

# Domain of Competence: Systems-Based Practice

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SYSTEMS-BASED PRACTICE (SBP) is the competency domain that is perceived to be the most abstract. Perhaps this is because it is so foundational to the practice of medicine that it goes unnoticed. The system underlies everything we do as a medical professional. It encompasses the vast array of people, places, resources, and environments in which we care for patients. At the core of SBP is the need to understand complex systems, navigate them for the benefit of patients, and lead or participate in continually improving them. Physicians' knowledge and understanding of the patient, community, and micro- and macrosystems within which they work are integral to optimal care delivery.

SBP cannot be defined exclusive of the other competency domains. Strong interpersonal and communication skills and professionalism are essential for: 1) interacting with the spectrum of patients, families, interprofessional team members, and other staff that form the foundation of our systems, and 2) breaching the barriers that exist interprofessionally, recognizing and embracing the diversity of professional culture. In fact, communication is broadly

defined to include principles of patient-centered care, emphasizing shared-decision-making, with consideration of the social, educational, and cultural contexts of care.

The competencies within this domain call upon the physician to broaden her view of care and advocacy beyond the individual patient to the community level and ultimately to a population level. She must accept and embrace responsibility for personal and systems error recognition and prevention, promoting patient safety through systems change. In defining the milestones within this domain, we were challenged by the interplay between the development of an individual and the limits of each system within which one functions, recognizing the interdependence between the two. Ultimately, competent patient care can only be delivered within competent systems of care.<sup>1</sup>

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Competency 1: Work effectively in various health care delivery settings and systems relevant to their clinical specialty

Robert Englander, MD, MPH

**BACKGROUND:** The physician who is willing to learn about the nature of systems, how to control them, and how to improve them can significantly influence medical systems. Being a good citizen in a medical system requires the appreciation of its systemic nature and the will to use that knowledge to change it, the better to accomplish its purpose.<sup>1</sup>

### DEFINITIONS:

#### SYSTEM

A system is defined as “a collection of interdependent elements that interact to achieve a common purpose.”<sup>1</sup>

#### SYSTEMS THINKING

The process of understanding how things influence one another within a whole. Systems thinking is an approach to problem solving, by viewing “problems” as parts of an overall system rather than reacting to specific parts, outcomes, or events and potentially contributing to the further development of unintended consequences.<sup>2</sup>

#### WORK-AROUND

A plan or method to circumvent a problem without eliminating it.

Perhaps the keys to competence in SBP are the ability to understand complex systems, navigate them for the benefit of one's patients, and ultimately lead or participate in their change where change is required for improvement. Using this construct, "work effectively" within the framework of this competency can be defined as understanding complex systems (knowledge), navigating them (skills), and internalizing the responsibility to lead or participate in changing them as core to one's professional identity (attitudes).

As is true for many of the competencies in SBP, the ability of physicians to advance along the developmental continuum is at least partly reliant on the system in which they practice. Nolan<sup>1</sup> identified principles that determine the systems' ability to improve. Several of these principles, which are outlined below, will impact practitioners' abilities to develop systems thinking within the context of their specific system.

- A system needs a [common] purpose to aid people in managing their interdependencies.
- The structure of a system significantly determines the performance of the system.
- Changes in the structure of a system have the potential for generating unintended consequences.
- The need for cooperation is a logical extension of interdependencies in systems.
- Systems must be managed.

Poorly designed and managed systems that do not have a clear mission, that are unaware of or unable to evaluate unintended consequences to change, and that operate in silos will be unlikely to foster development in this competency. In contrast, optimally functioning systems that have demonstrated these qualities will likely facilitate more rapid progression of the individual practitioner through the developmental continuum. The literature suggests that interventions aimed at experiential understanding of these principles can improve the learner's knowledge about and perception of systems<sup>3,4</sup> as well as their ability to develop system improvements.<sup>5</sup>

This competency is intricately linked to several other competencies. For example, the ability to deal with uncertainty will inform success in this competency, given the inherent uncertainty of complex systems. Plsek and Greenhalgh<sup>6</sup> perhaps state it best: "Because the elements are changeable, the relationships non-linear, and the behavior emergent and sensitive to small changes, the detailed behaviors of any complex system is fundamentally unpredictable over time." In addition, as the understanding of systems has become paramount to providing optimal care, this understanding needs to be an intricate part of one's professional identity. Chen et al<sup>7</sup> write:

*If the ethical practice of medicine depends on the system in which patient and physician interact, then physicians should see that improving systems of care is an integral part of ethical practice. Accomplishing...[this] requires that physicians change their mental models related to the ethical practice of medicine from that of a series*

*of dyadic relationships to one that incorporates systems thinking.*

Finally, working effectively within a health care system by definition requires the abilities to: 1) be an effective team member (see communication competency); 2) optimize interprofessional collaboration (see systems-based practice competency); and 3) be a reflective practitioner (see practice-based learning and improvement competency).

**DEVELOPMENTAL PROGRESSION:** After considering the 2 premises discussed above (that the context in which one practices may affect the ability to progress through this competency, and that this competency is highly interconnected with other key competencies), one can still outline a developmental progression for the ability to work effectively in various settings and systems. Given the complexity of health care systems and their inherent uncertainty, the work of Plsek and Greenhalgh<sup>6</sup> and Fraser and Greenhalgh<sup>8</sup> are particularly informative for this competency. They outline a developmental progression from competence to capability, as follows.

#### COMPETENCE

What individuals know or are able to do in terms of knowledge, skills, and attitudes.

#### CAPABILITY

The extent to which individuals can adapt to change, generate new knowledge, and continue to improve their performance.

Masters of this competency will go beyond even capability to internalization of the importance of systems thinking to the ethical practice of medicine and will become champions of systems' changes toward improvement.

Moving along the developmental progression in this series of milestones requires both knowledge of systems and ability to adapt to new systems. One must simply acquire knowledge about systems and systems thinking. Since this subject has not been a traditional mainstay of medical education, either at the undergraduate or graduate level, this may be difficult to achieve. Practitioners lacking an understanding of systems will often encounter a process problem, become frustrated, and develop a work-around without consideration of how to prevent the issue for themselves or other practitioners in the future. With a knowledge of systems, competence may be reached and allow individuals to fix issues within the context of that rotation or setting; however, they remain unable to apply the abstract lessons learned in new settings or systems. Therefore, the sentinel feature to developmental progression in this competency is *the ability to adapt to new settings and systems*. This is perhaps particularly true of residents, as they are often on block rotations for short periods of time requiring their adaptation to new settings and systems as frequently as every 2 to 4 weeks. The ability to teach systems thinking will be paramount to medical educators helping learners progress from competence to capability and instilling an attitude that values systems thinking.

## DEVELOPMENTAL MILESTONES:

- Focuses on the pieces of a process rather than the whole as a result of limited knowledge of systems. Frequently frustrated by the system's suboptimal processes, but lacks the ability to identify the root cause and thus to effect change.
- Has developed a knowledge of systems and therefore understands when others describe how the pieces relate to the whole. Not yet able to articulate/apply that relationship independently, and therefore develops work-arounds when faced with a systems challenge.
- Competent in working in various systems and settings; therefore, able to apply knowledge, skills, and attitudes in systems thinking to systems' problems within a given context. Recognizes the need to change systems rather than develop work-arounds, and can activate the system to do so. However, does not apply learning from one setting or context to another.
- Capable in systems thinking, defined as competence in systems thinking and the ability to adapt learning from one system or setting to another. In this way, can effect or stimulate improvements in a system and does so when the need arises.
- Capable as defined above and views improving systems of care as an integral component of professional identity. Leads systems changes as part of the routine care delivery process.

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## Competency 2. Coordinate patient care within the health system relevant to their clinical specialty

Susan Guralnick, MD

**BACKGROUND:** The American Academy of Pediatrics<sup>1</sup> defines the medical home as

*a model for the delivery of care to infants, children, and adolescents which is characterized as being accessible, continuous, comprehensive, family centered, coordinated, compassionate, and culturally effective. It should be delivered or directed by well-trained physicians who provide primary care and help to manage and facilitate essentially all aspects of pediatric care. The physician should be known to the child and family and should be able to develop a partnership of mutual responsibility and trust with them.*

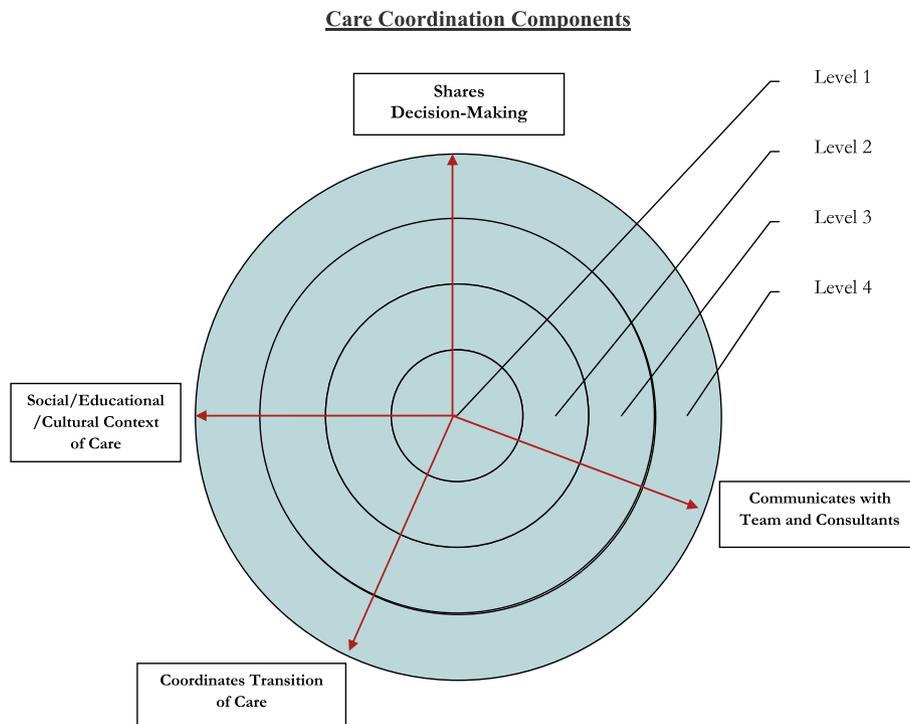
Numerous articles have been published recently regarding the medical home, a movement begun by the American Academy of Pediatrics and now adopted by all of the primary care specialties.<sup>2</sup> The physician's role in care coordination has not yet been well defined.

One reason cited for the lack of a standard definition is that care coordination does not have a strong theoretical foundation. Some of the literature recommends that families serve as the locus of care coordination, with physicians serving principally facilitative roles. There is acknowledgment, however, that the degree of engagement in care coordination by families varies from case to case based on their ability and desire to take on this role. The definition of the medical home emphasizes the role of the primary care team in coordination of services for children.<sup>3</sup>

That care coordination must take place in all care settings is now recognized by many organizations. The Society of Hospital Medicine<sup>4</sup> has included care coordination among the core competencies of hospitalist care, while the National Quality Forum<sup>5</sup> emphasizes the role of care coordination in “facilitating beneficial, efficient, safe, and high-quality patient experiences and improving healthcare outcomes.”

Ideally, the learner would ensure that appropriate and sufficient care coordination occurs within the context of a medical home for a panel of patients. However, care coordination does not occur in a vacuum; it is somewhat dependent on the system in which learners find themselves. That being said, there are specific knowledge, skills, and attitudes required for care coordination. These milestones were written in the context of our current medical education system of episodic care, which is not ideal. Learners are expected to achieve competence within their systems of care. For example, although care coordination at accredited cystic fibrosis centers is superior to that at centers with episodic care, there is still an expectation that care coordination for cystic fibrosis patients should occur in nonaccredited settings.

The role of the physician care coordinator has 4 essential components: 1) communication with the care team and consultants, 2) coordination of transition of care, 3) shared-decision-making, and 4) consideration of the social, educational, and cultural contexts of care. Care coordination requires competent communication with the patient/



**Figure 1.** Care coordination components.

family, consultants, service agencies, and various team members. Results should be shared and interpreted with the patient/family, welcoming and addressing their questions. Recommendations should be developed in partnership with patients and families. There must be an open and trusting relationship between the practitioner and the patient/family. Care is facilitated throughout the continuum of care including referral, consultation, testing, monitoring, and follow-up. Transition of care should be seamless, between all persons and settings involved in the patient's care (eg, primary care physicians, subspecialists, community agencies, inpatient and outpatient care, pediatric to adult care). A written care plan (paper or electronic) should be developed by the practitioner and the patient/family. Specific knowledge and skill are required to utilize the system, including but not limited to awareness of available services, referral systems, insurance issues, transition considerations, and patient information registries. Perhaps most important to care coordination is the ability of the practitioner to engage the family in shared-decision-making at all levels of care and to empower family members to participate in their own care coordination to the extent feasible and appropriate. There must be a family-centered, culturally effective partnership, assessing the family's strengths and needs and applying that knowledge in developing care plans and medical decision making. Each competency level contains several components. Each of these components may develop at a different rate, as is demonstrated in Figure 1.

#### DEVELOPMENTAL MILESTONES:

- Acts as authoritarian medical decision maker, developing care plans and setting goals of care without input from the patient/family, then informing the patient/family of the physician-defined plan. No written care plan is provided. Makes referrals, requests consultations, and orders testing with little or no communication with team members or consultants. Not involved in the transition of care between settings (eg, outpatient and inpatient, pediatric and adult); little or no recognition of social/educational/cultural issues affecting the patient/family.
- Involves the patient/family in a limited way in setting care goals and some of the decisions involved in the care plan. A written care plan is occasionally made available to the patient/family. The care plan does not address key issues. Variable communication with team members and consultants regarding referrals, consultations, and testing. Patient/family questions are answered regarding results and recommendations. Inconsistently involved in the transition of care between settings (eg, outpatient and inpatient, pediatric and adult). Makes some assessment of social/educational/cultural issues affecting the patient/family and applies this in his interactions.
- Recognizes the responsibility to assist families in navigation of the complex health care system. Frequently involves the patient/family in decisions at all levels of care, setting goals, and defining care plans. A written care plan is frequently made available to the patient/family and to appropriately authorized members of the care team. The care plan addresses key issues. There is good communication with team members and consultants. Results and recommendations are consistently discussed with the patient/family. Routinely involved in the transition of care between settings (eg, outpatient and inpatient, pediatric and adult). Social, educational, and cultural issues are considered in most care interactions.

- Actively assists families in navigating the complex health care system. Communication is open, facilitating trust in the patient–physician interaction. Goals are developed and decisions are made jointly with the patient/family (shared-decision-making). A written care plan is routinely made available to the patient/family and to appropriately authorized members of the care team. The care plan is thorough, addressing all key issues. Facilitates care through consultation, referral, testing, monitoring and follow-up, and helping the family to interpret and act on results/recommendations. Coordinates seamless transitions of care between settings (eg, outpatient and inpatient, pediatric and adult; mental and dental health; education; housing; food security; family-to-family support). Builds partnerships that foster family-centered, culturally effective care, ensuring effective communication and collaboration along the continuum of care.
- Current literature does not distinguish between behaviors of proficient and expert practitioners. Expertise is not an expectation of GME training, as it requires deliberate practice over time.

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### Competency 3. Incorporate considerations of cost awareness and risk–benefit analysis in patient and/or population-based care as appropriate

*Robert Englander, MD, MPH*

**BACKGROUND:** The competency of cost awareness and risk–benefit analysis is linked with competencies in medical knowledge and patient care, as well as with other SBP competencies, such as advocating for quality care. Every treatment and evaluation test should be considered within the context of its risks and benefits both to the individual patient and, potentially, to the population or whole system. Cost should be seen as one of the factors to be considered. For example, the risks of chemotherapy may be seen as the physical harm risks to the individual patients in light of the benefit of improved survival, but the cost should also be considered in the context of other available treatments.

The link between the ability to understand cost and analyze risks and benefits on the one hand and patient care skills and medical knowledge on the other was underscored in a Canadian study.<sup>1</sup> In this study, physicians who scored higher on the Canadian Family Physician written and Observed Structured Clinical Examination (OSCE) licensing examination demonstrated more appropriate use of consultants, better medication prescribing habits for the elderly population, and improved use of screening mammographies for women 50 to 69 years of age. In addition, multiple studies have shown a decrease in ordering inappropriate tests as medical knowledge and clinical experience increase independent of attitudes about cost containment.<sup>2,3</sup>

Looking at cost awareness specifically, studies have shown the ability to decrease costs with interventions aimed at educating physicians and providing them benchmarked feedback on their utilization patterns.<sup>4,5</sup> However, the importance of the interplay of clinical knowledge and judgment with cost awareness is underscored in a study by Rudy et al.<sup>6</sup> The authors provided intervention group residents with charge data either before or after ordering tests

for a hypothetical case. They found that residents receiving the charge data before ordering the tests spent less but had lower appropriateness scores for the tests they ordered. Thus, the interaction of cost awareness with knowledge is crucial to arriving at the best outcome for the patient.

The overall knowledge of costs and cost structures among physicians both in the United States and elsewhere is poor,<sup>7,8</sup> and many physicians, despite years of practice, would likely be categorized as relative novices if plotted on the developmental milestone scale below. Many physicians do not see their role in cost containment, and they are frustrated by the perceived idiosyncrasies of the pharmaceutical industry and/or the insurance industry in trying to provide their patients the care they need.<sup>9</sup> When physicians do have knowledge of cost issues, they tend to think of cost containment as it applies to a given patient rather than their own practice population as a whole or the broad general population. For example, physician prescribing practices will generally prioritize managing out-of-pocket costs for the individual patient above total medication costs.<sup>10</sup> In addition, physicians' prescribing and ordering practices may be influenced by the system or context of care. In a seminal work looking at varying health care costs in two demographically similar Texas cities, Gawande<sup>11</sup> suggested that market forces and business contexts of the physicians in those towns influenced costs.

Finally, many of the same principles apply to how physicians consider risk–benefit analysis. For example, physicians providing risk–benefit counseling rely on knowledge and clinical judgment to make sound analyses. They also tend early in development of this ability to focus on the individual patient without attention to the broader population or systems. In a fascinating paper describing the approach toward risks and benefits among doctors who become

patients, Klitzman<sup>12</sup> describes some of the processes that doctors may encounter in helping patients through risk–benefit analyses: 1) framing the statistics, 2) evaluating and managing the research/media hype around a given issue or diagnosis, 3) weighing risk and benefit, and 4) imposing value on statistics (eg, a “good chance” or a “bad chance”). His work helps provide a framework for understanding the developmental progression along these milestones.

#### DEVELOPMENTAL MILESTONES:

- Does not demonstrate awareness of cost issues in evaluation and management of patients. Has difficulty processing cost and risk/benefit information in a way that results in cost-containment actions or appropriate risk–benefit analysis. Frustrated by cost-containment efforts that are viewed as primarily externally mandated.
- Uses externally provided information (eg, prescribing information, test ordering patterns, or research around a treatment) to inform cost-containing action and/or preliminary risk–benefit analysis. Inadequate skills in critical appraisal may result in cost-containment activities and/or risk–benefit counseling inconsistent with the data or evidence provided.
- Critically appraises information available on an evaluation test or treatment to allow optimization of cost issues and risk–benefit for an individual patient. Adopts strategies that decrease cost and risk, and optimize benefits for individuals, with less attention to those outcomes for populations.
- Critically appraises information in the context of not only the individual patient, but also the broader population/system. Ascribes value to cost and risk–benefit decisions based on this broad understanding of the information.
- Consistently integrates cost analysis into one’s practice while minimizing risk and optimizing benefits for whole systems or populations.

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### Competency 4: Advocate for quality patient care and optimal patient care systems

*Stephen Ludwig, MD*

**BACKGROUND:** The traditions of pediatrics dictate that a pediatrician move from concern for the quality of care of each individual patient to the concern for the welfare of a group of children who might share a common illness, condition or life circumstance.<sup>1,2</sup> This broader concern and translating the concern into action are what we define as advocacy. Pediatricians should move through a progression of attitude and skill attainment in order to become effective child advocates. Fundamental to becoming an effective child advocate is the understanding of systems and how they work, because ultimately, the advocate must be able to understand systems and how to change them.<sup>3</sup>

Batalden and Davidoff<sup>4</sup> write, “Unless everyone goes to work recognizing that they have two jobs to do—doing the work and improving the work,” we will not be meeting the responsibilities of our profession. The Institute of Medicine reports *To Err Is Human: Building a Safer Health System*<sup>5</sup> in 2000 and *Crossing the Quality Chasm*<sup>6</sup> in 2001 stimulated physician interest in quality and safety. In the subsequent decade, it has become clear that incorporating

these issues into medical education curricula have become vitally important.

Advocacy should find expression in whatever career choice or practice model the pediatrician selects. Advocacy is often a multidisciplinary activity and may occur within the hospital (quality improvement) or in a community-based activity (community-based advocacy).

This competency ties in with the professionalism competencies. Besides the improvement in attitudes and skills described below, there is another dimension that moves from advocacy behaviors being a possible part of professional life or voluntary community life to a professional behavior that is a fully incorporated and routinely practiced part of the professional role.<sup>7</sup> The American Medical Association<sup>8</sup> indicates that physicians must “advocate for the social, economic, educational, and political changes that ameliorate suffering and contribute to human well being.”

Articulating and assessing milestones for this competency may further spur their incorporation and accomplishment in our medical education programs.

### DEVELOPMENTAL MILESTONES:

- Attends to medical needs of individual patients. Demonstrates a desire to take good care of patients and takes action for the individual patient's health care needs.  
Example: *Sees a child with a firearm injury and provides good care.*
- Demonstrates recognition that an individual patient's issues are shared by other patients, that there are systems at play, and that there is a need for quality improvement of those systems. Acts on the observed need to assess and improve quality of care.  
Example: *A physician notes on rounds, "We have sent home 4 to 5 firearm-injury patients and 1 has come back with repeated injury. We need to do something about that."*
- Acts within the defined medical role to address an issue or problem that is confronting a cohort of patients. Enlists colleagues to help with this problem.  
Example: *The physician works with colleagues to develop an approach, protocol, or procedure for improving care for penetrating trauma injury in children and measures the outcomes of system changes.*
- Actively participates in hospital/practice-initiated quality improvement and safety actions. Demonstrates a desire to have an impact beyond the hospital/practice walls.  
Example: *Attends a hospital symposium on gun-related trauma and what can be done about it and then arranges to speak on gun safety at the local meeting of the parent-teacher association.*

- Identifies and acts to begin the process of improvement projects both inside the hospital/practice and within one's community.  
Example: *Upon completion of quality improvement project, works on new proposed legislation and testifies in city council.*

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## Competency 5. Work in interprofessional teams to enhance patient safety and improve patient care quality

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**BACKGROUND:** As with most SBP subcompetencies, the ability of an individual to develop competence is dependent both on the macrosystem and microsystem in which one finds oneself. This is perhaps most true of the ability to develop in the area of interprofessional team engagement. At the macro level, the physician must overcome an *educational system* that educates in professional silos and puts a premium on autonomy and then function optimally in a *health care system* that requires physicians to be team leaders who optimize interdependent functionality. At the micro level, the extent to which a medical school and its corresponding academic medical center have broken down these silos and engaged in interprofessional education (IPE) is highly variable and is still in a rudimentary state in even the most forward-thinking institutions. In addition, the basic unit of resident education—the block or rotation—serves as a barrier to interprofessional team development. Finally, each of the health care professions has its own culture that can provide barriers to team functioning.<sup>1,2</sup>

The literature suggests that interprofessional teams working together provide safer and more effective care with better health outcomes.<sup>3–6</sup> Less clear is the optimal way to provide IPE to optimize performance on these teams. There has been little research on this topic to date. In a Cochrane Collaboration review of the literature on IPE in health care, Reeves et al<sup>7</sup> identified 6 studies that

looked at both learner and patient satisfaction and health outcomes and found modest positive effects on both. However, both the educational interventions and the studies were heterogeneous in nature, and the authors therefore conclude, “Although these studies reported a range of positive outcomes, the small number of studies combined with heterogeneity of IPE interventions, means it is not possible to draw generalisable inferences about the effects.”<sup>7</sup> The reader interested in understanding some of the precepts of IPE programs is referred to Hammick et al.<sup>8</sup>

The current disconnect between how we educate and how we function optimally notwithstanding, Clark<sup>9</sup> provides an excellent framework for understanding development in this competency. He states the challenge eloquently: “The real challenge in IPE [and interprofessional functioning] is for [health care professionals] to be able to see the world through the eyes of other professions, to be able to frame the patient's problem and the potential solutions to it in the terms of understanding of other kinds of health care providers.”

The first tenet of development in this competency requires an understanding that each of the health care professions has both a cognitive map (that is, the knowledge base underlying the profession) and a normative map (that is, the values, modes of moral reasoning, and methods of resolving ethical dilemmas).<sup>9</sup> Development as a true interprofessional team member requires a basic understanding

of the cognitive and normative maps of the other professions. As an example, a social worker who does not understand some of the basic tenets of the doctor–patient relationship may find herself in conflict with the physician who does not understand that social worker’s knowledge regarding appropriate boundaries. Clark<sup>9</sup> cites work by Perry<sup>10</sup> in setting out 4 stages of development in the understanding of knowledge and values.

#### **FOUR STAGES OF DEVELOPMENT:**

##### **DUALISM**

A person at this stage believes that knowledge is the accumulation of facts: the more you know, the smarter you are. Authority figures have the answers, which are simple and definitive. Physicians in this stage would be likely to be dismissive of input from any member of the health care team they saw as nonauthoritarian from a knowledge standpoint, which would include any nonphysician. They would see their own profession as supreme.

##### **MULTIPLICITY**

Individuals at this stage have a beginning understanding that ambiguity exists in some areas of knowledge and that all answers are not simple and definitive. Individuals at this stage are beginning to develop awareness of the other professions, but they still predominantly retreat to the world they know and in which they are comfortable.

##### **RELATIVISM**

At this stage, an individual recognizes ambiguity as a fact of life. Theories are devised to help organize knowledge and to understand what we observe and how we act, understanding that they are fallible. The individual in this stage values the importance of different points of view. Physicians in this stage make excellent team players, ensuring balanced input that respects the cognitive and normative maps of the other professionals on the team.

##### **COMMITMENT IN RELATIVISM**

At this stage, an individual chooses to adhere to a particular school of thought or stand up for a particular value, but only after reflection and a true understanding of the points of view of others. Other perspectives have validity, and others are invited to express their viewpoints using the tenets of evidence and sound reasoning. The physician in this stage understands the cognitive and normative maps of the other professions and embraces the interconnectedness and complementary nature of the different health care professionals. Physicians in this stage make excellent team leaders.

## **Competency 6. Participate in identifying system errors and implementing potential systems solutions**

*Susan Guralnick, MD*

**BACKGROUND:** The enormous complexity of modern medical care has made error detection and management extremely difficult. Traditional deterministic methods

## **DEVELOPMENTAL MILESTONES:**

- Seeks answers and responds to input from only intraprofessional colleagues; does not acknowledge the contributions or value of other members of the interdisciplinary team as being important.
- Seeks an understanding of the other professionals on the team, especially their unique knowledge base, and is open to their input, but still acquiesces to physician authorities to resolve conflict and provide answers in the face of ambiguity; is not dismissive of other health care professionals, but is unlikely to seek out those individuals when confronted with ambiguous situations.
- Demonstrates awareness of the unique contributions (knowledge, skills, and attitudes) of other health care professionals by seeking their input for appropriate issues, and as a result is an excellent team player.
- Demonstrates behaviors in the milestone immediately above. In addition, recognizes that quality patient care only occurs in the context of the interprofessional team and understands the roles and scopes of practice for each of the interprofessional team members. Explicitly matches scope of practice and skills of each professional to the team tasks. Serves as a role model for others’ interdisciplinary work and is thus an excellent team leader.
- Current literature does not distinguish between behaviors of proficient and expert practitioners. Expertise is not an expectation of GME training, as it requires deliberate practice over time.

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of solving the “error issue” cannot cope with the huge number of potential errors that are possible. Systems thinking and approach to error reduction provides

a different avenue for tackling this challenging dilemma.<sup>1</sup>

In his work about human error, Reason<sup>2</sup> defines 3 categories of error: those based on knowledge, skill, and rules. Knowledge- and skill-based errors are fairly straightforward; they occur when a person attempts to act without the adequate knowledge or skill to perform the task at hand.

Rule-based errors are those that are committed when a person deviates from a well-defined and validated process for completing a task. Medication administration errors are frequently the result of such rule-based failures. Medication errors may take many forms. For example, at several points in the preparation for medication delivery, there are clear and redundant steps in place, designed to assure that the proper drug is administered to the correct patient, at the proper time, in the right dose. Time constraints, incomplete or unclear prescribing, inadequate labeling, and personnel shortages frequently lead to noncompliance with established rules, resulting in rule-based errors.<sup>1</sup>

Errors may also be classified as active or latent. Active errors are those that can be attributed to a person; latent errors are “related to the design of the system. Errors routinely attributed to persons, such as administering the wrong dose of a medication because of an illegible order, are often rooted in unrecognized problems in the design of systems.”<sup>3</sup> “Leape and others have conceptualized errors as system flaws, not character flaws, and advocate continuous quality improvement, in which the reporting of errors is the first step along a constructive process toward understanding what factors within a system enabled an error to take place.”<sup>4</sup> Active and latent errors may occur in concert as a result of both system flaws and personal action.

The developmental progression of understanding errors moves from blame and defensiveness to openness and accountability. The individual must, in traversing this progression, always understand the element of personal responsibility for either individual error or systems error correction. In order to promote a culture of safety, there must be a safe and welcoming environment in which to report and evaluate errors. This enables study of the event and the development of strategies to prevent future similar events.<sup>4</sup> There is always a risk of error. Leape et al encourage “robust, high reliability individuals, teams, systems, and organizations that are able to recognize trouble

before negative consequences occur.”<sup>5</sup> Systems can be created that will reduce the probability that these mistakes will occur, thus preventing harm to patients.<sup>4</sup> Physicians should actively participate in processes, such as root cause analyses and morbidity and mortality conferences, that study error events and work to identify error prevention solutions.

#### DEVELOPMENTAL MILESTONES:

- Demonstrates defensiveness or blaming when encountering medical error. Does not express any awareness of personal responsibility for individual or systems error correction. Avoids discussion of error or identification of the type of error. Approaches error prevention from an individual case perspective only.
- Discusses errors without a defensive or blaming approach inconsistently. Demonstrates some awareness of personal responsibility for individual or systems error correction. Identifies medical error events, but cannot identify the type of error (active versus latent). Acknowledges that error may be more than the mistake of an individual and articulates recognition that there may be systems problems.
- Discusses errors openly. Actively identifies medical error events and seeks to determine the type of error. Identifies the element of personal responsibility for individual or systems error correction in many situations. Sees examination and analysis of error as an important part of the preventive process.
- Encourages open and safe discussion of error in most cases. Actively identifies medical error events. Accepts personal responsibility for individual or systems error correction, regularly determining the type of error and beginning to seek system causes of error.
- Encourages open and safe discussion of error consistently. Characteristically identifies and analyzes error events, consistently approaching medical error with a system solution methodology. Actively and routinely engaged with teams and processes through which systems are modified to prevent medical error.

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### Competency 7. Know how to advocate for the promotion of health and the prevention of disease and injury in populations

*Susan Guralnick, MD*

**BACKGROUND:** The pediatrician’s role as advocate for children’s health from a population perspective has been recognized for centuries.<sup>1</sup> For physicians to effectively manage the health of individuals, it is essential that they are aware of and knowledgeable about “health promotion, disease prevention, and management of costs for a popula-

tion of patients.”<sup>2</sup> Pediatricians need to be informed about their community and the population they care for, including health and social risks, in order to effectively advocate for improvement in child health and safety.<sup>1</sup> An interdisciplinary approach in which the pediatrician collaborates with advocates from various walks of life is the best

way to effect change and improve the health status of the population at large. This approach may include parents, teachers, nurses, lawyers, and government officials, among others.<sup>1</sup> Bicycle helmet and booster seat laws are examples of collaborative efforts pediatricians have engaged in that have had an enormous impact on the health of the pediatric population. Control of an influenza epidemic is a clear example of how a population approach to disease prevention can impact an individual patient. Physicians also advocate through mandated reporting responsibilities, such as reporting adverse drug events to the US Food and Drug Administration or reporting notifiable diseases to the state or local health department.<sup>3</sup> Physicians can become engaged at local, state, and national levels in this mission. The role of the physician requires him to inform, educate, and empower people and communities about health issues.<sup>4</sup> To be effective, the physician must have an understanding of the health literacy of the population served, so that the patients understand and act on the health care information provided.<sup>5</sup> The medical literature supports the importance of an increased focus on the prevention of injury and disease in the medical community rather than just on the treatment of the resulting morbidity and mortality.<sup>2,6</sup> It is essential that physicians' education about prevention and population health begin during medical school, with an expectation that advocacy and health promotion will become a part of routine practice.

Knowledge, skills, and attitudes should progress as one moves through the continuum of education. There must be a transition from focus on a single patient without thought of population health to a broad and internalized understanding of the importance of population health and its impact on individuals. The practitioner must advance from lack of awareness of the community and its implications for patients' health to proactively embracing the elements of community health that can foster the well-being of the population at large. Additionally, the physician must progress from little or no understanding of the individual physician's role in public health reporting to being a knowledgeable and responsible reporter committed to achieving the greater good.

#### DEVELOPMENTAL MILESTONES:

- Has not become informed about the needs and assets of his community as he expresses that he does not consider population health to be the role of a practitioner (eg, he may see this as the role of the public health worker). Unaware of community resources and does not collaborate with community agencies, professionals, or others to improve the health of children. Is unaware of a physician's public health reporting responsibilities and does not engage in required reporting.  
Example: *During a well check, a physician discovers that a patient is not wearing his helmet when skateboarding. He informs the patient and parents about the importance of helmet use, but he does not consider whether this is a problem prevalent in the community.*

- Demonstrates recognition that population health issues impact the health of individual patients as evidenced by occasionally seeking information about the needs and assets of the community in which he practices. Infrequently interacts with community agencies, professionals, and others with regard to population health issues. Is uncertain of public health reporting responsibilities and may not engage in required reporting.  
Example: *A physician notes that many of the parents in her practice are not reading to their children. She investigates and finds that few parents in this community read to their children. She then begins a Reach Out and Read program at her clinic site.*
- Expresses the belief that population health issues impact the health of his patients and therefore proactively identifies sources of information about the needs and assets of the community in which he practices. Interacts and begins to work collaboratively with community agencies, professionals, and others in order to address population health issues (eg, disease and injury prevention). Usually engages in required public health reporting.  
Example: *A physician notes that many children in the community are not wearing bicycle helmets. He seeks information about local bike helmet laws and then collaborates with a local parent organization to begin a community bicycle helmet education campaign.*
- Identifies population health issues through individual clinical experiences and community interaction. Is knowledgeable about and keeps up to date with the needs and assets of the community in which he practices. Routinely collaborates with community agencies, professionals, and others, and may take a leadership role in, advocating for population health issues (eg, disease and injury prevention). Consistently engages in required public health reporting.  
Example: *A physician in an urban area notes that in the emergency department they are seeing children who have fallen out of windows of high-rise buildings. She contacts the Department of Health to get statistics about this sort of injury. She researches and discovers there are no local laws requiring window guards. The physician then contacts local agencies and government officials to advocate for enacting such a law.*
- Current literature does not distinguish between behaviors of proficient and expert practitioners. Expertise is not an expectation of GME training, as it requires deliberate practice over time.

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