicine. And at the same time is around the time when the Syrian refugee crisis was sort of really kind of coming into the forefront in terms of media attention.

Duong, Martin, and Mary all described ways in which television shows have influenced their perspectives on the role of a physician. Martin highlighted a documentary series that inspired him to want to pursue a career in medicine:

... I saw, there was a documentary series that used to run on TLC, back when it was like an actually like an educational channel, that it was called ‘Trauma Life in the ER’. And it was, um, it was just a documentary team that followed around the trauma teams at academic institutions and level one trauma centers all over the country… how many moving parts there were and how complicated the injuries were. And how kind of how difficult the work was and how demanding it was. And I thought it was awesome. And I was like, that looks like a really cool job. It’s, um, you know, it’s much less of a job than it is kind of like a lifestyle. And I think even then, I kind of knew that that was what I what I wanted and what I needed. So, that was, I think, you know, when I first got an interest in medicine.

Martin is interested in specializing in trauma surgery, once he finishes his general surgery residency. In this way, this documentary seems to have had a significant influence on the pathway in medicine that Martin is pursuing. For Mary, a documentary about Acquired Immunodeficiency Syndrome (AIDS), called “the age of AIDS”, influenced her perspectives about public health, and about the role of physicians during public health crises. Mary reflected on the documentary as she explained why she chose to volunteer for a COVID-19 elective:

… I watched that probably like four times, um, just because I, you know, I think that we actually don’t really talk about the AIDS epidemic as much as we should in medical school. Because it really shaped a lot of like what are probably like health care leaders, like, what they think about medicine… And I think during that time, people, some physicians were like, kind of, really like afraid to be involved or like changed where they wanted to practice, or what field they went into, just to avoid that. And then there’s other people that felt like they had a responsibility to help people in those situations. And I think for me, that was a
Duong described how popular TV shows, like Grey’s Anatomy, had influenced his perspective on the role of a physician, prior to medical school:

Definitely, you know, like coming into, even before coming to medical school, like, the picture of like a physician for me, at that time, would be like, “Hey, let me know. Come in, come into the room, treat the patient, know a lot about medical stuff”. It just like TV drama shows like Grey’s Anatomy. And then come into medical school. I think, I don't know, like, after doing my gap year going to medical school. I have a good, great picture of like an EM doc, emergency medicine doc, going around getting me into the action, you know. Intubating, traumas, all that like fancy stuff on TV shows. Yeah. I want to going to be that person, got to be that confident. Gotta be that composed, and to be a great leader of a team. That's the person I want to be.

Although Duong explained how his perspective on the role of a physician shifted in ways that align with the principles of HSS, it is interesting that his perspective on the role of the physician prior to medical school was influenced by popular television shows.

Implementing System Change

The fourth set of findings relates to how participants described the various ways in which physicians can advocate and implement system change. This set focuses on describing the ways in which physicians can advocate, and details how participants in this study thought the U.S. health care system could really change. This section begins by presenting findings about the ways in which physicians can advocate for system change. The second part of this section offers findings related to how students thought real system change could come about.
Advocating as Physicians

Many participants in this study articulated ways in which physicians advocate for their patients. While there are various ways in which physicians can advocate for their patients, participants in this study highlighted advocating through policy, being a champion for the patient cause in various ways, educating others as a form of advocacy, and leveraging the skills of all members of the health care team as a means to advocating for patients. In all the ways that physicians can advocate for patients, the common thread is a humanistic physician who is able to fully consider socio-ecologic factors in their care of patients. Lucy noted:

I think the common thread is a humanistic physician who can think outside of the algorithm of diagnosing, that it’s, you’re thinking about all of the influences on that patient, and caring about all of them. And the way you address those is different.

Lucy concluded that there is no single way to advocate for patients. She and other participants expressed that it was possible to address the systemic barriers to health care for patients in different ways. These different ways of advocating for patients are discussed in the four sub-themes below.

Advocating Through Policy

Advocating through policy is one of the ways in which physicians can advocate for their patients. When it comes to advocating, it is tempting to consider physicians who advocate through policy as being the most committed to the principles of HSS and system change. Certainly, those involved in policy work, or the implications of the work itself, can be highly visible. Lucy has been heavily involved in policy work. She explained that she did not think that any one kind of physician advocacy was better than the other, or that physicians moved along a continuum that ended with physician advocates involved in policy work:
I think I would disagree that it’s a continuum or that it’s... it makes it sound like you’re... Do you know Play Doh? It makes it sound like there’s a form that you’re trying to get to, and you’re not a full physician until you realize that form, and that form is defined in one specific way. And I don’t think that’s true. I think that there’s, it’s more like, almost a concept map, where there’s a physician advocate. And you can either be one that utilizes a branch of education, or the branch of policy, or both, or something completely different. And there’s different ways of being the idealized physician advocate. There’s no one definition for that.

Lucy noted that physician advocacy is essential, but how physicians advocate for their patients can vary. To demonstrate this point, she mentioned one of her classmates, who is a patient advocate but is not focused on advocacy through policy:

And his way of being a patient advocate is being, like, truly present for them, caring for them fully humanistically, and taking time to educate them and their families, and serve within the community. So, the, I think there’s different ways of doing it. The advocate is the essential part, the policy is my way of being an advocate.

Thus, it is important not to elevate advocacy through policy above other ways of physicians advocating for patients. Nonetheless, participants in this study recognized the importance of policy and the need for physicians to influence policy. Aside from Lucy who had experience in writing resolutions and being directly involved in advocating through policy, other participants expressed a desire to influence policy indirectly through professional organizations or by advocating through legislators.

Dianne expressed her view that laws made without the direct input of physicians are not likely to serve the purpose of helping patients. She noted that the current system does not work because physicians and women are underrepresented when laws are drafted:

I think that if the laws are made without physicians, then they aren’t going to serve the purposes to help the patients. And I think that is part of the reason that the system doesn’t work is because they don’t have physicians at the table, or they don’t have women at the table. Oh, that’s kind of another issue in general, but yeah, I think that that leads to a lot of problems.

Lucy, too, articulated her view that physicians who are passionate about policy should be responsible for shaping policies that relate to health care. She recalled a story from earlier in her
interview, where there was a patient who was unable to be discharged from the hospital for months, because of state ‘prior authorization’ legislation that was negatively impacting that situation:

There’s, there’s very few jobs in the world where your day to day, everything that you can do, is dictated by people, in this case, the legislative branch, who have no direct experience with patient care, right? Or your day to day. So, that patient who was stuck in the hospital, was stuck there because of state legislation requiring ‘prior auth.’ by an insurance company. And it’s that, that was signed off by people who have never seen patients before. So, I think they’re, if there are physicians who are passionate about it, to be involved in policy, there is, there has to always be a physician or nurse, nurse or clinicians voice, in the shaping of that policy. Because otherwise they don’t like know, they don’t know what it’s like to care for patients.

Martin described how public health and policy are related to each other, and he emphasized that physicians play an important role when it comes to policy and public health. He was unequivocal in his view that physicians need to be engaged on matters related to public health and health policy, as he did not believe that legislators had the appropriate expertise in these areas.

I think that when it to comes to policy and public health, that physicians play, again, a substantial role in that. I think you can kind of lump those two together because a lot of public health is based on policy. I mean, if you think about what’s happening now, most of the public health related efforts in terms of COVID-19 are based on policy at this point. So, we got to be there. We have to be there for that conversation, because frankly, they don’t know what the hell they’re talking about.

Martin explained his opinion that too much trust is placed in legislators who do not understand health care and public health well enough to be effective on their own. He acknowledged that while legislators have the technical knowledge needed to write laws, he emphasized that physicians need to be consulted when writing health care policy:

…And so, I think that in terms of health care policy and public health, that would be physicians, and not only physicians, I mean, you know, epidemiologists, you know, people who work in medical education when it comes down to education, legislation and things.
Participants in this study articulated how they have been involved in advocating for their patients through policy, or how they intend to do adopt this aspect of the HSS innovation in the future. During her first three years of medical school, Lucy did considerable work in the health policy setting, wrote resolutions, and went to the Capitol to advocate for policy. Lucy’s early adoption of the HSS innovation resulted in her ultimately writing a resolution to the American Medical Association (AMA) asking them to expand veteran health services to better serve female veterans seeking gynecological or obstetric services and discusses a situation she ran into as a volunteer in a free clinic:

I was the patient navigator for them and I had a patient who was a veteran who came in asking about fertility services and gynecology services. And I asked her, because my job was to try and find different access for her clinical needs as a navigator, and I was like, “why not go to the VA?” And she said that like [location] VA has very limited medical services for women. And I started to look into that more and there’s, a lot of the VAs don’t have fertility services or gynecological or obstetric services, because it’s just built on that veterans used to be only men. And, so, I wrote a resolution to the AMA asking them to advocate to expand VA services, and that ended up going to the national conference and advocating for and it passed. And that was really rewarding and that kind of sparked more interest because I realized I could be successful with it.

Not all participants expected to advocate for policy in the same way that Lucy had. Paul, for example, did not intend to be an individual to directly advocate for policy changes in person, but he articulated his desire to stay involved by supporting organizations that can lobby effectively. Similarly, Caitlin noted that while she did not see physicians necessarily being the people who make legislative changes, she did see the need for physicians to unite and advocate for health policy changes that make the most sense:

… I think we’re not going to be the ones making those changes necessarily. But it’s our job to go to the people that can, and advocate and tell them what, from our point of view, needs to be changed, what needs to be done, and kind of unite as physicians.

While it was only Lucy who had substantial experience in advocating for policy changes first-hand, most participants in this study emphasized the importance of having physicians
represented when health and public policy changes were being drafted. Indeed, participants believed that policy impacted a physician’s day-to-day work and that leaving legislators to draft health policy on their own would have negative consequences for patient care.

_Chandoning the Patient Cause_

Participants in this study described how they advocated for patients by championing the patient cause. Deeply influenced by a humanistic, patient-centeredness in their approach, participants spoke about how adopting a systems perspective in the care of patients was synonymous with prioritizing the patient’s interests over all else. Dianne expressed her view that when physicians fail to adopt a systems-conscious approach, they create inefficiency, frustrate the patient, and fail to keep the patient’s best interest in mind. Interestingly, she noted how adopting a systems perspective allows the physician to keep the patient at the center of their work:

I think it’s the best way to take care of patients. We can’t operate in bubbles. And I think when we do, it creates a lot of inefficiency, and it’s frustrating for patients, and isn’t doesn’t keep their best interest in mind. So, I think that adopting a systems perspective keeps the patient at the heart of issues.

For Lucy, adopting a perspective on the role of a physician that aligns with the principles of HSS, is the way to practice humanistic medicine. For her, advocating for patients by championing their cause, is really an exercise is thinking holistically about all the potential influences impacting their ability to be healthy. This kind of approach requires physicians to think more broadly than the science of diagnosing disease:

I think that it is, like, how to practice humanistic medicine. It’s the way that you can care for the whole person in all of their needs, is to think about perspectives that are outside of like a linear algorithmic way of thinking.
In reflecting on her motivation for taking a deeply patient-centered approach to her physician advocacy, Lucy emphasized the humanistic aspects related to caring for patients. She also cautioned against separating the patient’s pathology from their lives:

I could probably make some connection to the work that I’ve done previously, especially in social services, but like truly what it is at the end of the day is that if I was that patient. I would hope that I wouldn’t be ignored just because I wasn’t interesting anymore to the team, or my mom, or you know someone I care deeply about. Like, I think everyone just deserves that kind of respect, you know? I think the more that we separate the pathology from the person, the easier it is to kind of just be like, “oh, well, they’re not an interesting patient anymore, so we won’t round on them. I’ll check in later”.

While Mary and Lucy both emphasized the humanistic underpinnings associated with physicians advocating by championing the patient’s cause, Mary did articulate, however, how she did not think that it was incumbent upon all physicians to actively attempt to change the health care system. She did feel like she should change the system, though, knowing that the system is not working in the best interests of patients. Mary’s motivation to change the U.S. health care system came from her desire to address the undue financial burden that is placed on patients and the unsustainable way in which care is provided:

I think, you know, there’s so much excess in some areas, and really like short shaft other areas. And I think that we’re not providing care in a sustainable way. And I think that we’re kind of unduly burdening people financially with health care. So yes, I think that I feel like I want to change, like, how that works.

Interestingly, Mary recognized that the health care system was not working for physicians either. Provider work life balance is an important systems principle that stands alongside the aims of improvement of population health, patient care experiences, and cost reduction.

The participants talked about several ways that they could champion the patient cause, including reducing the financial costs of care, recognizing the non-financial costs of care, recognizing the ways that physicians are also advocates, and attending to the overall care and wellness of patients.
Reducing the financial costs of care. Reducing the costs of care by practicing cost-conscious medicine, is one way in which participants expressed championing the patient cause. Participants also recognized that they had more agency than patients in the health system, and saw it as their responsibility to advocate for their patients through insurance companies, for example. Martin highlighted how he was focused on cost-conscious care, as a way of advocating for patients. In alignment with the HSS innovation’s concept of value-based care, he described how one has to consider the value of the intervention and the quality of the outcomes, when assessing its cost, and gives an example of someone involved in a car accident, where the surgical interventions are expensive.

But at the end of the day, we cut you open, fixed your liver, sewed your bow back together and close this massive aortic wound and you didn’t die. You didn’t feel it, and you didn’t get into post-operative infection, you walked out of the hospital, and you’re alive. I mean, those are complicated things that demand a lot. $35,000 is steep, but how much of a price can you put on what you got out of that?

He juxtaposes this with the price of two different types of Magnetic Resonance Imagings (MRIs), where the cheaper of the two can be just as effective as a more expensive one and goes on to say:

I don’t want people to be saddled with a shitload of money that they’re not going to be able to, to pay ever. And I think that that comes down to, like, in the instance, I want to make sure that they get better. But, also, in the future, I want to make sure that if they are sick, they can come to a physician with the, at least the thought in mind that, “if I have to pay a lot of money, it’s because I have to”, not because, “that’s just the way things work”.

Like Martin, Dianne also emphasized how physicians can champion the patient cause by practicing value-based medicine:

… I want to ask if the test or whatever I’m considering ordering has value… I’m considering, like, “is there a cheaper medication that might serve the same purpose of the more expensive one?” I’m thinking about questions like that. I mean, even if they are better off, the cheaper medication is probably still preferred in most cases, unless it’s not going to work as well.

Paul also emphasized the cost of care as an important concern for physician advocates. He highlighted the humanistic aspect of keeping costs as low as possible, as a demonstration of
respect for the patient. Like Martin, Paul also noted how patients may disengage from health care if they receive care that is unaffordable for them:

I think cost to the patients is a huge concern, just in general. Because if they can’t afford their treatment, they can stop it early. So ultimately, it definitely affects their health. The other thing is, I think it’s just out of respect for the patient, so, and this patient is already resource limited, and you’re going to go ahead and you’re going to give them a bill that is way magnitudes above, maybe a month salary or a year’s salary. Like, you definitely have to be mindful that for the patient….

**Recognizing the non-financial costs of care.** Caitlin explained that championing the patient cause is not only about keeping the financial costs of care as low as possible, though she recognized that this was important. For her, there can also be the emotional costs associated with certain types of care. Given her interest in Pediatrics, Caitlin spoke about these matters in the context of caring for children:

We have patients that, like, social issues keep them in for such a long time, and so we have to really know how can we minimize the cost. And the kids too, it’s not just the cost. Poking a baby every day: kind of on the mean side. Like, I think you have to look at not just the cost of money wise, but the cost to the patient and the family, and the pain… like moms don’t like seeing their babies being poked. There’s a lot of other costs, not just financial, that are associated with doing some of these things…

Paul, too, recognized that systems-conscious physicians should be sensitive to costs that are not just financial. He explained that ordering unnecessary tests could ultimately impact a patient’s trust in their physician, and other physicians in the future. He also emphasized how nurses might be pulled away from sicker patients when executing unnecessary physician orders, thereby negatively impacting patient outcomes:

… I shouldn’t say really the money for the systems. I really mean ‘resources’, because it’s not solely about the money aspect. It’s also time. So, you have to be like, you have to tie up the nurses to run these tests. Now, they can’t watch over the sicker patients. Or, in the case of patients, I think patients’ patience is a resource. So, you go ahead and you have to do all these extra tests and stuff, and then you lose their trust. And that impacts their health long term. So, you go ahead and you send them for an unnecessary imaging study, and then you go ahead and you do, like, all these unnecessary extra things, like extra needle
draws, whatever, then their patience starts wearing thin; they can’t, you know, engage as well in the future. So, I think that’s, kind of, all plays in there.

**Recognizing the ways that physicians are also advocates.** For Garry, a physician advocate who is championing the patient cause, does not switch between being a physician and being an advocate; he refers to this as “non-duality theory”. Garry described how physicians advocate for their patients in whatever ways are needed, in response to the patient and environmental factors that are present. Of note, he expressed his view that the issues that physicians take up when advocating for their patients, are system issues:

And, you know, my view of my role as a physician, is the physician advocate non-duality theory. You know, that they're not different. Your role as a physician is to advocate for your patients and, you know, whatever ways that need advocating for… by saying that I want to be an advocate as a physician for my patients, particularly those who are underserved, necessitates being a systems-educated physician and a system citizen, so to speak.

Garry explained that it was necessary for physicians to be systems-educated in order to be effective patient advocates. For him, physician advocates have to understand how a patient exists within the broader system.

Like Garry, Duong expressed his view that advocating for patients is inextricably intertwined into the role of a physician. He described how integrating the patient’s ability to pay for the costs associated with certain interventions into the care plan, is a way for the physician to ensure compliance and ultimately affect better patient outcomes:

… by being aware of the cost of your intervention, I think that that would be helpful in making sure that… so that you can make sure that you have a patient naturally follow the plan of care. Being transparent about the cost of care, or at least trying to be transparent in the cost of care at the beginning, can at least prevent a patient from being surprised by the high cost of some interventions. And I think like being a physician, it’s just within, it implied in their job to advocate for the patients and that. And I think we have a lot of power, as well as in the patient is willing to talk to us about their concerns about the plan of care, as we convey to them what we were thinking…
Duong had also recognized that physicians have more power than patients, and that physicians should cherish the opportunity to receive information on the patient’s perspective on the cost of care, and incorporate that information into the care plan.

In describing one way in which physicians can manifest their adoption of the HSS innovation, Lucy spoke about advocating for patients by engaging insurance companies on the patient’s behalf. She reflected on an opportunity she had to work with a patient who could not be discharged from the hospital because of an insurance policy, and noted how it was a powerful experience that showed her what it was like to advocate on an individual patient scale:

Unfortunately, a very important part of being an attending right now is being able to call an insurance company and advocate on behalf of your patient and their needs as not only their clinician. But as someone in the greater system that has a voice. And I got to be a part of all that. And while it was unfortunate circumstances, it was like really powerful for me to see how an advocate can be both on a larger policy scale and also on an individual patient scale and they’re both arguably equally important.

Several participants spoke about advocating for those with less power, such as children, or those who are food insecure. Caitlin for example, highlighted the uniqueness of physicians championing the patient cause when it comes to pediatric patients. In this context, she noted that physicians need to advocate for their patients’ best interests, sometimes in opposition to what parents may think is best for their patients:

I think our role is like really an advocate for these kids as a physician because they can’t speak for themselves. Not like when you have an adult patient and you go and say, “hey, these are your treatment options. Which one do you want?” You have to go through parents that can sometimes be very difficult between what they think is right and what should be done, or, I think you have to really stand up for your patient; I think that’s important aspect of pediatrics, beyond just treating illness.

Robert described how physicians can be advocates for their patients by addressing the systemic issues that cause them to have poorer health outcomes. He explained that this is a process of identifying deficiencies in a local system, and advocating on patients’ behalf to leverage those who are able to affect change in a local community:
… I think if you see these deficiencies in the community, you have to somehow address them or talk or partner with people that can address them. You know, as a physician, I don’t think I’m going to just have the power to just open a rehab facility on demand, but I think realizing that there’s deficiencies in the system and then talking to, you know, either higher ups at the health system you’re working, or other talking to nonprofits or partners in the community about this, I think are ways to… a physician can get involved… when I approach a patient that, if I see if something’s not going well, essentially, if it’s sort of like a resistance problem, I will kind of delve further and see why it’s not resolved. And it’s typically not the patient.

Robert concluded with his view that non-compliance with a care plan is not typically a patient problem, but rather a system problem. Dianne expressed a similar sentiment when she noted the importance of considering patients’ social situations when caring for patients:

I think that when I consider patients, that, I think, is really important not to overlook their social situations, and what they’re confronting at home that might be affecting their health care, but not directly related to their health. And how that plays out over and over again in the patient. And that builds up how well the system can care for their patients on a whole, up on a whole basis.

In thinking about the ways in which she demonstrated her commitment to considering patients’ social situations when caring for them, Dianne mentioned how she was careful to ask patients about their access to food when recommending that they be placed in quarantine during the COVID-19 elective. She also noted that she took into account caregiver burden issues when making her recommendations:

I think in the way I communicate with families and consider caregiver burden issues. It, with recently, with the telehealth screening. I’ve been asking patients if they have access to food when I quarantine, recommend quarantine, because I know there are resources, I could point them to. So, just some of that like things to think about on a wider basis.

Although there are clearly many ways in which physicians can advocate for their patients to champion their cause, Lucy shared her view that physicians who focus on just one of these means of advocating for their patients, can be as valuable as physicians who use multiple means of advocating for their patients. To illustrate her thoughts about this, Lucy shared an example from when she was interviewing for a residency program, where one of the residents at that
institution was singularly focused on drug pricing, but this was hugely valuable to his local health system:

One of the places I interviewed at, there was someone in that program that has really emerged as, a resident, as the voice on drug pricing. They were the expert, even at a very prestigious, like, university hospital. They were the person that all the attendings went to on drug pricing. And I remember thinking like, “wow, can you imagine like just being such an expert on that one thing and how amazing that is? And you’ll go and testify and do all this stuff on that one topic”. And he has that, like, capacity and bandwidth to do that. I think it’s just a personality thing. It’s the way your mind works. Like, I tend to be a little bit more of a jack of all trades, master of none, kind of person. And it’s just like, I think it’s, again, it’s just however you work best within the system; however, you can juggle patient care, your own wellness and well-being, and do what you can to try to improve the system, is completely defined by you. I don’t think there’s a right way.

Interestingly, Lucy mentions the importance of physicians’ own wellness as a factor to consider when choosing how, and the extent to which, to advocate for patients. Provider work-life balance is an important systems principle that stands alongside the aims of improvement of population health, patient care experiences, and cost reduction.

*Attending to the overall care and wellness of patients.* Virtually all of the participants spoke in some way of attending to the overall care and wellness of patients. Paul for example indicated that the most important aspect of advocating for patients is for physicians and patients to enter into a “therapeutic alliance”. He explains how this alliance is about balancing the patient’s goals with what is best for their health, and balancing these. Paul mentioned how when physicians act in isolation from the patient desires, it may result in unintended but negative outcomes:

The biggest thing for me is the physician is working with the patient, and you’re creating, you know, a therapeutic alliance. I think that that’s central to what you need for the patient. But I think it is a spectrum, where you want to make sure that you’re helping the patient achieve what they want, but also helping guide them to what’s best for their health.

Similarly, Garry articulated how he viewed his role as a physician to include supporting the overall wellness of his patients. He described how there are any number of ways in which
physicians can champion the patient’s cause, since there are so many systemic issues that affect health. Given the magnitude of problems that impact patient health, Garry noted that it was important for physicians to prioritize the ways in which they could advocate for patients:

As a doctor, I believe that my role is to add to, support the wellness, overall wellness of my patients through ever whatever facet requires work. So, with the understanding that there are so many things that people need help with. And there’s a need to triage because I can’t be simultaneously involved in, you know, all the different things which we need help. Whether it be like, you know, fair housing or, you know, public health issues, or finding insurance or whatever it may be. There’s, there’s so many systems problems that it’s impossible to do all of them… to me, it’s a very broad, an all-encompassing group of broad and all-encompassing responsibility and how you triage, in which direction you go, is then guided by whatever you’re interested in, passionate about, and or have experience in, where you can be most effective.

Garry suggested that physicians could make triaging choices based on physicians’ passions, the areas in which they have experience, or where they might be most effective:

I’m very interested in, you know, like I said, all these things. I kind of talked about international health, public health, languages, cultural anthropology and it makes sense for me. And public policy. And, so, it makes sense for me to, kind of, work with immigrants, using these populations, because these are a lot of the main issues that they’re facing. And fluency in these different areas, is going to make me the most effective advocate for them both on an individual level on the systems level.

Garry also explained how advocacy work with patients at their individual levels or advocacy that results in systems level changes, both required fluency in systems thinking.

**Educating as a Form of Advocacy**

Participants in this study described how educating others could be a form of advocacy. Students highlighted how physicians could educate their patients as a way of advocating for them. They also talked about educating medical students, residents, and other health care workers on the care team, as ways of advocating for patients.
Mary spoke about how physicians help educate patients and people around them, in order to articulate a coherent picture of all the details related to the patient’s health. Connected to the role of physician as educator, Mary also noted that patients need to be able to trust physicians with their fears and anxieties and be able to disclose deeply personal details of their lives:

I think I’m a doctor as an educator. So, I think you help educate your patient or the people around you, or if you’re in academics, like residents, medical students. But, I think that regardless of your practice setting, physicians always a teacher to a degree... And then I think the other part is, and this is kind of maybe branching off of the educator role, I think, you’re a confident in a certain type of way, in that you’re a person that your patient can trust with, you know, their fears and anxieties and can trust that you’ll have their best interests at heart, and they can kind of divulge to you like things maybe they don’t tell other people.

Paul suggested that educating patients is absolutely a way of advocating for them. He spoke about physicians being able to co-create care goals, and assist patients in overcoming insurance roadblocks. He also mentioned that he pursued a Master’s in Education because of a desire to be an effective educator for his patients:

I would say the biggest thing is advocate for patients. So, I think it comes down in a number of ways. It’s not just about giving the right diagnosis and moving on from it. It’s making sure that the patient and you set goals together to make sure that you’re actually acting on what the patient’s ultimate goals are, help them achieve those goals. And along the way, what’s going to be barriers both on their end. So, like, for example, are they setting up realistic goals that they can attain? But, also, bigger, you know, things like insurance roadblocks, that kind of stuff. And so, I mean, for me communication, just key in the whole physician in education, which is why I actually got the master’s in education.

Brianna, in thinking about what constitutes the best interests of the patient, noted that their understanding and comfort level were the two key aspects to consider. For a physician to be successful in helping the patient to understand and be comfortable, the physician needs to be an effective educator. Brianna also tied cost-conscious care into the role of physician as educator-advocate:

One: their understanding. Because I feel like, if a patient does understand that it can lead to not only medical complications, because they may not know actually what to do, but also just unnecessary fear of the unknown. Patient understanding. I think, patient comfort. Making sure that the patient has what they need and that
just because of paternalistic kind of like medicine, where this is the physician, we’re telling you to do it, do it. The physician actually takes the time to realize, “am I asking you to get like a $500 per month medication that you can’t afford?”, taking the time to make sure that the patient is comfortable with, also, plan in everything that’s going on. So, I think patient comfort level and patient understanding.

Patrick articulated how he thought that patient education was synonymous with good care. He also mentioned, however, the importance of physicians advocating for patients by educating future physicians in the best way possible:

To begin with, is that you’re adding to the profession in a unique way because you’re training future doctors, essentially, and that certainly holds a lot of importance to me. Especially because when you go through the process yourself, and you maybe see the ways in which it’s not done as well, you want, you’re motivated to be the change in that and do it better. And then, in terms of like patient education too; it’s just a part of, like, good care to me, because it helps the patient get on board, so to speak, with their medical care and understand it better, and motivates them to care about their own health and a lot of ways.

Patrick expressed the ways in which physicians might educate members of the interprofessional team, as a way of advocating for patients. He noted that the physician has a unique role on the team, and how she/he communicates can influence the kind of care that the patient receives.

Also, Patrick noted how physicians can educate patients in ways that inspire them to care more about their own health:

Even just your role on the on a team: physician as educator. I feel like part of it is, is also like physician as communicator. Because a lot of the education that you’re doing is, is a way of communicating as well. So that’s why I’m thinking just like interprofessional teams, for example, like you being able to communicate with one another and educate your other team members, is maybe part of it. And it’s also very much patient centered care in a lot of ways because the better you’re able to educate someone, like you mentioned, kind of like population health. But even on the individual level too. The more you’re able to educate a patient, the better. They’re able to relate to what you’re doing, for example, and appreciate that care… But it inspires them to maybe care more about their own health as well.

Lucy expressed how education of any type is a way to change any system, including the health system. She described how she might not have time to continue advocating for patients
through policy during her residency training years, but that she could educate medical students to become more aware of how policy might be influencing the work of a physician:

… education in any sort, is the way to change any system. So, I mentioned, maybe, if I don’t have time to write policy and go to conferences, the way that I can be an advocate and promote policy is through talking about it with medical students like, “hey did you realize that like prior auth. is written in this way and because of this, this is why our patient is being hung up?”.

Lucy further elucidated how she may go about educating medical students about aspects of care related to health systems:

I kind of wonder if my role will shift a little bit because what will be essential is to be an educator for patients and med. students, may be the way that I advocate for my patients in residency will be through education because I'll be doing it anyway. And it will be easier in that moment to ask the medical students to reflect on like what, almost do like a needs assessment, but like for like systems in like a systems way. Like, “what will this patient need to be discharged?” beyond the clinical…

Participants clearly viewed physicians educating patients, medical students and residents, and other members of the health care team, as a way to advocate for patients. Of note, this education relates to cost-conscious care, understanding the patient perspective, and making others aware of the systems issues impacting patient care.

**Leveraging the Team**

Physicians can leverage the skills and expertise of other members of the health care team as a way of advocating for patients. Participants highlighted the unique role of the physician on a health care team, and noted how a physician can improve patient outcomes by maximizing the input that can be gained from all members of the team.

Patrick pointed out how it is easy to assume that a physician is the leader on a health care team. While he felt that this assumption was appropriate at times, physicians did not hold all the power in terms of affecting the best possible patient outcomes. He also reflected on his time as a
patient in the health care system, when undergoing multiple surgeries, and emphasized that the
health care environment has changed. This change necessitates the physician balancing the roles
of all health care workers in support of patient outcomes:

I think that it’s important for sure to be balanced between being a member of a
team of a health care team. And at first, I think it’s easy to associate the role of
physician as leader of that team, and I certainly think that’s appropriate at times.
But I think that that can be misconstrued as meaning that they hold all the power,
and I don’t know if that’s necessarily the case. It’s more so, balancing the roles
appropriately and really contributing to a team effort towards caring for a
patient…

Patrick suggested that it was necessary for a physician to be both a systems thinker and a team
player, in order to be an effective practitioner. He noted that the starting point for physicians is to
know that all members of the health care team contribute to having better patient outcomes:

… you need to be more of a systems thinker and a team player, and all these
things now to be an effective physician. Just, and part of that is just the nature of
our health care system, how its transformed over the years. It’s not like just the
physician anymore. There’s a team of all these people and you need to be
functional on that team in order to have better patient outcomes. So that’s part of
it, is just knowing that that’s important.

While not downplaying the importance of other health care workers, Mary did note that
physicians are leaders in the health care team. Mary explained that physicians must advocate by
leading the team in ways that benefit patients:

… you’re also a kind of one of the leaders of the health care team, which is
obviously very important. And you’re, you, kind of, help steer the proverbial ship
of the people that you’re working with. So, whether it’s on labor and delivery and
you’re trying to triage your priorities, or whether it’s in the clinic and you’re kind
of trying to direct how you best manage all of our patients, and, kind of, how we
can proceed forward and, like, most efficiently, but also, in the way that benefits
our patients.

Rather than being a leader on the health care team, Duong expressed how he thought that
physicians were coordinators of health care teams. Duong saw coordinating health care workers
on the team as being equivalent to patient advocacy. For him, all members of the health care
team play an equal role in getting the patient the best care possible:
For me is the best one word I think of right now is like ‘coordinating’. So, is, kinda like, big thing. Because specifically for me an emergency medicine doctor when you in the department, you, kind of, playing a role you’re not, for me, like I’m not, like, that super different than the other people, let’s say, the custodian or the housekeeper, social worker, kind of thing. We all strive for the same goal, you know. Certainly diagnose, treat, or treat and discharge patients… I think the role of the physician in the department is to make sure that you coordinate everything right so that you can get the right diagnosis, or trying to get the right diagnosis. Trying to get the right people involved in addition to yourself to get a patient treated, managed, and discharged properly.

Since the physician is authorized to diagnose, treat, and discharge patients, there can be a natural hierarchy in the health care team. Duong explained that physicians could still be coordinators of health care teams in this environment. He noted that members of health care teams work within their own scope of practice, contributing in their own ways to overall patient outcomes:

… people in the department have to play different roles and have different scope of practice, of course. But as long as they know what they should do, or what they can do to help out a team, I think that that’s good enough. I mean, I don’t want people to get, you know, out of their scope practice and do things that they are quite uncomfortable with…

Abheer used the metaphor of the physician as a team captain, to describe their role as a leader on the health care team. Like a captain, he explained, a physician acts as a liaison between the patient and the system, and the different players in the system. He also explained how it was incumbent upon the physician to decide when to utilize the skills of different health care workers, in order to get the best possible outcomes for patients:

I think of it as almost like a captain of the basketball team or captain of a track team, or something where, you know, the captain isn’t always… the captain wasn’t like the best player all the time, a captain wasn’t with the highest score, or somebody’s the captain and also was like the one that everyone could go to as like a liaison between them and the coach, or them and whoever. And they, kind of, rally the team around, and it was their responsibility to, you know, make sure that everyone’s voices were heard… understanding when you need what, and who you need the most to kind of pull together the team as one, is kind of how I view the role of the physician.

In relation to how being cost-conscious would directly influence her practice in the future, Brianna highlighted the importance of building a team that she trusts. In particular, she
highlighted how other health care workers may have perspectives on the patient care that the physician does not, which could impact the overall outcomes for patient:

I think it made me realize that I want, I guess, will need to have an understanding of how I can provide this support to a patient. I understand that, as a physician, you’re pulled in many different directions and you’re very busy. So, I think that eventually translates into like me developing a team that I trust, that can provide this to patients. And I think I’ve seen that a lot through, not only at [Institution] but other institutions, where you round with these teams, the social work, for the various support that can help figure out logistics for these patients that you may not think about, or you may not know all of the obstacles that a patient has to overcome to, kind of, meet the goals that you expect of them.

Paul described how he had experienced leveraging the team as patient advocacy, while doing an Acting Internship (AI). He described how he would present patient information to a whole host of health care workers in the interprofessional team, in order to support the most ideal plan of care for patients:

… we would present to the social workers and the nurse care coordinator, and we present to the pharmacist there. And, so, that was always a nice experience, right? Because then you had the whole team there and you could really engage them and, kind of, set up, you know, what’s the best way to get this patient home or to like, whatever level of care they need.

Paul also shared another story from his time as a medical student in the clinical environment, where he was able to leverage the expertise of ‘Rx to Go’ pharmacists, in support of caring for a patient. He told a story about an elderly patient who was having difficulty understanding how to use her inhalers and how the most efficient and beneficial approach was to have all those caring for the patient meeting with her simultaneously:

… And then, so you started as joining together and saying, “hey, let’s get all the stakeholders together”, which is a very, like systems-based idea. And it’s like, “get everybody’s involved in the care, in one room and like figure this out together”. So, I like ‘Rx to Go’ and that kind of stuff because it just takes another barrier off, because a lot of patients get discharged and the local pharmacies are closed, and then they go a day or two without their meds. And they’re most vulnerable right when they get discharged, especially.

Of note, Paul described how leveraging the expertise of pharmacists could negate the negative outcomes associated with a patient being discharged and not having immediate access to
the medications that the need, at a time when they are most vulnerable. Paul also mentioned how partnering with social workers was another way that the team could be leveraged in order to support patient outcomes. In the context of a story about a patient who was unable to be discharged from the hospital because the patient’s insurance company would not authorize payment for an acute rehabilitation facility, Paul highlighted how social workers could be valuable partners in removing insurance barriers, saving money for the health system, and getting patients the care they need:

… And then they didn’t cover any of the acute care rehab facilities. And then every time you were just about to discharge him to a lower level of care, his oxygen decides to drop and then he would go ahead and have to stay longer. And, so, he would just… this is like a repeating pattern of like, two weeks. This is costing the insurance company like three times as much if they just send them to a lower level of care that like could provide the services he needed. So that was it. Frustrating. But you see that play out, so like the really good social workers that can also help partner with you, help a lot.

Paul’s story illustrates how addressing the systems issues that impact individual patients is a systems task that necessitates working with others in the health care team.

**Imagining Real System Change**

Participants in this study imagined the ways in which the system could really change. For some, real system change could be accomplished through educating the people who are responsible for change in the system. For others, real system change could be accomplished by working within the existing system. Yet there were also participants who felt as though an overhaul of the existing health system was needed in order to bring about tangible change. After some initial general discussion, I present the findings from this theme in three parts, namely: Educating System Influencers, Working Within the Current System, and Overhauling the System.
In general, participants did not believe that physicians were obligated to bring about broad system change. At the most, they believed that physicians could bring about change within their immediate sphere of influence. Participants wrestled with the role of government and legislators, and how physicians interact with them to bring about change. Robert highlighted how physicians have been slower to advocate for system change than other health care providers:

… it is the government, obviously, that creates these policies. But at the same time, there’s always going to be a pushing and pull as far as lobbyists, money, etc. But I think, to some degree, it’s a call to arms for physicians in a way to advocate for these changes. You know, I think, unfortunately, physicians have been a little late to the game and not as the loudest speaker in the room when it comes to some advocacy… I think always going to be a tug of war against government to go in a different direction. But I think it’s, we have to make sure we’re at the table.

Almost all participants, like Robert, emphasized how physicians needed to participate in shaping the health care system to bring about change.

**Educating System Influencers**

In imagining how the health care system could substantively change, participants highlighted how educating systems influencers could make a real difference. Garry noted how physicians need to have systems fluency, understanding how systems are structured and how they work, in order to be agents of change in the health care system:

But to do that requires effective knowledge of what the system looks like and where to go within the system to get the system to address the issue. And, so, systems fluency and knowledge of how systems are structured and work, as an indispensable component of that physicians’ work.

Garry explained that systems fluency is needed at every level of education and training for physicians. For this reason, he saw HSS education as being key in shaping how the system could change in the future:
… as a resident, systems fluency is incredibly important, which you learn through HSS. As a fellow, or attending physician, you’re doing a lot of the… you are still performing in systems work, but in a lot of different ways. So, whether it be guiding healthcare system policy, identifying needs and communicating within the institution, requires the same, if not higher, level of systems fluency, but it’s simply manifest differently. There’s not a component… there’s not a period of time in your tenure as a physician that you are not intimately involved with the health system every single day, and for which fluency is not required to do the best job you can.

Caitlin thought that HSS education allowed students to make tangible changes to the work flow of a hospital. She also thought that students could become trained in quality improvement, which would equip them to identify problems and solve them, making the local health system more efficient. She did note, however, that larger changes in the U.S. health care system would not necessarily be solved through education:

… education is very important to making those smaller changes and improving, kind of, like within a hospital system, that hospital’s, kind of, efficiency and things like that. And I think that that’s very good. But I think countrywide, overall, there has to be some higher-level overhauling, but I think the education can really help, little, like, flow within the unit.

Robert described how physicians can have a tangible impact on the health care system through quality improvement education. He noted that physicians, and other clinical workers, could save money and reduce waste, as a consequence of quality improvement education:

I think from a quality improvement standpoint, which can save money, especially if you’re reducing applications, or if you’re reducing resource, you know, waste. I think that’s huge. So, I think from that aspect, absolutely physicians should be involved in, and I think physicians can often come up with the ideas to do that. From an advocacy standpoint and a public health standpoint, I absolutely believe physicians have a role in that as well, I think

Dianne pointed out that targeted systems education is needed in order to affect real system change. Specifically, Dianne noted how it might be necessary to educate more experienced physicians, so that all physicians could advocate for systems change together:

That, like, in the governmental, or federal level, state politics as well, all impact the health system. And, you know, medical students can be advocates and, but, maybe older physicians with more experience also need to be aware of the challenges that we’re facing so that we can all advocate on a whole.
Duong was more skeptical about the value of HSS education in being able to influence real system change. For him, there still lacks evidence that systems-educated physicians are able to bring about tangible patient outcomes in the system. In reference to other countries where there are better health outcomes than in the U.S., Duong expressed his doubts about HSS education being able to bring out real system change:

The question I would ask you, is that, do they have health system education in their medical education? And having the system health system education, is there any study out there that that tell you specifically by, you know, making people more educated about the process, does it translate into the good outcome? And if it does, at a micro level, does it, does it do so in a macro level, at the national level?

On the other hand, Garry felt that there was no debate to the question of whether or not physicians should be HSS education. His view was that HSS education needed to be expanded to include decision makers at all levels. For him, the central question is around deciding which decision makers in the health care system should be systems-educated:

I don’t think there’s a debate to the question of whether or not that physicians should be HSS educated in order to be the optimal physician, they can be for all those reasons, sort of previously enumerated. And obviously administrators in hospitals and other people in healthcare administration, same, same principle. I think it needs to go beyond that… I think that the understanding of who needs to undertake an education in health systems science to understand the intricacies of the health care system should be broadened.

Lucy described a situation where change to the U.S. health care system is inevitable. She described how the COVID-19 pandemic has emphasized that the system is not working well enough. She also mentioned that many people are dissatisfied with the care that they receive, and that physicians are burnt out within the system:

I think that health system sciences allows students to reflect on how they can improve the system. In my opinion, it would be a universal system, but for others, it might be somewhere in between. Maybe the way we get there is like baby steps, and augments to the, smaller augments to the system. And if that’s going to be the case, either way, any major changes you want physicians who understand the way the system works to be able to guide that right?… But I think that either way the system is going to change after COVID. I think we all recognize that. I think a lot of people are dissatisfied in the way that they receive
care. We’re recognizing the stresses that are on the system, the way people are burnt out within the system. And I think that the more you educate physicians to be aware of, of this system, the more those physicians can play a role in guiding it to a way that’s more clinically centric and not like lobbyists centric…

Interestingly, whether the system will change incrementally or entirely, Lucy felt that physicians needed to be systems-educated in order to play a role in shaping the new form of the U.S. health care system in a way that is clinically-centric, and not lobbyist-centric.

**Working Within the Current System**

When considering what needs to happen in order for the health system to really change in the U.S., participants described ways in which physicians could work within the existing system. Duong explained that the current health system is complex and fragmented, and that physicians are attempting, currently, to implement change in their micro-systems that can be aggregated into the broader health care system. He described how real system change could occur if different health care institutions within a local health system could collaborate on common system problems, and advocate for policy changes in coalition. He expressed how it was not pragmatic to overall the existing system. He also noted how incremental changes to the system can be difficult, and the outcomes from these interventions may not come quickly:

… health advocacy is one thing. But we operating under a very complex and fragmented system and what we do, we’re trying to do, right now is to educate people about that complex system, and try to circumvent on aggregate in that system, or to make little changes here and there, so that your micro system can adapt into that big fragmented system… For me coalition between different hospital system which we got to one common problems and try to, so that we can leverage that power and make a change and to make it into a policy change at a state level or at a national level.

Lucy explained that real system change can occur by physicians practicing systems-conscious medicine in their daily practice, and that it was not necessary or helpful for all physicians to be trying to bring about radical change in the system:
I don’t think that everyone needs to be the person that goes to the Hill or needs to be the person that changes the system. If we were, if every doctor was trying to radically change the system in the way that they think is best, I think that would also be problematic. I think that if that person is singularly focused on cost of care and the way that they work to better that is through, like, the way they approach each patient, and ensuring that they get the lowest cost of care, like, or in that they become hyperaware of that one particular thing and focus on that, I think that that’s absolutely fine.

Mary expressed doubt that she could personally change the entire health care system. For that reason, she noted her commitment to advocating for system change within whatever capacity she could. However, she emphasized that the current U.S. health care system was functioning and providing needed health care. She also stressed that there are also business interests motivating a continuance of the status quo, which would make complete change in the health care system difficult to accomplish. While she acknowledged the inefficiency of the current system, she warned about the risks involved in overhauling it:

… I don’t think I can personally like change the whole health care system. I think that it has, you have to have a lot of people willing to, I mean… it’s really a huge risk to change how we deliver, you know, how we pay for health care in the United States. Because you’re risking everything that you have right now. And look, there’s a lot of problems, but we at least have a somewhat like functioning hospitals...

For Brianna, there was no point in having a huge issue with the profit focus in the U.S. health care system, because she thought it was unlikely to fundamentally change in that respect. For this reason, she noted that it was important for physicians to manage the business aspects of medicine while focusing equally on optimal patient care:

… I don’t think there’s really a point of having, like, a huge issue with it because it’s not going to be something that is ever going to go away. But I think there’s a way to manage it and still have an equal focus on providing optimal patient care while it’s still being a business.

Robert underlined a need to balance the different interests in the health system, in order to have real system change with respect to cost. In particular, he saw insurance companies as having too much power, and that the existing system needed to adapt to rectify this:
… And a lot of that, I think, comes down to the balance of the different players, which is not just health system, but the pharmaceutical companies, the insurance companies, and the payers, mainly Medicare, Medicaid, and how we handle that. And I think right now, from a macro policy standpoint, I see that the insurance companies have a lot of power. And I think until we sort of negotiate them having a little bit less power in what goes on, I think you’re going to see issues with costs continue to be an issue.

He also thought that a nationwide integrated Electronic Medical Record (EMR) would be critical to improving patient outcomes. Rather than fundamentally overhauling the health system, Robert thought that real system change could occur if communication within the health care system could be improved by having a single EMR:

I think integrating EMRs is going to be critical because I think information sharing is just too difficult... So, I think we need more systems like that, especially with linking out-of-state files. I think a universal EMR would be appropriate.

Robert also felt that there was currently too great of an emphasis on pharmaceutical innovation, as an excuse for the high costs of care. He argued that it was necessary to interrogate the kinds of innovation that are being done in the U.S. health care system, in order to bring about real system change. He also briefly mentioned there needing to be more proactive, rather than reactive, spending with some social programs:

… I think medical innovation is great. I think it’s important. I think it’s why the U.S. has always been on to the frontlines of things. But as we’ve invented new things, we haven’t really seen huge differences in health outcomes… I think it comes down to how the money is spent, and I think it sometimes is spent too reactively rather than proactively with some social programs. I think that’s sort of where the money is.

Patrick thought that he could affect real system change by identifying and addressing ways in which the system is contributing to physician burnout. He noted that the current system was failing to address physician burnout sufficiently, and that the focus of wellness programs has been misaligned with the central issues:

I hope to, in the future, as I experienced more as a physician, identify ways in which I think that the system is contributing to burnout and maybe be an advocate for that change. And I think that the word ‘burnout’ is thrown around a
lot, and even in residency programs. Sometimes the Wellness aspect of programs is trying to get at this burnout, and, but, I think sometimes they missed the mark in terms of like what burnout is, when I think about burnout…

Patrick provided specific examples of some of the systemic issues that need to be addressed in order to bring about real system change. He highlighted the need for adequate work stations and a user-friendly EMR, as facilitators of physician wellness. He also disparaged current attempts, like promoting meditation, to address physician burnout:

… One of the things that I saw being like really intrusive to your typical workflow during the day is having computers and a functioning electronic medical record to do what you need to do. Like those are things now that are just undeniably necessary in day-to-day work, but there’s oftentimes I would see like computers that aren’t working or a workspace that just isn’t conducive to like actually getting work done, or an EMR that’s just so challenging to work with that it’s just, it’s another barrier to get past. And those are things that I think you know from a systems perspective, and maybe more of a top-down approach like you need to, want to change those things and make those available instead of slapping a Band-Aid of like, well, you should meditate more because that’s why you’re burnt out, or something like that. So, you know, I want to help change that perspective a little bit…

Duong stressed the need to reduce the cost of care in current the U.S. health care system. However, he felt like there were actions that physicians could take in their day-to-day practice that could bring about real system change. He mentioned being transparent with patients about the costs associated with their care, as a form of patient advocacy. He also noted how, at a higher level, health institutions could work to reduce the costs of care by negotiating contracts with insurance companies, or by creating their own insurance plans, or sourcing the most cost-effective medical equipment. In the end, Duong underscored how complex the health care system is, and how affecting real system change is not a simple task:

I mean, the goal is to reduce the cost of care. But I think at least being, the first step is being transparent about the cost of care is a, could be potentially more practical, in a way. Or being like, in conjunction with the attempts to reducing the cost, I think like, personally, how should I put it, the cost of care. It is a system thing and it’s not like you’re going to change one thing in the system that could affect the others elements, and the cost of care that the different players in determining the cost of care. And I mean, advocacy, and trying to be transparent in the cost would be helpful. But at the end of the day, it all boils down to the
policy... So, although the goal sounds simple, just like, “reduce the cost of care or being more transparent”, it just takes a lot of work and a different approach, depending on what system you’re operating in.

Mary emphasized the ways in which physicians could affect real system change that relate to their daily work. For her, she imagined that she could advocate for family planning services and laws regarding birth control and abortion services, as these would fall within her personal sphere of influence:

… I feel strongly about is like access to family planning services and laws regarding birth control, and how we find different types of birth control and abortion services. And I think that’s something that I’m going to have a lot more of a direct role in personally. And then in any way in which, like, I can advocate for maybe some of the bigger changes I believe are necessary, I will. But I think that my personal sphere will probably be restricted, not restricted, but will be focused on that, and whatever capacity that I have.

Interestingly, Mary noted that she would only be able to focus on real system change in light of whatever capacity she may have. This idea of physician wellness is one that is embraced as a systems concept, alongside a focus on population health, patient care experiences, and cost reduction.

Paul spoke about engaging with the community as a way to work within the existing health care system, and affect real system change:

… a lot of health care right now is designed to treat illness. But I think that the goal of the physician is also to ultimately just promote health. And, so, when you’re engaging with the community, it’s important to see what the resources are available and how you can maximize those to help your patients… And, so, I think that one of the biggest things I think will be interesting in the future, is how you can engage the community to look at what they already have as their strengths to help cover their weaknesses…

In his description, Paul emphasized ways in which physicians could implement real system change while working within the existing system. For Paul, physicians have a responsibility to have a relationship with the community, know what resources are available in the community to be maximized in support of patients’ health, and be able to promote lifestyle changes by linking patients to resources in the community.
**Overhauling the Existing System**

Caitlin recognized that educating physicians in a systems education might help physicians’ knowledge and ability, but she felt that it was limited in being able to affect real system change because of the broken system in which physicians exist:

Educating definitely will help from like the physician point of view. Like, kind of, like our knowledge and our ability. But I think we’re all still, even if we understand the system, I think we’re working in a little bit of a broken system. I think the education kind of gives us knowledge of what is there, and how to use it to the best of our abilities for our patients, and how to properly, or tell how to best give the patient care. But I think the system itself will limit what we can do.

For this reason, Caitlin believed that the system itself had to be overhauled in order to affect real system change. Indeed, Caitlin spoke about how her physician father had become cynical about the health system, because of its brokenness. However, she described how he was still passionate about the medicine, which was separate from the system for him. She concluded that the health system needs some major changes in order not to negatively impact the physicians who are passionate about caring for patients:

... And when you get my dad talking about the right topic, he can be very cynical about the system, but once you get to talk about the medicine, you can see… you’ve just got to walk away because he’ll just go on for hours. So, I think it is definitely a system issue. There are a lot that need to be changed in the end, but I don’t know how we can do that. But I do think that the system needs some major changes.

In imagining how the existing system could be overhauled, Caitlin recognized the importance of policies. However, she emphasized that a central issue in the U.S. health care system is access to health care. She described the systemic issue relating to medical education, and how there are not enough physicians being trained for the number that are needed. Ironically, she points out, there are limited numbers of spots for students to get into medical school, and not all students who finish medical school are matched into residency programs. For Caitlin, an
overhaul of the process of how physicians are educated and trained into the health system is needed in order to address the systemic issue of access to health care: 

I think that policies do need to change. But I think some of the big roadblocks are just access. We don’t have, like I said, some people just don’t have access to medical care easily… And the active issue is we don’t have enough, and I think part of that is medical schools are very competitive, there’s a limited number of spots. But even then, not everyone that goes medical school ends up going to residency. Not everyone matches. Like if you have a limited number of residency spots, we’re limiting the amount of people that can go into it. Yet we need more. So, I think that there’s even barriers to get the physicians to the people, because there are way less people becoming physicians than want to. And then there’s barriers to getting to being at that spot toward the access.

Insurance coverage, and how to pay for care, is another major issue in the health system that Caitlin felt needed to be overhauled in order to bring about real system change. Caitlin explained how insurance coverage is abysmal, and people often delay or forsake care because of the costs associated with paying for it on their own:

And then being able to pay for it. Insurances, I think policies around that, as there’s a lot of people that can’t, they just won’t, it just isn’t covered. Like, it just doesn’t happen... They can’t afford it and then end up coming in, when they’re really, really sick. And at that point, there’s not always a lot we can always do, or it costs a lot more.

Dianna also expressed her view that there needed to be an overhaul to the way in which insurance is provided to people. She felt like this was something that needed to happen at the governmental level. She also expressed hope that the COVID-19 pandemic may prompt changes in this direction, especially since there may be high levels of unemployment in the foreseeable future:

… it’s been said that, like, we are the ones that can make changes. But I still sometimes, I also feel that a lot of the changes that we need, come from more of a governmental level, where we need like changes to the way that insurance is provided to people. And I really hope that COVID helps prompt some of that change because, you know, we might be stuck with pretty high unemployment rates for a while and people are sicker than usual.

For Lucy, real system change could be accomplished by overhauling the current health care system and replacing it with a universal health care system. Mary also noted that the U.S.
health care system would only change significantly if there was a change in the way that health care was funded. In particular, she emphasized the role of insurance companies is creating a flawed health care system:

We need to change the way in which people are financially motivated in health care. And I think that until we change the way that we fund health care in the United States, like, nothing is going to really concretely change. Because every health system is now a completely entered, almost every health system, is now, like, has this very tight relationship with whatever insurance company they’re working for... But I just think that until we kind of change, like the, I don’t know how much we can nibble around the edges without changing like the base at a certain point. You have to realize that we’re just doing it wrong altogether, I guess.

Paul described how HSS is a good path forward for getting physicians to best understand how they support patient health. He also recognized HSS as being the best thing to be done in medical education in order to affect system change. However, he recognized HSS as only being one part of the solution. For Paul, the existing U.S. health care system needs to be overhauled in order to bring about real system change. He also felt as though patients needed to be engaged to be more active advocates for their own health, especially as it relates to employers negotiating directly with hospital systems. Most fundamentally, in the long-term, Paul felt that the U.S. health care system needed to go to a single payer model:

… I think there’s just more to it. And one of that is engaging patients more and so getting patients to be able to advocate, as well as the physicians. So, like a lot of employers right now, they’re starting to get them on board to negotiate directly with the hospital systems, and some of that. They almost need the patients themselves to become informed. But I think physicians are a good modality to help that. But I think it’s one of those things that there’s a lot of different pieces at play. And even like larger systemic changes, like going over to, like a single payer model, I think long term, is something we are going to have to do as a country, which I think we can help push for... I think it’s [HSS] the biggest thing to do within medical education for it. But I think there’s a lot of other pieces that need to move, which is in itself, like a health systems thing.

Intriguingly, as Paul considered the multiple aspects of the health care system that would need to be overhauled to affect real system change, he recognized his own systems-thinking about this.
Chapter Summary

This chapter presented the findings of this qualitative research study which explored why some fourth-year medical students exemplify the principles of Health Systems Science (HSS), and how they come to incorporate these principles into their perspectives on the role of a physician. The findings suggest that these students form these perspectives on the role of the physician through participating in the health journey of a family member, or by overcoming a significant health problem of their own. This gave them first-hand experience with the brokenness of the health care system and allowed them to see how various health care workers all contributed to the patient experience, in ways that the physician could not do on her/his own. The meaning students made from these experiences helped them to have an interprofessional orientation in their own perspective on the role of a physician, have a greater appreciation for the patient’s perspective, and generally realize how system issues impact the lives of health care workers and patients. Students also learned how to communicate with patients more effectively because of these experiences. Through their personal experiences, students realized the financial impacts of health care and often connected these experiences to their practice as future physicians.

There was a connection between a humanities education and students’ formation of a perspective on the role of the physician that aligns with the principles of HSS. In particular, this was true when students had experiences with global trips that formed part of formal education in the humanities. Through these experiences, students gained an appreciation for other ways of knowing. Also, students’ global educational experiences had long lasting influences on them in their practice as student physicians, and on their perspectives on the role of a physician.

Students also formed perspectives on the role of a physician that aligned with the principles of HSS, through their engagement with a four-year formal HSS curriculum. In
particular, students’ early exposure to the health care system through a Patient Navigation course was significant in shaping their perspectives on the role of a physician. For many participants in this study, systems issues became more apparent and relevant to them once they participated in clinical rotations in their third and fourth years of medical school. Also, the COVID-19 pandemic amplified systems issues, and students who participated in COVID-19 electives were able to gain perspective on the workings of the health care system. This chapter also reported students’ stated perceptions about the shortcomings of their HSS curriculum.

Students’ social networks have played a key role in shaping their perspectives on the role of a physician. Their perspectives on the role of a physician were influenced by their role models, including those who were exemplary physicians demonstrating a commitment to system issues. These physicians inspired students to form perspectives on the view of the system, the ways to approach patient care, the importance of an interprofessional orientation to care, the need to practice cost-conscious care, and the value of physicians being integrated into the community where they practice. Students also recognized the important role that communicators of scientific knowledge have played in shaping their perspectives on the role of a physician.

Students’ social networks reinforced the systems orientation embedded in their perspectives on the role of a physician. Involvement in like-minded cohorts influenced students’ perspectives on the role of a physician in ways that aligned with the principles of HSS. Participants also highlighted how the values that have become embedded into their worldviews, through their participation in their social networks, have endured into medical school and have supported a systems orientation in their perspectives on the role of a physician. Students also internalized values that were connected to their religious backgrounds. These values were important in the formation of their perspective on the role of a physician.

Students also highlighted the political environment, the presence of political issues in the media, and the influence of television shows in shaping their perspectives. Participants
recognized television shows as being influential in their decision to pursue medicine as a career, their views about the role of a physician prior to medical school, and their ideas about how to act during a public health crisis.

Students described how physicians could advocate for patients, as a way of implementing system change. Physicians exemplifying the principles of HSS can advocate through policy, take up issues that are important to the health and wellness of patients, educate patients and others as a form of advocacy, and leverage the skills of all members of the health care team as a means to advocating for patients.

Participants described how to affect real system change. For some, real system change could be accomplished through educating a broad class of people who are responsible for change in the system. For others, real system change could be accomplished by working differently within the existing system. Yet there were also participants who felt as though an overhaul of the existing health system was needed in order to bring about tangible change.
Chapter 5

DISCUSSION

The purpose of this study was to explore why some fourth-year medical students exemplify the principles of Health Systems Science (HSS), and how they came to incorporate these principles into their perspectives on the role of a physician. This research was guided by the following questions:

1. How do students who exemplify the principles of HSS perceive the process of how they experience a shift in their perspectives on the role of a physician?
2. What key experiences have they had that helped them begin to embrace the principles of HSS, both before medical school and since being in medical school?
3. What role has the support or influence of others had in contributing to their exemplification of the principles of HSS?
4. What are their perceptions of what needs to happen in order for the system to really change?

To answer these questions, I used qualitative interviews as the primary means of data collection. In this chapter, I discuss the findings of this qualitative research study. First, I provide an overview of the findings in light of the research questions and the literature. Next, I discuss the findings through the lenses of transformative learning theory and diffusion of innovations theory. I discuss the implications the findings from this study have for medical education and adult education, in the third section of this chapter. In the fourth section, I describe the limitations of the study and possibilities for future research. Finally, I offer closing reflections on the meaning of this study.
Findings in Light of the Research Questions and Literature

The findings from this research study support the findings in the existing HSS-related literature, and offer new insights entirely. In this section, I discuss the findings in light of the four research questions and the literature. First, I provide an overview of the findings related to the first two research questions. Second, I discuss the findings in relation to the third research question. Lastly, I discuss the findings from this study in relation to the fourth research question. In all three of these subsections, I simultaneously discuss the findings in light of the research questions and the existing HSS-related literature. The three subsections here are entitled: Key Experiences Leading to a Shifted Perspective, The Influence of Others, and Change and Health Systems Science.

Key Experiences Leading to a Shifted Perspective

The key experiences that lead to a shifted perspective relate to the first two research questions exploring the perceptions and experiences that result in a changed perspective that embraces the principles of HSS. There was a pattern in the kinds of experiences that led students in this study to have a perspective on the role of a physician that aligned with the principles of HSS. Rather than a single shift in their perspective, students highlighted multiple seminal moments that, over time, influenced their perspectives on the role of a physician. Indeed, students recognized experiences around the health journey of a family member, or by overcoming a significant health problem of their own, as being formative. Also key was the meaning participants made from work experiences prior to medical school, a humanities education when linked to global educational trips, participation in the HSS formal curriculum, and from
interactions with their social networks, including role models and communicators of scientific knowledge.

**The importance of pre-medical school experiences.** There has been some discussion in the literature about when and where along the training spectrum HSS topics should be introduced (Gonzalo, Dekhtyar, Hawkins et al., 2017). For many participants in this study, seminal moments that have contributed to the formation of their perspectives on the role of a physician came from their volunteer, research, and work experiences, during the years that they were completing their undergraduate studies. This is a new contribution to the discussion around HSS, which has not yet been published in the literature. Although students in this study did report learning through an HSS curriculum, their interactions with formal curricula pre-medical school featured much more prominently for them. Thus, while there has been discussion in the HSS literature about the importance of improving the Undergraduate Medical Education (UME) and Graduate Medical Education (GME) transition (Gonzalo, Baxley et al., 2017), the findings from this study highlight the potential benefit of focusing on the transition from pre-medical school undergraduate studies to UME. The findings also suggest that medical schools may consider adapting their admissions processes to screen for students primed to embrace the principles of HSS, to achieve the goal of preparing the next generation of physicians for practicing in evolving health systems.

**Recognizing some students are more open to HSS-related experiences.** There have been several contributions in the literature relating to how innovative ways of integrating HSS into curricula were implemented (Ackerman et al., 2016; Couzos, 2019; Gonzalo, Graaf, Kass, et al., 2017; Lawson et al., 2019; McCoy, Lewis et al., 2018; Pruitt et al., 2017). These studies recognized factors that had facilitated and/or inhibited learning, but none considered what makes some students more intrinsically open, engaged, and likely to engage in new HSS-related experiences. This is important because there is an underlying suggestion in the existing literature that HSS curricula may be more effective when students who are predisposed to HSS are
participating. Lawson et al. (2019), for example, successfully demonstrated how an eight-week summer immersion program in HSS, between the first and second years of medical school, was effective in increasing knowledge, skills, and confidence in topics related to HSS and, they argue, laid the groundwork for more intensive, longitudinal experiences for students interested in developing greater expertise. However, all of the 15 students who had been accepted over two years into the program had applied voluntarily, and they may have had a predisposition toward HSS. This is significant because many other HSS-related studies have been not been able to report positive student outcomes from educational interventions (Levitt et al., 2012; Mookherjee et al., 2013; Tartaglia & Walker, 2015). This raises the importance of the Lawson et al. (2019) study, and draws attention to the nature of the participants in that study.

Findings from this dissertation study point to factors that have caused students to have a voluntary interest in HSS to begin with, which addresses a current gap in the HSS literature. Gonzalo, Graaf, Johannes et al. (2017) argued that in identifying and addressing barriers to care through value-adding roles, students would have the opportunity to appreciate first-hand the fragmentation of the health care system and participate in efforts to overcome those gaps to improve outcomes. For some students in this study, their participation in value-adding roles early in medical school solidified, rather than formed, their perspectives on the health system and on the role of a physician within it.

**Significance of dealing with family or personal health crises.** One significant and related way in which students in this study formed their systems-aligned perspectives on the role of the physician was through their participation in the health journey of a family member, or by overcoming a significant health problem of their own. These experiences gave students first-hand exposure to the brokenness of the health care system and allowed them to see how various health care workers all contributed to the patient experience, in ways that the physician could not do on her/his own. Thus, in principle, this finding supports the Gonzalo, Graaf, Johannes et al., (2017)
idea that by performing value-adding clinical systems learning roles, students could develop a different perspective on health care delivery and the patient experience, thereby enhancing their education. However, this study highlights how pre-medical school life experiences feature more prominently for some students who exemplify the principles of HSS, and how the meaning they made from these experiences may have contributed to orientating them towards HSS to begin with. This is noteworthy because the literature highlights that not all medical students have exhibited interest or engagement in value-adding roles early in medical school (McDermott et al., 2019). Recognizing that there are experiences that students have prior to medical school that shape their perspectives in ways that align with the principles of HSS, is a previously unexplored idea in the HSS literature. This is not to ignore, however, that there may be factors in medical school that cause students to be less engaged in value-adding roles early in medical school. One participant in this study, for example, reflected on how difficult it was to be a patient navigator for a vulnerable patient when she herself was new to an area, unaware of the resources available to her patient, stretched to be able to commit additional time to helping her patient, and overcoming her own barriers associated with starting medical school.

**Significance of value-added clinical systems roles.** The HSS literature also highlights how students report learning about barriers to care in a direct way and learn about components or processes of the larger health care system and how care is delivered, when participating in value-adding roles early in medical school (Gonzalo, Graaf et al., 2018; Gonzalo, Wolpaw et al., 2018). Gonzalo, Wolpaw, Graaf et al. (2018) also found that students reported six educational benefits of performing value-added clinical systems learning roles in the health system. These included gaining an enhanced understanding of and appreciation for: a patient’s perspective on health care and his/her health, barriers and social determinants of health, health care systems and delivery, interprofessional collaboration and teamwork, clinical medicine, and approaches to communicating with patients. Related to learning about barriers to care and how care is
delivered, this study found that, through their personal experiences with the health care system prior to medical school, students realized the financial impacts of health care and often connected these experiences to their practice as future physicians. These personal experiences featured most prominently in students’ reflections on the process of forming their perspectives on the role of a physician. The meaning students made from these experiences helped them to have an interprofessional orientation in their own perspective on the role of a physician, have a greater appreciation for the patient’s perspective, and generally realize how system issues impact the lives of health care workers and patients.

As value-added clinical systems learning roles are almost always embedded in an interprofessional setting, Hunderfund et al. (2018) concluded that value-added activities will be most successful when they embed students in multidisciplinary health care teams. Value-added clinical systems roles can include health coaching, transition planning and implementation, and patient education (Gonzalo, Wolpaw et al., 2018). Interestingly, however, no students in this study indicated that their participation in formal HSS curricula had produced seminal moments that resulted in an increased appreciation of the role of other health care workers. Instead, through their work experiences, participants were able to experience non-physician roles, and these experiences gave them an appreciation for the roles of non-physician health care workers, shaping their perspectives on the role of a physician in ways that aligned with principles of HSS, insofar as an orientation towards interprofessional care to support patient outcomes. Also, students gained a special understanding of the patient’s perspective and gained skills and perspective on how to effectively communicate with patients, as a consequence of these work experiences and the meaning participants assigned to those experiences. The research literature highlights that students participating in value adding roles also grew in empathy for patients, and identified that participating in these roles helped them learn how to communicate more effectively with patients (Gonzalo, Graaf et al., 2018; Gonzalo, Wolpaw et al., 2018). This study
shows how students might make these gains prior to medical school, and why they might be better positioned to solidify this learning once in medical school.

Similarly, Gonzalo, Wolpaw et al. (2018) found that value-added clinical systems learning roles benefited both students and patients by facilitating student learning about issues related to patients’ lives. The most valuable tasks were those where students had the most amounts of autonomy (Gonzalo, Graaf et al., 2018; Polak et al., 2017). Direct patient benefit activity roles for students where they monitor care plans, perform home visits, facilitate patient access to services and resources, and are involved in patient education (Gonzalo, Graaf, Johannes et al., 2017) are those that provide the most autonomy (Gonzalo, Graaf et al., 2018). In this study, meaning students made from their work experiences in the medical field as medical scribes, a Certified Nurse Aide (CNA), a physician observer, and a Social Worker, were all significant in students’ process of forming their perspectives on the role of a physician. Like those direct patient benefit roles reported in the research literature, these work experiences prior to medical school were valuable with respect to gaining a perspective on the role of a physician that aligned with the principles of HSS.

Overall, there appears to be an alignment in what the literature reports students have learned from participating in value-adding roles early in medical school, and what students in this study reported learning from their own lived experiences, their work experiences prior to medical school, and their own experiences as a patient or a family member of a patient with a significant health diagnosis. However, the literature points to significant issues with student receptivity of HSS curricula (Butler et al., 2017; Gonzalo, Ahluwalia et al., 2018; Gonzalo & Ogrinc, 2019; Gonzalo et al., 2016). This study contributes to understanding what experiences might make students more accepting of HSS curricula, through the alignment of its principles with their worldviews.
Although first-hand, lived experiences featured prominently in the formation of students’ perspectives on the role of a physician, in ways that aligned with the principles of HSS, students did also form these perspectives through their engagement with a four-year formal HSS curriculum. In particular, students’ early exposure to the health care system through a Patient Navigation course was noteworthy in shaping their perspectives on the role of a physician. Importantly, though, for many participants in this study, systems issues became more apparent and relevant to them once they participated in clinical rotations in their third and fourth years of medical school. Also, the COVID-19 pandemic amplified systems issues, and students who participated in COVID-19 electives were able to gain perspective on the workings of the health care system. Students also highlighted how participating in global educational trips provided the context for seeing systems issues exaggerated, in ways that were deeply formative to them.

**Humanities education and global experiences.** As a completely unique finding to this study, there was a connection between a humanities education and students’ formation of a perspective on the role of the physician that aligns with the principles of HSS. In particular, this was true when students had experiences with global trips that formed part of formal education in the humanities. Through these experiences, students gained an appreciation for other ways of knowing. Also, students’ global educational experiences had long lasting influences on them in their practice as student physicians, and on their perspectives on the role of a physician. Indeed, there was a distinctive humanistic philosophical underpinning informing students’ perspective on the role of a physician. In demonstrating leadership in the system, students described different ways in which they could serve the interests of patients, who they recognized as having less agency in the system than physicians. They were motivated to improve the health system primarily because of their interest in serving patients. This finding has implications for how we define a systems citizen.
Through the existing empirical literature, a systems citizen can be defined as one who (a) shows a commitment to providing the patient with an excellent patient experience by seeking to understand the patient’s perspective, accounting for psychosocial risk factors, and thereby effectively communicating with the patient (Ackerman et al., 2016; Gonzalo, Graaf et al., 2018; Gonzalo, Wolpaw et al., 2018); (b) is dedicated to cost-conscious care and shows an awareness of socio-economic barriers to care, including insurance, that influences the approach to patient care (Gonzalo, Graaf et al., 2018; Gonzalo, Wolpaw et al., 2018); (c) has an orientation of patient care that is consistently interprofessional in nature, drawing on the expertise of other care providers with an awareness of their roles and responsibilities, acknowledging multiple perspectives, and contributing to a holistic and unfragmented patient experience of care (Ackerman et al., 2016; Gonzalo, Graaf, Kass, et al., 2017; Gonzalo, Wolpaw, Graaf et al., 2018; Rivera, Hunderfund et al., 2018; O'Brien, & Wamsley, in press); (d) takes an approach to patient care that shows a working knowledge of health systems, the larger health system, and how care is delivered (including policy, informatics, etc.) (Ackerman et al., 2016; Couzos, 2019; Gonzalo, Ahluwalia et al., 2018; Gonzalo, Graaf, Johannes et al., 2017; Gonzalo, Graaf, Kass, et al., 2017; Gonzalo, Graaf et al., 2018; Gonzalo, Wolpaw et al., 2018; Pruitt et al., 2017); (e) is confident with QI principles and seeks to conceptualize and apply health systems improvement plans (Baxley et al., 2016; Walsh et al., 2019); and (f) demonstrates enthusiasm, engagement, and motivation to affect changes to improve the patient experience and population health while reducing costs (Gonzalo, Graaf et al., 2018; Hunderfund et al., 2018; Rivera et al., 2020). The findings from this study suggest that a systems citizen is also a humanist who believes that individuals have the freedom and autonomy to make their own choices, that human beings possess the power to solve their own problems, and that interaction with others is essential because human beings are social beings by nature.
The Influence of Others

The influence of others is key to responding to the third research question. This study found that students’ social networks have played a key role in shaping their perspectives on the role of a physician. In particular, their perspectives on the role of a physician were influenced by their role models, including those who were exemplary physicians demonstrating a commitment to system issues. Involvement in like-minded cohorts influenced students’ perspectives on the role of a physician in ways that aligned with the principles of HSS, and reinforced the systems orientation embedded in their perspectives on the role of a physician. Participants also highlighted how the values that have become embedded into their worldviews, through participation in their social networks, have endured into medical school and have supported a systems orientation in their perspectives on the role of a physician.

Several studies have addressed the matter of faculty professional development in HSS, recognizing the importance of faculty influencers in HSS education (Baxley et al., 2016; Gonzalo, Ahluwalia et al., 2018; Walsh et al., 2019). Participants in this study reflected on how influential their role models have been in shaping their perspectives on the role of a physician. Students shared experiences that they had with exemplary physicians. These physicians inspired students to form perspectives on the health system, the ways to approach patient care, the importance of an interprofessional orientation to care, the need to practice cost-conscious care, and the value of physicians being integrated into the community where they practice.

From the existing research, supervisor factors that influence the student role include: varied expectations, experience, interest and comfort with teaching, and ability to delegate to students (Gonzalo, Graaf et al., 2018; Rivera et al., 2020; Sheu et al., 2018). Consistent with the findings from other empirical studies (Gonzalo, Graaf et al., 2018; Polak et al., 2017), Sheu et al. (2018) found that the authenticity and value of student roles were enhanced when they were given
autonomy and their efforts were central and necessary in their patients’ care. In this dissertation study, students reported learning to be more systems-minded from exemplary physicians. In particular, how exemplary physicians communicated within the medical team, how they conducted themselves as educators, and the way they accounted for the specific social circumstances of the patient during discharge planning, were all ways in which exemplary physicians influenced students to have a perspective on the role of a physician that aligns with the principles of HSS. Also, physicians who gave students the opportunity to work with patients experiencing barriers to appropriate care, like working to resolve insurance barriers, helped students to incorporate a systems perspective in their view on the role of a physician.

With respect to exemplary physicians, students in this study also noted how impressed they were in how physicians would prioritize the patients’ concerns over the need to stay on schedule, the positive relationship the physicians had with their patients and their families, the manner in which they communicated with patients in order to connect with them, the rapport they had with patients, and the way they would consider all the costs of care to the patient when deciding on a course of care. Also, participants learned to appreciate the broader system in which patients exist through observing the ways in which exemplary physicians carefully connected the details of their patients’ lives, in order to understand an entire family’s household environment. Through lessons, during patient appointments, and during one-on-one meetings, students were able to learn from exemplary physicians, and learn how to make practical use of the skills they had learned in medical school. In these ways, exemplary physicians played a role in shaping students’ perspectives on the role of a physician in ways that aligned with the principles of HSS.

As a unique finding from this study, students also recognized the important role that communicators of scientific knowledge have played in shaping their perspectives on the role of a physician. In particular, physician role models, parents, and prominently published physician advocates, helped to mold the choices participants made in their career pathways as future
physicians. Students also recognized the importance of internalized values that they learned through family members, religious beliefs, and/or from participating in like-minded cohorts, in the formation of their perspective on the role of a physician.

For participants in this study, their social networks reinforced the systems orientation embedded in their perspectives on the role of a physician. Involvement in like-minded cohorts, like school clubs and professional organizations, as examples, influenced students’ perspectives on the role of a physician in ways that aligned with the principles of HSS. This finding is consistent, in some ways, with evidence of the benefits of near-peer learning reported in the HSS-related literature. Some have published about the benefit of teamwork experiences when teaching Quality Improvement/Patient Safety (QI/PS) (Leeper et al., 2018), and others have shown how medical students are highly receptive to learning from each other (Shah et al., 2017) and from residents/near-peers too (Raty et al., 2017). Near-peer teaching of QI/PS to medical students has also correlated positively with improved course evaluations (Raty et al., 2017). In their study of preclinical medical students embedded with residents on a QI track, Locke and Kneeland (2017) found benefit in a tiered student-resident-faculty member learning structure that is analogous with the structure in the clinical learning environment. The findings from this study, together with the findings from existing empirical literature, support the idea that students’ perspectives are influenced by each other and near-peers, to align with the principles of HSS.

This study found that politics played a shaping role as students formed their perspectives on the role of a physician. Participants also recognized television shows as being influential in their decision to pursue medicine as a career, in shaping their views about the role of a physician prior to medical school, and their ideas about how to act during a public health crisis. There is currently no published literature on the influence of politics, the media, and popular culture in influencing students’ perspective on the role of a physician, in ways that align with the principles of HSS.
The fourth research question focused on what participants believed was needed so that the system could really change. For some, real system change could be accomplished through educating the people who are responsible for change in the system. For others, real system change could be accomplished by working within the existing system. Yet there were also participants who felt as though an overhaul of the existing health system was needed in order to bring about tangible change. Students also described how physicians could advocate for patients, as a way of implementing system change. Physicians exemplifying the principles of HSS can advocate through policy, take up issues that are important to the health and wellness of patients, educate patients and others as a form of advocacy, and leverage the skills of all members of the health care team as a means to advocating for patients. As it relates to the existing research literature, it is most relevant to discuss the findings from this chapter that pertain to how participants thought HSS curricula should change.

Students in this study independently offered ideas about how they thought the HSS curriculum could be improved. Finding ways to keep students engaged in HSS-related education is important to its success, especially since some studies have found that students tend to have mixed responses to, for example, QI/PS curricula (Henley, 2002; Mak & Miflin, 2012; Ogrinc et al., 2007), while other studies have reported outright student dissatisfaction with QI/PS educational interventions (Gould et al., 2002; Levitt, Hauer, Ponchelet & Mookherjee, 2012; Neeman et al., 2012). Although generally in support of HSS education, students in this study discussed their views that the content was sometimes too theoretical and not practical enough. Students also communicated that it felt to them that too much time was spent in formal lectures justifying why HSS needed to be studied, rather than reviewing topics in depth. Participants expressed their views that there were insufficient opportunities to tailor the content according to
the interests of the student body, or to provide feedback about how to approach topics differently. Some participants also mentioned that the formal HSS sessions could have been executed more effectively and, during their interviews, students communicated their ideas about how they thought this could be done differently, such as preparing invited guests on panels more appropriately so that discussions did not devolve into debate. Some participants also noted that there was a diversity of topics in the HSS curriculum, but insufficient opportunities for students to fully master any one area in the systems curriculum.

**Findings in Light of the Theoretical Framework**

In this section, I discuss the findings of the study in light of the theoretical frameworks of transformative learning and diffusion of innovations. In the first sub-section, I discuss how applying the lens of transformative learning theory reveals how, in varying degrees, students in this study adapted existing perspectives, incorporated altogether new perspectives, and rejected prior meaning structures. The fundamental components of transformative learning theory like reflective discourse, critical reflection, and a change in action resulting from revised assumptions, are identifiable in the perspective formation journeys of some participants in this study.

Applying the diffusion of innovation theory lens reveals how the perceived *relative advantage* and *compatibility* of the HSS innovation are characteristics that have contributed positively to its adoption by participants in this study. The perceived *complexity*, lack of *trialability* and *observability* of the HSS innovation have been barriers to its adoption, according to the findings of this study. I discuss these findings in the second sub-section.
Transformative Learning Theory

When applying the theoretical lens of transformative learning to the findings of this study, there is evidence that participants experienced a shifting and shaping of their perspectives. The meaning participants made from their experiences influenced their perspectives on the role of a physician, in ways that aligned with the principles of HSS. There are myriad revisions and adaptations of Mezirow’s (1978) original ten phases of individual perspective transformation (Hoggan et al., 2017; Nerstrom, 2014; Nohl, 2015). Yet, all proposals are tied to each other by the presence of fundamental components of transformative learning theory like reflective discourse, critical reflection, and a change in action resulting from revised assumptions. These fundamental elements of the transformative learning process are identifiable in the findings from this study.

Many of the participants in this study reflected on how they formed their perspective on the role of a physician. Focusing on seminal moments over the course of their lives that have had a profound influence on their views, students unpacked how they came to incorporate the principles of HSS into their perspectives on the role of a physician. In varying degrees, students in this study adapted existing perspectives, incorporated altogether new perspectives, and rejected prior meaning structures. Through conversations with faculty advisors, exemplary physicians, peers, and near-peers, participants formed and shaped their perspectives on the role of a physician, in ways that ultimately aligned with the principles of HSS. In all cases, participants articulated ways in which they took actions that reflected their perspectives on the role of a physician. In part, this change in action based on revised assumptions is a defining product of perspective transformation (Mezirow, 1990). Participants acted based on their revised assumptions by advocating through policy, being a champion for the patient cause in various
ways, educating others as a form of advocacy, and leveraging the skills of all members of the health care team as a means to advocating for patients.

For Nohl (2015), “the process of transformative learning begins when novelty, neither anticipated nor planned, breaks into life” (p. 39). This is the first of five phases in his conception of the transformative learning process that he terms a “non-determining start”. Daloz (2000) rejects Mezirow’s (1978) original idea that a disorientating dilemma could be a sudden or single event, when he argues that “closer examination reveals that a change or shift was a long time coming and its possibility prepared for in myriad ways, generally across years” (p. 106). Overall, the participants in this study identified one of two types of experiences that started the formation of their perspectives on the role of a physician. A significant personal or family member’s health-related experience was one type of experience that introduced a kind of novelty into participants’ lives, and which opened the process which deeply influenced their perspective on the role of a physician. Early non-physician work experiences in the health care environment was another type of starting point in participants’ perspective formation on the role of a physician. Participants formed new meaning schemes from these novel experiences, through their meaning-making processes. They identified subsequent seminal experiences that contributed to making these meaning schemes further differentiated. The formation of their perspectives on the role of a physician can be understood through the Mezirow’s (2000) description of learning.

For Mezirow (2000), learning occurs in three ways, all of which relate to changes with meaning schemes. Meaning schemes are “specific expectations, beliefs, feelings, attitudes, and judgments” that “tacitly direct and shape a specific interpretation and determine how we judge, typify objects, and attribute causality” (Mezirow, 2000, p. 18). Within this framework, the first way adults learn is within meaning schemes, when the meaning schemes become further differentiated. The second way learning occurs is when new meaning schemes are learnt, which are compatible with existing schemes. Finally, transformative learning occurs when new
perspectives are constructed after the underlying assumptions of the prior and inadequate structures are critically assessed. That is, transformative learning occurs when a person’s prior meaning structures are no longer adequate for making meaning of their lives, so a new perspective is formed after critically assessing the prior meaning structures. While the majority of participants’ learning appeared to occur in the first and second ways, some participants described deep, structural, qualitative shifts in their meaning schemes/perspectives (O’Sullivan, 2003) which are indicative of transformative learning.

Confronted by the exaggerated differences in resources between the U.S. and developing countries, participants revised their assumptions about their own privilege and took on a clinical practice that was acutely sensitive to resource utilization in the health system. Participation in a longitudinal like-minded cohort fundamentally established a service-orientated worldview that underlay future action in the clinical environment. Similarly, the dialogical challenges to assumptions embedded in the care of patients posed by a near-peer, also reinforced cost-conscious action in the clinical environment. Importantly, the most intense examples of perspective shift among participants in this study, were always a product of a culmination of experiences over time, rather than a single event. Also, the most influential experiences for participants were always rooted in experiential activities, like first-hand exposure to the health care environment as patients or as health care workers. Cranton and Roy (2003) propose, “the central process of transformative learning may be rational, affective, extrarational, experiential, or any combination of these depending on the characteristics of the individual and the context in which the transformation takes place” (p. 90). Participants in this study did not highlight traditional classroom experiences as being fundamental in the formation of their perspectives on the role of a physician. While some of their experiences were likely to involve strong emotions, no participants explicitly emphasized the affective dimensions of their learning through experiences. Arnold and Prescher (2017) concluded that the goal of transformative learning is “to
question and put into perspective our self-conception of the world” (p. 287). There is evidence in this study that some participants did exactly this.

**Diffusion of Innovations Theory**

An interest of this study was to understand students’ motivating factors for being early adopters of the HSS innovation; this was best understood through the diffusion of innovations theoretical framework. Rodgers (2003) highlighted how it is the perceived newness of an idea that will determine whether it is an innovation, not necessarily how new the idea might actually be. Although HSS has developed out of the quality improvement, patient safety, and systems-based practice literature since at least the early 1990s, HSS is undoubtedly widely perceived as being new to medical education. Participants in this study had participated in a four-year longitudinal HSS curriculum, and the curriculum had existed in an evolving form since 2013 at the single medical school in which all participants were enrolled. Rogers (2003) posited that there are five characteristics of innovations, as perceived by individuals, that explain their different rates of adoption; these characteristics are: relative advantage, compatibility, complexity, trialability, and observability.

*Relative advantage* is the degree to which the innovation is perceived as better than the idea it supersedes, and the rate of adoption of an innovation is correlated with how advantageous an individual perceives an innovation to herself/himself (Rogers, 2003). Participants in this study explained how the COVID-19 pandemic prompted huge investments in telehealth, and many stressed that telehealth would significantly impact how health care in the U.S. would be delivered in the future. Some student participants highlighted how their exposure to telehealth, through their participation in COVID-19 electives, could give them a competitive edge in this burgeoning type of health care service. Two participants described how one of their motivations for enrolling
in a longitudinal HSS elective course was to have the opportunity to meet key stakeholders in their local health care system, and that this was a unique networking opportunity. These examples are indications that some participants may have been motivated to embrace the HSS innovation as a means of gaining relative advantage.

*Compatibility* is the degree to which an innovation is perceived as being consistent with an individual’s existing values, beliefs, past experiences, and current needs (Rogers, 2003). Almost all participants expressed ways in which HSS aligned with their values, beliefs, and past experiences. Motivated by a desire to serve patients humanistically, to make the best perceived moral choices, to utilize their personal talents and service impulses in favor of productive ends, and to compassionately reduce the costs of care, participants in this study committed to the principles of HSS. Students’ meaning-making from pre-medical school and medical school experiences, contributed to a perspective on the role of the physician that was aligned with the principles of HSS. This study sought to select participants who exemplify the principles of HSS, and all participants, but one, described how HSS was compatible with their existing values, beliefs, and past experiences.

*Complexity* is the degree to which an innovation is perceived as difficult to understand and use, and new ideas that are simpler to understand and use are associated with more rapid adoption by individuals (Rogers, 2003). The degree to which an innovation may be experimented with on a limited basis is the *trialability* characteristic of innovations. An innovation that is trialable is representative of less uncertainty for individuals, and less uncertainty correlates with greater and more rapid adoption of innovations. The findings from this study suggest that the perceived complexity of the HSS innovation and its lack of trialability are some of its greatest barriers to adoption. Participants described HSS as being too theoretical in nature, its formal curricular content as lacking in perceived scientific rigor, and for needing to be more practical and more clearly related to their everyday work as future physicians.
Observability is the degree to which the results or impact of an innovation are visible to others; the easier it is for individuals to see the results of innovation, the more likely they are to adopt (Rogers, 2003). Participants described the ways in which they could impact individual patients positively by assisting them to navigate a broken U.S. health care system. However, even some of these student participants, who exemplified the principles of HSS, had doubts about how to bring about real system change. While they articulated the ways in which they might advocate through policy, be a champion for the patient cause in various ways, educate others as a form of advocacy, and leverage the skills of all members of the health care team as a means to advocating for patients, they varied in their perceptions about how much change they could affect system-wide through their adoption of the HSS innovation.

Implications for Theory and Practice in Medical Education and Adult Education

The findings from this study have implications for theory and for practice in medical education and adult education. For transformative learning theory, this study challenges Mezirow’s (1978) notion that a disorientating dilemma is needed in order for the transformative learning process to occur, raises the question about whether individual transformative learning journeys are incongruent with social action, highlights the potentially important role of empathy in the transformative learning process, calls for the theory to account more fully for the important role of relationships in the transformative learning process, and suggests that the theory could provide adult educators with a practical set of tools to bring about transformation in learners. This study also has implications for the diffusion of innovations theory, highlighting the need to supplement it with another theoretical lens when attempting to gain insight into how learners may become ready for the future successful adoption of an education innovation.
For practice, the findings of this study have important implications too. Early exposure for students to the clinical learning environment in value-adding roles are positively associated with shaping students’ perspectives on the role of a physician. However, special measures should be taken to support medical students in these roles in order to facilitate maximum learning, accounting specifically for student challenges of being newly enrolled in medical school and often being new to an area. Also, there appears to be value in continually revising and improving the HSS curriculum, specifically by designing the curriculum around the unique nature of adult learners. Findings from this study also indicate the potential value of finding ways to integrate HSS into humanities curricula and vice versa, and echo calls for medical schools to adapt their admissions processes to achieve the goal of preparing the next generation of physicians for practicing in evolving health systems.

Implications for Theory

This study contributes to the continual revisioning of transformative learning theory. As noted and argued in other places (Daloz, 2000; Laros, 2017; Nohl, 2015), this study challenges Mezirow’s (1978) notion that a disorientating dilemma is needed in order for the transformative learning process to occur. Instead, participants had a series of novel events over time from which they drew meaning, to form their perspective on the role of a physician. In varying degrees, students in this study adapted existing perspectives, incorporated altogether new perspectives, and rejected prior meaning structures.

Transformative learning theory has often been criticized for not providing adult educators with a practical set of tools to bring about transformation in learners (Christie et al., 2015). Some even argue that it is not possible for educators to coordinate a transformative learning experience for students (Newton, 2012). However, this study shows a clear pattern of experiences that could
possibly be carefully orchestrated in favor of supporting medical students in forming a more permeating perspective on the role of a physician that aligns with the principles of HSS. Strongly informed by a progressive philosophical orientation, one might argue that this study highlights the potential for educators to carefully design transformative learning experiences for learners that replicate, to some extent, the experiences that might have a transformative effect through everyday life. Participants in this study, for example, recognized the important role of their pre-medical school work experiences in the health care environment, and how the meaning they made from these experiences significantly influenced their perspectives on the role of a physician. Providing students with the opportunity to serve in similar roles, as part of their formal education, might be an element in the overall approach to facilitating a transformative learning experience for medical students.

Importantly, for students in this study, humanism was embedded in their meaning schemes, in their habits of mind, in their world views, and in their perspectives on the role of a physician. They demonstrated their commitment to the principles of HSS on the individual level, with individual patients interacting with the health system, and on the broader health system level too. A major criticism launched at transformative learning theory is that it is too egocentric for those who see the goal of adult education as social action because of its emphasis on individual transformation (Christie et al., 2015; Newman, 1994; Merriam, et al., 2007; Taylor, 2007). However, students in this study, motivated by humanistic impulses and fairly uncritical about power between and over people, were committed to changing the health care system in one way or another. This raises the question about whether individual transformative learning journeys are incongruent with social action. Indeed, as a product of their transformative learning experiences, participants in this study were motivated to act on behalf of patients, and to act with others in the system.
Taylor (2007) argued that the transformative learning literature needs to give greater attention to “the role of context, the varying nature of the catalysts of transformative learning, the increased role of other ways of knowing, the importance of relationships and an overall broadening of the definitional outcome of a perspective transformation” (p. 174). Like Tagawa (2016) who found that encounters with not only positive, but also negative role models might facilitate medical student learning, this study highlights the importance of role models and social networks in the transformative learning process in the context of some fourth-year medical students’ lives. For participants in this study, these relationships could not be separated from the series of experiences that influenced the formation of their perspectives on the role of a physician. This finding confirms the need for transformative learning theory to account more fully for the important role of relationships in the transformative learning process.

The diffusion of innovations theory has been applied to a wide range of studies (Haider & Kreps, 2004) and is applicable in the context of health care (Dearing & Cox, 2018). Through its application in this study, the diffusion of innovations theory confirmed its usefulness as a lens with which to understand the factors that might result in the adoption of an innovation. From this theoretical framework, for example, it was clear that a major factor for participants adopting the HSS innovation was because it aligned with their values, beliefs, and past experiences. However, the diffusion of innovations theory on its own does not provide sufficient insight into how and why, for example, people form particular values or beliefs. In the context of medical education innovations, the implication is that for successful adoption of the innovation, adult educators should adapt the innovation to align with the audience, or change the audience altogether. The diffusion of innovations theory does not provide insight into how learners may become ready for the future successful adoption of a future education innovation. The diffusion of innovations theory does assist in understanding whether an innovation is too complex, not trialable, not compatible with its audience, or does not provide enough of a perceived advantage for adopters.
However, for gaining insight into how learners may become ready for the future successful adoption of an education innovation, educators should supplement the diffusion of innovations theoretical framework.

**Implications for Practice**

The findings from this study have implications for Medical Education and Adult Education. To begin with, there has been much debate about the timing and nature of HSS educational experiences (Gonzalo, Dekhtyar, Hawkins et al., 2017). This study highlighted the importance of early exposure to non-physician clinical learning roles with respect to how influential those experiences are in participants’ formation of perspectives on the role of a physician. Early exposure to the clinical learning environment in value-adding roles is an important existing approach in HSS curricula (Gonzalo, Wolpaw et al., 2018; Hunderfund et al., 2018; Polak et al., 2017). However, there needs to be more attention to the context in which learning takes place. Participants identified that their most influential experiences in the formation on their perspective on the role of a physician occurred during their undergraduate college years. The timing of early clinical experiences, when students are themselves newly transitioning to an area and are immersed in the comparatively stressful environment of medical school, may inhibit students from drawing maximum benefit from the learning experience. In the case of Patient Navigation-type courses (Gonzalo, Graaf et al., 2018), for example, it is therefore important that medical educators are careful to provide students with robust referral resources to effectively support vulnerable patients, and to provide opportunities for students to be supported personally through debriefs and check-ins, as examples.

Brocket (2015) highlights one of the most distinctive characteristics of adult learners is the wealth of experience they bring with them. Students in this study independently offered ideas
about how they thought the HSS curriculum could be improved. They expressed their views that there were insufficient opportunities to tailor the content according to the interests of the student body, or to provide feedback about how to approach topics differently. Participants also discussed their views that the content was sometimes too theoretical and not practical enough. Students also communicated that it felt to them that too much time was spent in formal lectures justifying why HSS needed to be studied, rather than reviewing topics in depth. Some participants also mentioned that the formal HSS sessions could have been executed more effectively, and during their interviews, students communicated their ideas about how they thought this could be done differently. Some participants also noted that there was a diversity of topics in the HSS curriculum, but insufficient opportunities for students to fully master any one area in the systems curriculum. Although there have been changes to the HSS curriculum at the institution where all participants completed their medical school, this study highlights the need to continually revise and improve it. Indeed, the findings from this study suggest the need to be increasingly sensitive to factors influencing students’ motivation to learn HSS (Keller, 2010) and accounting for the unique nature of adult learners and how they learn (St. Claire, 2015).

This study also found that there was a connection between the humanities, a humanities education in the context of global educational trips, and participants’ exemplification of the principles of HSS. In an increasing number of medical schools in the U.S., HSS has taken its place as the third pillar of medical education that compliments the foundational basic and clinical sciences, which are the other two pillars of medical education (Gonzalo & Ogrinc, 2019). At the medical school where all participants were enrolled, HSS is quite uniquely the fourth pillar of medical education alongside the basic science, clinical science, and humanities, pillars. Just as there is evidence that HSS complements the basic and clinical science pillars of medical education (Gonzalo et al., in press), so too is there evidence from this study that there is a complementary relationship between the HSS and humanities pillars. Findings from this study
indicate the potential value of finding ways to integrate HSS into humanities curricula and vice versa.

Also, there have been calls for medical schools to adapt their admissions processes to achieve the goal of preparing the next generation of physicians for practicing in evolving health systems (Gonzalo & Ogrinc, 2019). Medical schools may consider favoring applicants who might be more likely to embrace the principles of HSS and incorporate these into their perspectives on the role of a physician. As suggested from the findings from this study, favored applicants might have had a strong humanities education, have had work experience in non-physician health care worker roles prior to medical school, and/or have participated significantly in the health journey of a family member, or have overcome a significant health problem of their own.

Participants in this study expressed views on the role of a physician that were aligned with a humanistic philosophical perspective (Elias & Merriam, 2005). Indeed, in their views on how to care for patients and account for the patient perspective, leverage the skills of other members of the health care team, and advocate for change in the system, students were fairly uncritical about power between and over people. Some may argue that accounting for a physician’s positionality in relation to patients and non-physician health care team members, is an essential requirement if physicians truly want to partner with patients for the betterment of their health or to leverage the skills of teammates, in the context of the system. Yet, HSS does not incorporate adequately enough the power that physicians have in relation to others in the system. Nor does HSS explicitly address the differences in agency that physicians of varying race, ethnicity, sexual orientation, or gender, as examples, will have in being able to navigate the health system. The lack of discussion from participants in this study about power between and over people, especially when dealing with real system change, is noteworthy and addressing this lack can be considered an implication for practice.
Limitations and Implications for Future Research

As in any study, there are limitations that imply suggestions for further research. These are discussed in this section.

Limitations

One limitation of this work is that the research was conducted by one researcher at a single site. All participants in this study participated in the same four-year longitudinal HSS curriculum. Therefore, it is not possible for me to claim the universality of the findings. Indeed, representations of HSS in curricula look differently at different medical schools, which may impact students’ perceptions of and experiences with HSS. Nonetheless, I provided rich descriptive data and I believe that the findings represented here will resonate with medical educators at other institutions, and will provide inspiration for performing similar research at other medical schools.

Although I was careful to maintain the trustworthiness of my research, it is possible that other researchers may have coded the interview data in different ways. My interpretations could be influenced by my own background and perspective. If other researchers conduct similar research in the future, the comparison of results could provide useful validation of the findings from this study.

Owing to the small sample size, the findings of this study may not be generalizable. However, the findings focused on the meaning participants made from their experiences and there appeared to be a pattern in the types of experiences that were significant in influencing participants’ perspectives on the role of a physician, in ways that aligned with the principles of HSS.
In spite of the limitations of this study, the study adopted strategies of qualitative research to add to its strengths and to insure the dependability of the findings. While these were discussed more fully in Chapter Three, some of these include: triangulating the data I collected in this study with multiple sources of data and conserving data integrity by maintaining a record of all raw data, transcripts, field notes, coding lists with explanations, process notes, and written reflexive notes about literature relevant to this study.

**Suggestions for Further Research**

There are several implications for research based on this study. First, participants in this study had a series of novel events over time from which they drew meaning, to form their perspective on the role of a physician. There is potential value to expand this research to be more longitudinal in nature. Future research could contribute to understanding whether students continue to adapt their existing perspectives, incorporate altogether new perspectives, and/or reject prior meaning structures relating to their perspectives on the role of a physician.

Second, participants highlighted some formative experiences which were likely to involve strong emotions. Yet, no participants explicitly emphasized the affective dimensions of their learning through experiences, and some even denied the importance of their emotions in these experiences. Future research might use other means of data collection more suited to exploring the affective domain with participants. While semi-structured interviews were useful in providing rich, thick descriptions, this format engaged participants to relay their experiences through a cognitive process. Other data collection methods, like art-based research, might be more suited to exploring the affective dimensions related to students’ formation and reformation of perspectives on the role of a physician. Future research of this nature might contribute to more
fully understanding the role of emotions, and empathy in particular, in fourth-year medical students’ transformative learning processes.

Third, the findings from this study highlighted the important role that students’ social networks played in shaping their perspectives on the role of a physician, in ways that aligned with the principles of HSS. Future research could focus on the impact of deliberate cohorting of medical students, to see if this could reinforce a systems orientation for individual students. In a similar way, future research could focus more specifically on the role that politics, the media, and popular culture plays in influencing students’ perspectives on the role of a physician.

Fourth, while the findings from this qualitative study are valuable, future quantitative studies might also positively contribute to understanding the prevalence and significance of fourth-year medical student experiences in the formation of their perspectives on the role of a physician. This study found that students formed a perspective on the role of a physician aligned with the principles of HSS by living patient experiences directly, interacting with formal curricula, and through a shaping of their perspectives through social networks. Future quantitative research could utilize larger samples of medical students to explore the significance of these findings. Using the findings from this qualitative research study as a starting point, it would also be interesting to explore whether quantitative instruments could be developed and used to identify medical students who are likely to have a perspective on the role of a physician that is aligned with the principles of HSS.

Fifth, these students who were thriving in health systems, were first and foremost interested in the humanities, and HSS complimented this orientation. Future research might explore how exactly humanities education primes medical students to be able to adopt a perspective on the role of a physician that is compatible with the principles of HSS. This study specifically found that global education experiences that formed part of humanities curricula, were particularly formative for some participants. Future research might also contribute to
highlighting the specific aspects of a humanities education that are supportive in students’ formation of an HSS-aligned perspective on the role of a physician, which may have implications for the way HSS curricula are taught.

Sixth, through their own experiences, participants reflected on how they gained perspective and, in many cases, were able to empathize with others. Transformative learning theory has been criticized for its tendency to stress the cognitive dimension at the expense of the emotional and social dimensions and the situatedness of learning processes (Illeris, 2004). Dirkx (2006) and Taylor (2009) have, in particular, argued for increased attention to the emotional dimension of transformative learning, and Taylor (2007) asserted that there was a need for greater understanding of the aspects of relationships such as intimacy, trust, and empathy. Oddly, none of the participants in this study explicitly focused on the emotional aspects of their transformative learning experiences, in spite of their formative experiences which were likely to involve strong emotions in the context of their own health journeys or through their relationships with others. Indeed, in every review of transformative learning, the role of relationships has been identified as being significant in the process of transformation (Taylor & Cranton, 2012). Several studies have reported findings that imply that transformative learning occurs among trusting relationships with others, where an essential component is a sense of morality, well-being, and empathy towards others (Chin, 2006; Scott, 2003; Taylor & Cranton, 2012; Jokikokko, 2009). Shapiro (2011) argued that medical education continues to address the emotional realm through ignoring, detaching from, and distancing from emotions, which may account for why participants in this study did not explicitly address the emotional aspects of their transformative learning experiences. Future research could explore the potentially important role of relationships and emotions, particularly empathy, in the transformative learning process.
Final Reflections and Closing Thoughts

As a U.S. patriot originally from South Africa, I am filled with great pride thinking about the major accomplishments of this country. I am filled with hope at the thought of this nation’s ability to overcome adversity, create opportunity, and lead the world in innovation. This is why it was shocking to me to learn how costly, fragmented, and inefficient the U.S. health care system is, and this is what sparked my initial interest in HSS.

Many of us can recall encounters where a doctor fails to see us holistically, focuses on our sicknesses too narrowly, and seems not to understand our patient perspective. For me, HSS is about physicians adopting a perspective that views patients in the context of the broader system in which they exist. There is no doubt that physicians need to be engaged to improve the U.S. health care system, since they bring experiences and perspectives that are unique to them. Like my desire to have doctors who can see the big picture when they treat patients, so too I desire to have physicians co-leading improvements in the U.S. health care system, acutely aware of the broad-ranging ramifications of the changes we make.

I was perplexed to learn that many medical students nationwide expressed dissatisfaction about learning HSS. Since HSS is about adopting a systems-perspective in order to reduce cost, improve quality, eliminate inefficiency, and improve population health, I wanted to know why many students rejected HSS. By focusing on the positive deviants at one medical school, I was able to gain insight into what kinds of experiences and meaning-making processes have orientated some medical students towards a perspective on the role of a physician that aligns with the principles of HSS.

As a social scientist and adult educator, I was most interested to discover a connection between HSS and a humanities education. Garry, a participant in this study, reflected on what he
gained from his anthropological education. His reflections have remained ever-present in my
mind during this dissertation research:

And I think a large part of the purpose of one of the lessons that I took from my
anthropological education was the ability and framework to deconstruct the
assumptions that are hard-baked into the cultural milieu that you’re in, and to
identify them to realize their shortcomings, and then to identify different holdings
and other cultural and societal milieus. And that was something that I think is
really critically important, especially if… you want to work with people who
have vastly different backgrounds than you.

If this kind of education can prompt and equip medical students to be able to deconstruct the
assumptions that are embedded in cultures and societies, then this is exactly the education I want
to advocate to have included as part of a medical education. Having lived and worked in the
Republic of South Africa, the People’s Republic of China, the Kingdom of Saudi Arabia, the
United Arab Emirates, and the United States of America, I personally value tools and approaches
that can bridge the gap between people who are vastly different from each other.

For me, health care is not simply about physicians diagnosing and treating disease.
Patients make themselves vulnerable, trusting health care workers with their li-

es. Our human
bodies are not the sum of our personhood. While I do not know exactly how the U.S. health care
system needs to change, I am convinced that we can do better. No matter our role in the health
system, we are all impacted by its effectiveness.

I end this doctoral program enriched by the people I have learned with over the last three
years. I first became interested in medical education through conversations with physicians doing
adult education classes with me. I was intrigued by the complexity of medical education, and the
uniqueness of the environment in which adults learned. Regardless of the background of my
classmates or professors, though, I have learned that adults really do learn in ways that are
definitely not confined to formal educational spaces alone. I leave this program convinced that
adults have the answers to their own problems and know what they need in order to learn; our
role as adult educators is to hold the space for them, being sensitive to all the unique challenges of adulthood that threaten to derail them.
Appendix A

INTERVIEW GUIDE

Request permission to audio record.

1. Let’s start by talking a bit about your background. Tell me when and why you decided to pursue a career in medicine.

2. I would like you to take a few moments to think about your life experiences across the full span of your life, and identify any experiences or seminal moments that may have contributed to molding your current perception on the role of a physician. Jot down a word or two to represent these moments/experiences on [this] journey map. This will be something you can reference throughout our interview.

   a. [Does that make sense? Can I clarify anything?]

   b. [Encourage participant to talk out loud about what they are jotting down].

   c. [Probe for details when journey map is done] e.g.

      i. What experiences have you noted on your journey map?

      ii. How did that experience influence your current thinking about the role of a physician?

      iii. Why do you think this experience was an important event in your journey that has led you to your current thinking about the role of a physician?

      iv. Is there any pattern you notice in the experience you’ve identified as key moments in this journey? Is there something similar about these experiences?
v. [Depends on Journey Map] Are there any experiences from before medical school that may have indirectly influenced you to have your current perception of the role of a physician?

3. As you reflect on your experiences, are there any people who have had a significant influence on your perception of the role of a physician? [Probe]
   a. What kind of figures have these been to you (e.g. supportive, challenging/provoking)? [can ask one by one if more than one influencer]
      i. In what ways did they support/challenge/provoke you?
   b. How did they influence you? [explore for dialogue, making critically aware of assumptions]
      i. [For more than 1 person of influence] What common characteristics or features do you notice, if any, about these people who have had this influence on you?

4. What is your motivation or intentions for adopting an HSS perspective/approach?

5. How have you applied HSS in your clinical practice (e.g. during AIs or Clerkships or like COVID Elective?)
   a. How do you plan to continue adopting an HSS perspective when you go into residency?

6. Do you think HSS education will have any influence on the U.S. healthcare system?
   a. Is HSS the answer in the U.S. healthcare system to reduce cost, improve quality, eliminate inefficiency, and improve population health?
      i. [Explore/Probe: NO – then what? YES – why? Anything else?; COMBINATION OF THINGS – what’s the combination? How much of the pie in the combination belongs to HSS?]
7. If the goal of this research is to explore why some third- and fourth-year medical students exemplify the principles of HSS into their perspectives of the role of a physician, what do you think we should still talk about?
   
a. What should I have asked you that I did not?
Appendix B

JOURNEY MAP
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