The Pediatrics Milestone Project

A Joint Initiative of

the Accreditation Council for Graduate Medical Education
and
the American Board of Pediatrics

ACGME

To the Medical Education Community:

The Pediatrics Milestone Working Group has written this letter to accompany the attached first iteration of our work. We are anxious to share our work with you, but at the same time feel compelled to point out that what you are about to read is a work in progress, a first iteration with many more to come. The Advisory Board* was invaluable in providing guidance, support and wisdom. We gratefully acknowledge the time and effort that they contributed to this effort. A special thank you goes to Lisa Johnson who helped us to get our work into an organized document. We also want to acknowledge Beth Fine, a medical editor at the American Board of Pediatrics for the long hours that she spent editing the grammar and style of this work to enhance its readability and clarity.

While the Pediatrics Milestone Working Group has spent countless hours searching the literature to inform our process of piecing together the developmental progression of knowledge, skills and attitudes for each sub-competency and then translating this background information into milestones, we recognized the need to further develop this work with the assistance of experts. We gratefully acknowledge the input of these experts (see below); their insights strengthened our work and enhanced its credibility. For the sake of our learners and our patients we are committed to "getting this right" in the hope that we will make assessment of and feedback to individual trainees more meaningful. In turn, we anticipate that more meaningful aggregate data about trainees will improve the ability to evaluate and improve our programs.

The Working Group is counting on the Pediatrics community to remain involved and invested in the work that is to come. We appreciate the thoughtful feedback that we have received from the membership of the Association of Pediatric Program Directors (APPD) along the way, specifically as it relates to making the sub-competencies of personal and professional development explicit. It is essential that we now review and critique this product, to learn what works and what doesn't. The leadership of the APPD is poised to help set up collaborative networks, through APPD's Longitudinal Educational Assessment Research Network (LEARN), to organize and institute rigorous processes to engage the community in studying these milestones. The Initiative for Innovation in Pediatric Education and APPD LEARN will work collaboratively to develop projects that will allow APPD members to participate in studying educational innovations, the Pediatric Milestones presenting rich opportunities for such an adventure! Ideally we will get all pediatric residency programs participating in at least one research collaborative. A formal and organized process will allow us to advance with efficiency and efficacy in our improvement efforts and ultimately achieve our goal of linking educational and patient care outcomes. Realizing that GME is one piece of the continuum, we look forward to partnering with our colleagues who focus on undergraduate medical education, fellowship training, and maintenance of certification to study milestones in these contexts.

We hope that those outside the specialty of pediatrics, who read this document, will find it helpful as you continue conversations about how to make competency-based education and assessment more meaningful in the context of your specialty. More specifically, we hope you will find applicability to your specialty in the core competencies of professionalism, interpersonal and communication skills, practice-based learning and improvement and systems-based practice. Should you choose to build on what we have developed, we will learn from your adaptations of this work as well as from your creative thinking about how to address milestones in your own specialty. This letter is intended to be the beginning of that ongoing dialogue.

Sincerely,

The Pediatrics Milestone Working Group**

The Working Group wishes to acknowledge and thank the content experts who reviewed sections of this document for their willingness to share their time and expertise.

Content Expert	Sub-competency
Richard **Antonelli**, MD, MS	Coordinate care within the health care system relevant to their clinical practice
David P. **Baker**, PhD	Work effectively as a member or leader of a health care team or other professional group
Cynthia Fuchs **Epstein**, PhD	Provide appropriate role modeling
Ronald M. **Epstein**, MD	Healthy responses to stressors
Mohammadreza **Hojat,** PhD	Take primary responsibility for lifelong learning to improve knowledge, skills and practice performance through familiarity with general and rotations specific goals and objectives and attendance at conferences
Lucian **Leape**, MD	Participate in identifying system errors and implementing potential system solutions
Lorelei **Lingard**, PhD	Provide appropriate supervision
Lorelei **Lingard**, PhD	Self-awareness of one's own knowledge, skill, and emotional limitations that leads to appropriate help-seeking behaviors
Lorelei **Lingard**, PhD	Trustworthiness that makes colleagues feel secure when one is responsible for the care of patients
Lorelei **Lingard**, PhD	The capacity to accept that ambiguity is part of clinical medicine and to recognize the need for and to utilize appropriate resources in dealing with uncertainty
Salvatore **Mangione**, MD	Perform complete and accurate physical examinations
Debra **Rotor**, DrPH, MPH	Interview patients and families about the particulars for the medical condition for which they seek care, with specific attention to behavioral, psychosocial, environmental, and family unit correlates of disease
David **Stern**, MD	The entire professionalism competency domain
	Advocate for quality patient care and optimal patient care systems
Rachel **Yudkowsky**, MD, MHPE	Perform complete and accurate physical examinations

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*Added by the pediatrics community; underlined phrases also added by the pediatrics community

A. COMPETENCY: PATIENT CARE

1. *Gather essential and accurate information about the patient*

Primary Author: Daniel Schumacher, MD

Background

Early Development of Information-Gathering Skills
In the early stages of clinical reasoning, learners must rely upon their knowledge of basic pathophysiology and principles learned in their preclinical training when they gather information about patients. This knowledge allows them to use analytic reasoning to generate mental maps, which are representations of how things are related and linked to one another. In this situation, mental maps represent the way in which components of a patient's history and physical examination are linked to one another as well as to the possible diagnoses.[1-5] With limited clinical experience, these mental maps can be both overly extensive and inappropriately convoluted, including information of no or limited clinical relevance to the patient's current presentation. At the same time, the lack of clinical experience may result in neglecting important features of the history and examination. The end result is often limited connections between the pieces of information gathered.

Intermediate Development of Information-Gathering Skills
As they gain exposure to clinical practice, learners begin to link signs and symptoms of their current patient to patterns of signs and symptoms they have seen in previous patients. With increasing clinical experience, learners use these prior clinical encounters to help them filter and group the information gathered into more specific diagnostic categories and then gradually advance to creating illness scripts. These scripts are based on recognizing patterns of signs and symptoms seen in previous clinical encounters and can be thought of as mental scaffolding representing the characteristic features of specific illnesses.[1-6] Illness scripts are unique to each physician and become more robust with advancing clinical experience. As an example, the early development of an illness script for group A streptococcal pharyngitis may include fever, throat pain, and oropharyngeal erythema with exudates on examination. With further clinical experience, this illness script may advance to include the additional features of headache, abdominal pain, malaise, tender anterior cervical lymphadenopathy, and palatal petechiae. With still further experience, this illness script may advance to include features such as Pastia's lines and circumoral pallor. As illustrated in this example, illness scripts become more robust and discriminating as they develop, allowing the physician to become more facile and exacting in gathering essential and accurate information about his patients.

Advanced Development of Information-Gathering Skills
As clinical expertise continues to develop, practitioners move from using prototypical illness scripts to creating more robust and elaborate scripts that incorporate specific characteristics of individual patients to form "instance" scripts.[1] Recognition and use of these subtle variations in disease and patient characteristics help to discriminate features of similar illnesses and enhance the precision and accuracy with which clinical information is gathered, thereby avoiding premature closure in the development of a differential diagnosis.[1,2] In the example of pharyngitis, this clinician would be open to the unexpected and may consider the possibility of a pseudomembrane when tonsillar exudate appears atypical. He may subsequently suspect a diagnosis of diphtheria, even though many clinical characteristics overlap with group A streptococcal pharyngitis (throat pain, fever, headache, malaise, nausea, and cervical lymphadenopathy).

In the progression of information gathering, it is important not to misperceive pattern recognition as a higher order cognitive process than analytic reasoning. Rather, the increased use of pattern recognition with advancing clinical experience simply represents the natural progression of information-gathering skills.[2]

However, even the master clinician engages in analytic reasoning when presented with rare cases not previously encountered in practice.

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❖ Either **gathers too little information or exhaustively gathers information following a template** regardless of the patient's chief complaint, with each piece of information gathered seeming as important as the next. Recalls clinical information in the order elicited,[7] with the ability to gather, filter, prioritize, and connect pieces of information being limited by and dependent upon **analytic reasoning** through basic pathophysiology alone.
❖ Clinical experience allows linkage of signs and symptoms of a current patient to those encountered in previous patients. Still relies primarily on **analytic reasoning** through basic pathophysiology to gather information, but the ability to link current findings to prior clinical encounters allows information to be filtered, prioritized, and synthesized into **pertinent positives and negatives** as well as **broad diagnostic categories**.
❖ Advanced development of pattern recognition leads to the **creation of illness scripts**, which allow information to be gathered while it is simultaneously filtered, prioritized, and synthesized into **specific diagnostic considerations**. Data gathering is driven by **real-time development of a differential diagnosis early** in the information-gathering process.[8]
❖ **Well-developed illness scripts** allow essential and accurate information to be gathered and **precise diagnoses to be reached with ease and efficiency** when presented with most pediatric problems, but still relies on analytic reasoning through basic pathophysiology to gather information when presented with complex or uncommon problems.
❖ **Robust illness scripts** and instance scripts (where the specific features of individual patients are remembered and used in future clinical reasoning) lead to **unconscious gathering of essential and accurate information in a targeted and efficient manner** when presented with all but the most complex or rare clinical problems. These illness and instance scripts are robust enough to enable discrimination among diagnoses with subtle distinguishing features.

2. ***Organize and prioritize responsibilities to provide patient care that is safe, effective, and efficient***

Primary Author: Daniel Schumacher, MD

Background

In the 2001 report, *Crossing the Quality Chasm: A New Health System for the 21st Century*, the Institute of Medicine[1] (IOM) describes "the prevailing model of health care delivery [as] complicated, comprising layers of processes and ha ndoffs that patients and f amilies find bewildering and c linicians view as wasteful…and fail[ing] to build on the strengths of all health professionals involved to ensure that care is timely, safe, and appropriate."[1] The IOM described six aims for improvement: safety, effectiveness, patient-centeredness, timeliness, efficiency, and equality in patient care. With this in mind, this milestone for organizing and prioritizing responsibilities to provide patient care that is *safe, effective, and efficient* finds important relationships with several other milestones in all competency domains. G iven the broad and deep relationships to other milestones that address the provision of patient care that is safe, effective, and efficient (second half of the current milestone), this milestone will focus on t he skills needed for *organization and prioritization* of this care (first half of the current milestone) from the perspective of how these skills can lead to care that is safe, effective, and efficient.

Time Management
When considering the organization and prioritization of responsibilities to provide patient care, time management is an i mportant element of the foundation. C ovey's Time Management Matrix Technique (TMMT) provides a useful construct for consideration.[2] In the TMMT, all activities are placed into one of four quadrants based on their relative importance and urgency as follows:

- Quadrant I: Important and urgent
- Quadrant II: Important and not urgent
- Quadrant III: Not important and urgent
- Quadrant IV: Not important and not urgent

As Covey describes, the goal is to organize and prioritize responsibilities such that they fall within Quadrant II (important and not urgent), which focuses on planning ahead, being proactive, and optimizing productivity. In contrast, Quadrant I (important and urgent), which focuses on being reactive and responding to crises, should be avoided as much as possible. I n clinical practice, it is sometimes not possible to avoid emergent situations, as patients can acutely decompensate without warning. I n this situation, working in Quadrant I (important and urgent) is inevitable and unavoidable. However, even in clinical medicine, being proactive and astutely aware of the current situation can allow one to anticipate and avoid many crises, maximizing functioning in Quadrant II (important and not urgent) and minimizing transitions into Quadrant I (important and urgent). A n example of this is the night rounds done by the junior and senior members of the health care team leading to the discovery of and intervention on behalf of a c hild with worsening respiratory distress, thereby preventing the child's eventual respiratory failure.

The activities of Quadrant III (not important and urgent) include interruptions as well as required unproductive work (e.g., attending a poorly run meeting in which nothing meaningful is accomplished). These activities are also sometimes unavoidable in clinical practice. H owever, they can also be anticipated and proactively avoided at times (remaining in Quadrant II [important and not urgent] and avoiding a transition to Quadrant III [not important and urgent]). An example of this is the physician who makes sure to address the questions and concerns of the multidisciplinary team and family on bedside rounds to prevent some pages, which serve as interruptions,[3-5] as he continues his work for the day.

While the activities of Quadrant IV (not important and not urgent) are not important in terms of organizing and prioritizing responsibilities for patient care, they can serve as important outlets for maintaining work-life balance, reducing stress, and e nhancing personal and career satisfaction (e.g., the physician who reads a good mystery novel for 20 minutes during lunch, when able, as an enjoyable escape from the workday).

Multitasking and Minimizing Interruptions

In addition to time management, important foundational elements of organizing and prioritizing patient care responsibilities include: 1) the optimization of multitasking and 2) the minimization and successful navigation of interruptions. The nature of work in the emergency department has led to several articles describing the frequent interruptions and multitasking,[6-9] which can lead to lapses in information transfer that occur in that environment.[6] Unfortunately, these activities can compromise the safe and effective care of patients, an important consideration when viewing this sub-competency in its entirety. The next two sections, therefore, describe the role of these elements in the safe and effective, as well as efficient, organization and prioritization of responsibilities.

Optimization of Multitasking

While multitasking can impair the safe and effective care of patients, it can also benefit the efficiency of that care. Among emergency medicine residents, work efficiency is enhanced not only by clinical experience but also by the ability to multitask well.[8] Therefore, the *optimization* of multitasking is an important skill in achieving competence in this milestone. The work of Chisholm et al[9] underscores the importance of this in pediatrics. T he authors showed that while emergency medicine physicians have more interruptions and spend more time simultaneously managing more than one p atient, office-based primary care physicians spend more time performing simultaneous tasks. S imilarly, O'Leary and colleagues[5] found that hospital-based internal medicine physicians spent 21% of their time multitasking.

Minimization of and Response to Interruptions

Multitasking and interruptions are closely related in many ways. Increasing interruptions often leads to the increased need for multitasking. Therefore, minimizing interruptions can benefit the optimization of multitasking. The *minimization* of interruptions was previously discussed briefly as it relates to time management. The *response to* interruptions will be addressed here.

The literature reports a v ariable response to interruptions. Brixey and colleagues[10] noted that emergency medicine attendings most often responded to an interruption with a brief break in task followed by a return to the same preinterrupted task. However, they note that O'Conaill and Frohlich[11] found that 41% of interruptions in the office workplace lead to a p ermanent break in task in which there is no r eturn to the preinterrupted task. While there are urgent and emergent interruptions in clinical medicine that necessitate a prolonged or permanent break in task (e.g., a physician is examining a child in the emergency department with viral conjunctivitis when another child begins seizing and becomes apneic), most responses to interruptions in the clinical setting are likely related to the developmental level of the individual being interrupted. When early in clinical experience, interruptions are more likely to lead to a prolonged or permanent break in the present task to respond to the interrupting task. This can be t rue even when the interrupting task is less important. F or these learners, permanent breaks in task are likely secondary to forgetting about the preinterrupted task altogether. As Brixey and colleagues[10] demonstrate, individuals with more advanced clinical experience are more likely to respond to an interruption with a brief break in task, with return to the preinterrupted task after the interruption. They are also more likely to prioritize interruptions and address them in order of importance.

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❖ **Struggles to organize** patient care responsibilities, leading to focusing care on **individual patients** rather than multiple patients; **responsibilities are prioritized** as a **reaction to unanticipated needs** that arise (those responsibilities presenting the most significant crisis at the time are given the highest priority); even **small interruptions in task often lead to a prolonged or permanent break in that task** to attend to the interruption, making return to initial task difficult or unlikely.
❖ Organizes the simultaneous care of a **few patients** with efficiency; **occasionally prioritizes** patient care responsibilities **to anticipate future needs**; **each additional patient or interruption in work** leads to **notable decreases in efficiency and ability to effectively prioritize**; permanent breaks in task with interruptions are less common, but **prolonged breaks in task are still common.**
❖ Organizes the simultaneous care of **many patients** with efficiency; **routinely prioritizes** patient care responsibilities **to proactively anticipate future needs**; additional care responsibilities lead to decreases in efficiency and ability to effectively prioritize **only when patient volume is quite large or there is a perception of competing priorities**; **interruptions in task are prioritized** and only lead to prolonged breaks in task when workload or cognitive load is high.
❖ **Organizes** patient care responsibilities **to optimize efficiency**; provides care to **a large volume of patients** with marked efficiency; patient care **responsibilities are prioritized to proactively prevent those urgent and emergent issues** in patient care that can be anticipated; interruptions in task lead to only **brief breaks in task in most situations.**
❖ Serves as a **role model of efficiency**; patient care responsibilities are **prioritized to proactively prevent interruption by routine aspects** of patient care that can be anticipated; unavoidable interruptions are prioritized to **maximize safe and effective multitasking** of responsibilities in essentially all situations.

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3. *Provide transfer of care that ensures seamless transitions*

Primary Author: Robert Englander, MD, MPH

Background

With the advent of work duty hours and the Institute of Medicine reports on patient safety of the past decade, the skill of transferring care between providers and teams has become paramount. The literature on teaching and assessing "handoff" communication has proliferated in the realms of nursing,[1,2] patient safety,[3] medical education,[4,5] and medical specialties.[6,7] Handoffs occur in a variety of settings and contexts. For example, handoffs may occur within units, between units, between specialists and generalists, between subspecialists in different specialties, or between inpatient and outpatient settings. In addition, they may occur in person, by telephone, or by written document.

Emerging from the literature is a developmental progression in this skill, both at the individual and system levels. Novice systems and individuals have in common a lack of standardization in the process. There is variability in the content, efficiency, accuracy, and synthesis of information both within and between individuals handing off on different patients. In addition, Arora and Johnson[3] observed significant variability in the process between teams, departments, units, and different hospitals or clinical settings within a system. The foundation of developmental progression in this skill is the development and use of standardized templates for information exchange. Many templates have been provided in the literature.[2] To some extent, this stage of development requires support from the system in which the practitioner practices. The advanced beginner may use the template but has minimal ability to abstract pertinent information or add pertinent information beyond the script. As one becomes proficient, one can reliably and reproducibly transfer the pertinent information using and adapting the template. Assessment of this level of skill has been demonstrated through Observed Structured Clinical Examinations (OSCEs). The progression to competence includes becoming more succinct, avoiding errors of commission and omission, and improving one's ability to anticipate events and responses for the practitioner accepting responsibility. In addition, the competent practitioner in this skill facilitates the opportunity for the receiving caregiver to read back, repeat back, or question any critical information.[2] The competent receiving caregiver of handoff information also takes ownership for insuring understanding of the information and using deliberative inquiry to fill in any perceived gaps.

As one advances beyond the competent stage, one becomes increasingly agile in communicating the right information in a succinct manner in increasingly complex, demanding, and specialty-specific situations.[5] The expert and master stages in handoff communication also involve superimposing a critical element of professionalism on this skill, that is, the transfer of professional responsibility.[3] Even when separated in time or space, the master in handoff communication makes clear to patients, families, and members of the health care team when the professional responsibility for the patient has changed. On the part of the transferor, that professional responsibility includes transfer of all pertinent information for both active and anticipated issues during the ensuing time period. For the transferee, it includes the responsibility to obtain clarity and to assume responsibility once clarity around the patient's issues has been provided, whether that responsibility is to last an hour, a shift, a week, or longer. For the individual assessing handoff communication, the master would never think nor utter the words, "I am just cross-covering."

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❖ Demonstrates **variability in transfer of information (content, accuracy, efficiency, and synthesis)** from one patient to the next. Frequent errors of both omission and commission in the handoff.
❖ **Uses a standard template** for the information provided during the handoff. Unable to deviate from that template to adapt to more complex situations. **May have errors of omission or commission**, particularly when clinical information is not synthesized. Neither anticipates nor attends to the needs of the receiver of information.
❖ **Adapts and applies a standardized template, relevant to individual contexts, reliably and reproducibly**, with minimal errors of omission or commission. Allows ample opportunity for clarification and questions. **Beginning to anticipate potential issues for the transferee**.
❖ **Adapts and applies a standard template to increasingly complex situations** in a broad variety of settings and disciplines. Ensures open communication, whether in the receiver- or provider-of-information role through **deliberative inquiry,** including but not limited to read-backs, repeat-backs (provider), and clarifying questions (receivers).
❖ **Adapts and applies the template without error and regardless of setting or complexity.** Internalizes the **professional responsibility** aspect of handoff communication, as evidenced by formal and explicit sharing of the conditions of transfer (e.g., time and place) and communication of those conditions to patients, families, and other members of the health care team.

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4. *Interview patients/families about the particulars of the medical condition for which they seek care, with specific attention to behavioral, psychosocial, environmental, and family-unit correlates of disease*

Primary Author: Daniel Schumacher, MD

Background

Models that shine light on the behavioral, psychosocial, environmental, and family-unit correlates of health and disease critical in the medical "interview" focus on the therapeutic relationship formed between the physician and the patient and family rather than on an act of information gathering driven by the physician.[1,2] With this in mind, we will use the term medical encounter rather than interview.

Ideally, the medical encounter serves three functions: gathering biological and psychosocial information, responding to the emotions of patients and families, and educating patients and families to ensure optimal outcomes.[1] The encounter can be divided into four functional components: building a relationship, data gathering, patient education and counseling, and activating and partnering.[2-4] Building on this construct as well as on the work of Friere[5], Roter has conceptualized the developmental continuum of physicians' skills in facilitating the involvement of patients in their care as beginning with patient participation and moving to patient activation and then empowerment facilitation.[6] We also propose a developmental stage before this, in keeping with the work of Roter, which we have labeled "doctor participation" because this stage includes behaviors that do not engage the patient and/or family to participate. The components of these participatory communications skills are shown in **Table 1.**

Table 1. Developmental Continuum of Facilitating Patient and Family Involvement (adapted from Roter[6])

	Data Gathering Skills	Relationship Skills	Partnering Skills	Patient Education and Counseling
Doctor Participation	Closed Questions.	Negative talk (e.g. disagreements, disapproval, criticism).	None.	Unilateral, prescriptive, and/or otherwise doctor-centered education without consideration of the patient and/or family's needs.
Patient and/or Family Participation	Open questions, eliciting topics/chief concerns for the medical encounter at the beginning of the encounter and jointly prioritizing the topics.[1]	Not interrupting, emotional responsiveness (includes behaviors such as empathy, reassurance, expressing concern), legitimizing feelings and thoughts, engaging in social conversation[4,7], clarifying and summarizing.[7]	Showing interest through verbal and non-verbal behaviors, paraphrasing the patient and/or family member, avoiding verbal dominance in the conversation.	Sharing information desired by the patient and/or family
Patient and/or Family Activation	As above under patient and/or family participation.	As above under patient and/or family participation.	As above under patient and/or family participation. Additionally, asking for patient and family expectations, opinions, and suggestions and engaging in joint problem solving with the patient and family (sharing control[1]).	As above under patient and/or family participation.
Empowerment Facilitation	As above under patient and/or family participation as well as patient and/or family activation.	As above under patient and/or family participation as well as patient and/or family activation.	As above under patient and/or family activation. Additionally, brainstorming options jointly and negotiation.	Verification of information and counseling about treatment, lifestyle, and psychosocial issues; motivational interviewing.[1]

ADVANCING DEVELOPMENT (vertical label with downward arrow at left of table)

As this construct illustrates, the recognition and sensitivity toward the verbal and non-verbal cues and statements from the patient and/or family are important in guiding the encounter as well as in forming a therapeutic relationship with the patient and family that will lead to empowering them with their own health care. For example, not interrupting, showing empathy, and expressing concern with a teen presenting for a health supervision visit can prompt further information gathering that leads to the diagnosis of pregnancy, with subsequent formation of a vital therapeutic partnership and counseling that facilitates empowering her to share in decision-making about care options.[8]

In the developmental trajectory of physicians' skills in facilitating the participation of patients in their care described above, it should also be noted that early in their development, physicians will tend to focus on gathering biomedical information, whereas later in development they will include elicitation and then joint decision-making and counseling around psychosocial issues as well. Additionally, as physicians continue to develop their communication skills with a deliberate focus on the behavioral, psychosocial, environmental, and family unit correlates of disease, more advanced skills are incorporated as well. These include using understanding of personality type and communication style of self and others to tailor and optimize communication as well as perceiving and responding appropriately to defense mechanisms (such as silence, denial, attacking back, blaming others, and changing the subject) in critical conversations.[1]

Previous studies[9-10] have shown declination in interpersonal communication skills with advancing medical education. This may not be surprising given that the emphasis on teaching medical interviewing skills is limited to early in the undergraduate medical education curriculum. Given that competence is a habit[11] and that skill maintenance depends on "deliberate practice"[12], the continued focus on these foundational skills throughout the graduate medical education years is important.

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Developmental Milestones

❖ Medical encounter focuses on **doctor-centered** information-gathering and **biomedical aspects** of the medical condition; patients' and families' **emotional cues and expressions go unnoticed or are ignored.**
❖ **Begins to form a therapeutic relationship** through patient and family participation in eliciting both biomedical and psychosocial information**. Responds to patients' and families' emotional cues and expressions** in a manner that shows respect and acknowledges their role in the encounter, but struggles to respond in a therapeutic manner that allows for shared decision-making and counseling.
❖ **Responds to emotional cues** and expressions and **shares control** of the medical encounter to create a therapeutic relationship with patients and families that aims to **activate and empower them.** Allows the medical encounter to go beyond information gathering to focus on **joint problem-solving, shared decision-making, and counseling,** being sensitive to the developmental level of the child and his/her role in this process.
❖ **Tailors the encounter to optimize communication** based on the personality type and communication style of self and others; **advanced and dynamic perception of and response to emotions** fosters a therapeutic relationship, even in difficult encounters (e.g., the delivery of bad news or counseling a defensive patient).

5. *Perform complete and accurate physical examinations*

Primary Author: Daniel Schumacher, MD

<u>**Background**</u>

The foundation of learning to perform complete and accurate physical examinations is found in the deliberate practice of performing examinations on many patients. Only through ongoing practice can one become adept in both performing examination maneuvers correctly as well as eliciting and recognizing normal and abnormal findings.[1] When considering the pediatric physical examination, flexibility to reorder the approach and agility in performing the maneuvers to maximize their efficacy and efficiency are also foundational to engaging children at their developmental level and accommodating their current behavioral states.

Trends over the past few decades toward reliance upon imaging modalities over physical examination skills[2] and also away from teaching and possessing superior and discriminating physical examination skills during training[3-6] have led Bordage to ask: "Where have the history and the physical examination gone?"[7] In an editorial bearing a similar name, Bordage[7] cites the work of Peterson and colleagues,[8] who showed that while history is the major determinant leading to a final diagnosis among the physicians they studied, physical examinations were important in excluding and confirming diagnostic hypotheses. In short, performing complete and accurate physical examinations is an important next step after performing a complete and accurate history.

Demonstrating the importance of history to examination, Norman and colleagues have shown that approaching the physical examination with diagnostic hypotheses and their associated findings in mind leads to a greater likelihood of noticing these findings when they are present.[9-11] Conversely, approaching the physical examination without specific findings in mind makes someone more likely to miss those findings even when they are present. Furthermore, incorrect diagnostic hypotheses prior to the physical examination can lead to misinterpretation of physical findings (i.e. confirmation bias) and attribution of importance and meaning to irrelevant findings.[9-10] Thus, it is not approaching the physical examination merely with a list of diagnostic hypotheses in mind but rather with a *more accurate and select* list of diagnostic hypotheses in mind that is most important in performing physical examinations that are complete and accurate and that lead to success in diagnostic reasoning. With this in mind, the material discussed in the milestones of 1) gathering essential and accurate information about the patient and 2) making informed diagnostic and therapeutic decisions, both under the Patient Care domain, provide a necessary foundation to this sub-competency of performing physical examinations.

The findings of LeBlanc, Brooks and Norman and colleagues[9-11] have led others to advocate for a hypothesis-driven physical examination (HDPE), in which learners make diagnostic hypotheses prior to examining a patient, over the standard head-to-toe examination, in which learners perform a complete examination with minimal or no regard given to the presenting complaint or history (a method of learning physical examination skills that is common in medical school training).[12-13] Through employing the HDPE, the relevance and efficiency of a learner's physical examination maneuvers are enhanced as they mindfully attend to specific maneuvers that confirm as well as discriminate between the diagnostic hypotheses being entertained.

While it is important to use diagnostic hypotheses to drive the physical examination, it is also important to perform a more complete physical examination survey when examining patients. Making a habit of routinely performing a survey examination helps to develop a range of normal findings, gain fluency in executing the maneuvers, and avoid premature closure around a diagnosis by surveying for findings that may otherwise be missed but would contribute meaningful information to clinical reasoning, diagnosis, and/or treatment. Consider as an example the 12 year-old child without a history of asthma who presents with bilateral knee pain and whose physician suspects Osgood-Schlatter disease but also discovers wheezing on lung examination, which he performs as part of his survey physical examination. Without a careful and deliberate lung examination, this finding would have gone unnoticed. Here again, however, the mindfulness with which this survey examination is performed is paramount. As the work of LeBlanc et al[9-11] suggests, if this physician were going through the rote steps of a survey examination without anticipating potential findings during each part of the examination and being mindful of what he is seeing and hearing, he could still miss the lung finding.

The increasing rarity of being taught and possessing superior examination skills during training[3-6] underscores the importance of "making the direct observation of students and residents, while they take histories and conduct physical examinations, a major responsibility and activity of the faculty. Faculty members could thus give the students and residents constructive feedback on the appropriateness and accuracy of their history-taking and physical-examination techniques and of their interpretation of the findings."[7]

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Developmental Milestones

Milestones for the Psychomotor Performance of the Physical Examination

❖ Performs and elicits most physical examination maneuvers **incorrectly**
❖ **Performs basic physical examination maneuvers** correctly (e.g., auscultation of the lung fields) but does not regularly elicit, recognize, or interpret abnormal findings (ex: recognition of wheezing and crackles).
❖ **Performs basic physical examination maneuvers** correctly and **recognizes** and correctly interprets **abnormal findings.**
❖ Performs, elicits, recognizes, and interprets the findings of **most physical examination maneuvers** correctly.
❖ Performs, elicits, recognizes, and interprets the findings of even **special testing physical examination maneuvers** correctly most of the time (e.g., stork test for spondylolysis).

Milestones for the Approach to the Pediatric Physical Examination

❖ **Does not alter the head-to-toe approach** to the physical examination to meet a child's developmental level or behavioral needs.

❖	**Sometimes uses a developmentally appropriate approach** to the physical examination, achieving variable success.
❖	**Consistently and successfully uses a developmentally appropriate approach** when examining children.
❖	Is fluid and agile in performing the physical examination in a way that **maximizes cooperation of the child** and thus accuracy of findings; experience facilitates the engagement of the child **as well as the caregiver** in the physical examination.

Milestones for the Approach to the Focused Physical Examination

❖	Performs essentially the **same rote head-to-toe physical examination of the patient regardless of presenting complaint**; does not use diagnostic hypotheses from the history to anticipate or look for specific positive or negative findings on physical examination.
❖	With a broad list of diagnostic hypotheses after the history, uses a head-to-toe approach to the physical examination to **anticipate and look for a myriad of potential positive and negative physical examination findings for multiple diagnostic considerations**. This approach can lead to failure to identify pertinent and important physical findings that are present, misinterpretation of physical findings, and attribution of importance and meaning to irrelevant findings.
❖	Uses a narrow list of diagnostic hypotheses generated through the history to **anticipate and look for specific positive or negative physical examination findings of only the most relevant diagnostic considerations**; open to new diagnostic possibilities in the process of performing a survey physical examination to elicit unexpected abnormalities but may dismiss these as unimportant when it is difficult to integrate these findings into the working differential diagnosis.
❖	Uses a narrow list of diagnostic hypotheses generated through the history as well as through extensive clinical experience to anticipate and look for **key specific physical examination findings that will discriminate between competing similar diagnoses**; uses surprises that result from a survey physical examination to rethink and retest diagnostic hypotheses; actively looks for physical exam findings that disconfirm the working diagnosis or rule in or out rare but high-risk alternative diagnoses.

6. *Make informed diagnostic and therapeutic decisions that result in optimal clinical judgment*

Primary Author: Daniel Schumacher, MD

Background

When considering the developmental progression of making informed diagnostic and therapeutic decisions that result in optimal clinical judgment, the role of previous clinical experience cannot be emphasized enough.[1-9] With increasing clinical experience, learners do not simply gain new knowledge in an additive manner. Rather, they reorganize existing knowledge in an elaborated way that allows them to become more efficient and effective in diagnosing and treating new patients who possess features similar to those of previous patients.[1-4] This highly learner-specific knowledge is best gained through individual clinical experience, which is a necessary but not sufficient prerequisite for developmental advancement in making informed diagnostic and therapeutic decisions that result in optimal clinical judgment. As Kolb[10] suggests in his Experiential Learning Theory, this knowledge is strengthened through reflective observation, active experimentation (e.g., in a simulation environment), and abstract conceptualization. In fact, the mental energy that is saved as one becomes more efficient and effective in diagnosing and treating new patients must be reinvested in reflection and new learning if one is ultimately to become an expert clinician and not just an experienced nonexpert.[11]

Early Clinical Reasoning: Analytic Reasoning through Basic Pathophysiology
Development of expert diagnostic and therapeutic reasoning follows a predictable progression.[1] In the preclinical and early clinical stages, learners rely on knowledge of the pathophysiologic causes and consequences of disease and analytic reasoning to formulate diagnostic considerations. As a result,

knowledge is organized as a causal network. At this stage, the learner presented with a child who has hemolytic uremic syndrome may reason, "Not urinating in the past day seems like it could be a problem with the kidneys' ability to make urine. The low hemoglobin seems likely to be from hemolysis, which is one of the ways that red blood cells can be lost in the body. In this way, the red blood cells are broken open, often because they have fragile structuring on the inside or are having trouble passing through certain vessels of the body and are being broken from the outside. With the low platelets as well, I wonder if this child has an illness that affects all cell lines—perhaps an infection with fever and bloody diarrhea as well." With clinical experience, these "networks of detailed, causal, pathophysiologic knowledge become *encapsulated* into diagnostic labels…that explain signs and symptoms."[5] At this stage, the learner may reason, "This child has infectious diarrhea that has lead to a secondary process affecting the kidneys (anuric renal failure), the red blood cells (hemolytic anemia), and the platelets (thrombocytopenia)."

In early clinical reasoning, it is important to note that learners are also likely to be less developed in other sub-competencies of patient care, such as gathering essential and accurate information about the patient in the history and performing complete and accurate physical examinations. Therefore, learners may not successfully elicit salient features of the clinical presentation and/or may give undue weight to features that are not as important, leading to suboptimal clinical reasoning that can include diagnostic and therapeutic considerations that are unnecessary and/or exclude considerations that are important.

Intermediate Clinical Reasoning: The Emergence of Illness Scripts
With even further clinical experience, learners organize knowledge as illness scripts or narrative scripts in which the characteristic features of specific illnesses form clinical patterns in memory.[5,6] At this stage, the learner arrives at the diagnosis of hemolytic uremic syndrome through matching the patient's clinical picture to his illness script for this disease, which may include elements of renal failure (anuria, elevated creatinine, edema), hemolytic anemia (low hemoglobin, high LDH, pallor, tachycardia), thrombocytopenia, and other features (e.g., bloody diarrhea, a history of eating a hamburger at the state fair, ill appearance, decreased energy and playfulness, irritability, and a myriad of other clinician-specific components). These illness scripts can be used to compare and contrast diagnostic possibilities by comparing clinical patterns of disease presentations. Clinicians continue to refine and remodel these scripts as they encounter new patients. Over time, they become robust representations of diseases, each one riddled with nuances and discriminating features of illnesses that even become context dependent.[5] Episodic memories of individual patients seen in the past add specific situational information to these scripts, transforming illness scripts into "instance scripts" unique to individual patients (e.g., the 1-year-old with diabetes insipidus who dunked his head under the bath water and gulped water as quickly as possible).[6]

Advanced Clinical Reasoning: Avoiding Premature Closure
With advanced clinical experience, the knowledge structures formed previously in the development of clinical reasoning "do not decay; neither do they become inert, nor inaccessible. They *sediment* into multiple 'layers' which are accessed"[1] in future clinical presentations where illness scripts or instance scripts stored in memory cannot be readily matched to a new patient who presents a diagnostic and/or therapeutic dilemma.[6] With this in mind, it is important to note that advanced clinicians are not just using pattern recognition from previous cases they have seen. They are also engaging in analytic reasoning and using their understanding of the underlying causal mechanisms of diseases and their pathophysiologic consequences to compare and contrast the discriminating features of the diagnoses they are entertaining.[1,2,4] This mental activity avoids premature closure or settling on an incorrect diagnosis based on cases in the past that looked similar on the surface but were different upon deeper probing—a problem that would persist if the clinician were using pure pattern recognition.[2]

Problem Representation and Semantic Qualifiers
In this developmental progression, the sophistication with which medical knowledge in memory is organized and made available for use in diagnostic and therapeutic reasoning is ever-improving, a key determinant to the increasing success of clinical judgment.[9,12-16] Storage of knowledge and the retrieval of that knowledge, rather than the amount of knowledge, is related to diagnostic reasoning performance.[17] For example, possessing a high level of knowledge that is poorly organized is associated with inadequate accessibility of diagnostic considerations and suboptimal diagnostic reasoning. It is here, again, that the role of experience is important. With increased clinical experience, learners begin to reorganize clinical information that is

gathered from the patient into abstract terms in their minds that they can then use to categorize and understand clinical presentations, "facilitat[ing] the retrieval of pertinent information from memory"[4] and making it available for diagnostic reasoning. This process is known as "problem representation."[4,7] As part of this process, learners begin to use semantic qualifiers in their abstraction and description of cases.[4,8]

Semantic qualifiers are qualitative modifiers that give deeper meaning to clinical information in the learner's mind and s ubsequently help learners discriminate clinical features and diagnostic hypotheses with more precision and accuracy. They are most often described as paired opposites that are used to describe clinical information (e.g., acute and chronic; focal and diffuse; proximal and distal). However, they also include pathognomonic findings (e.g., opsoclonus-myoclonus in neuroblastoma), criterion that are essential to make a diagnosis (e.g., the triad of hemolytic anemia, thrombocytopenia, and acute renal injury in the diagnosis of hemolytic uremic syndrome or the presence of 4 of 5 clinical features in addition to high fever to confirm the diagnosis of typical Kawasaki disease), and absolute criteria for exclusion of a diagnosis (e.g., focal seizure excluding the diagnosis of *simple* febrile seizure). A s use of semantic qualifiers allows enhanced discrimination between diagnoses, increasing use of semantic qualifiers is associated with increasing success in diagnostic reasoning.[8] As learners begin to use problem representation and semantic qualifiers, the 2-year-old with "a temperature to 103°F and really bad ear pain on the left and right that began last night" becomes the "*febrile* (opposite of afebrile) toddler with *acute* (opposite of chronic) onset of *severe* (opposite of minor) *bilateral* (opposite of unilateral) ear pain." Through this abstraction and reorganization, this clinical knowledge is reframed in the learner's mind in a manner that facilitates the ready access to connect to and build upon previous knowledge for use in diagnostic and therapeutic reasoning.

<u>Evolution of Creating a Working Differential and Subsequent Decision-Making</u>
In the developmental progression of diagnostic and therapeutic reasoning, it is also helpful to consider the evolution of creating a working differential diagnosis and subsequent therapeutic decision-making.[2] Novice learners, who do not possess knowledge specific to pediatrics, struggle to create diagnostic hypotheses for pediatric diseases. As a result, their early diagnostic hypotheses tend not to change as more clinical information is gathered (because this new information is not helpful in diagnostic and therapeutic reasoning). Intermediate learners tend to change their diagnostic hypotheses frequently as more information becomes available, often changing their diagnostic schema after the history, after the physical examination, after initial testing, and after initial therapy and management. T heir resultant therapies tend to treat the features of a diagnosis rather than a unified diagnosis. Interestingly, the changing of diagnostic hypotheses for novice and perhaps for intermediate learners may depend on the type of additional clinical information provided. The work of Coderre and colleagues[18] demonstrates that first-year medical students are much less likely to retain their initial diagnostic hypothesis when additional information is discordant with initial information; whereas, they are much more likely to retain their initial diagnostic hypothesis when subsequent information is concordant. Advanced learners tend to develop quite advanced and narrowed diagnostic hypotheses early in a case and use subsequent history, physical examination, and tests to confirm this initial schema. As a result, their therapies tend to be focused and specific, based on a unifying diagnosis for the patient.

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Developmental Milestones

❖ Recalls and presents clinical facts in the history and physical in the order they were elicited **without filtering, reorganization, or synthesis**. **Analytic reasoning** through basic pathophysiology results in a **list of all diagnoses considered** rather than the development of working diagnostic considerations, making it **difficult to develop a therapeutic plan**.
❖ Focuses on features of the clinical presentation, making a unifying diagnosis elusive and leading to a **continual search for new diagnostic possibilities**. Largely using **analytic reasoning** through basic pathophysiology in diagnostic and therapeutic reasoning; often reorganizes clinical facts in the history and physical examination to help decide on clarifying tests to order rather than to develop and prioritize a differential diagnosis. This often results in **a myriad of tests and therapies** and **unclear management plans**, since there is no unifying diagnosis.
❖ Abstracts and reorganizes elicited clinical findings in memory, **using semantic qualifiers** (such as paired opposites that are used to describe clinical information [e.g., acute and chronic]) to compare and contrast the diagnoses being considered when presenting or discussing a case. The **emergence of pattern recognition** in diagnostic and therapeutic reasoning often results in a **well-synthesized and organized assessment of the focused differential diagnosis and management plan**.
❖ Reorganized and stored clinical information (illness and instance scripts) leads to **early directed diagnostic hypothesis testing** with subsequent history, physical examination, and tests used to confirm this initial schema. **Well-established pattern recognition** leads to the ability to **identify discriminating features** between similar patients and to avoid premature closure. **Therapies are focused and based on a unifying diagnosis**, resulting in an effective and efficient diagnostic work-up and management plan tailored to address the individual patient.

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7. *Develop and carry out management plans*

Primary Author: Robert Englander, MD, MPH

Background

This sub-competency is intimately enmeshed with other competencies and sub-competencies described in this document. It is perhaps most intimately linked to the sub-competency "Make informed diagnostic and

therapeutic decisions that result in optimal clinical judgment." Much of the literature refers to "making informed diagnostic and therapeutic decisions" and "developing management plans" with one voice,[1-3] often under the rubric of clinical judgment. The literature on illness scripts is particularly pertinent and has been covered in the "Make informed diagnostic and therapeutic decisions…" sub-competency.

Nilsson and Pilhammar[4] provide an additional framework for understanding the developmental progression in clinical judgment through a qualitative analysis of junior and senior physicians using a critical incident technique. They found that junior and senior physicians demonstrated differences in clinical judgment in a number of different areas, including those outlined below:

- **Use of theoretical knowledge versus use of previous experience and knowledge of the course of events**: Junior physicians tend to base their clinical judgments and management plans predominantly on their theoretical knowledge. As one matures, one has increasing superimposition of experience to place the theoretical knowledge in context towards an understanding of issues such as risk and prognosis. The most seasoned clinician can build upon theoretical knowledge with experience in ever more complicated and difficult situations.
- **Ethical approach to management decisions**: Junior physicians tend to exercise clinical judgment founded on their own personal assumptions of how one should behave in general and in consideration of health care resources. The senior practitioner is increasingly able to understand individual patients in the context of their lives to make decisions that maximize well-being, minimize harm, and avoid over-treating.
- **Meeting and communicating with patients**: Junior physicians tend towards one-way communication of information to patients. Senior physicians become increasingly engaged in two-way discussions around management. The most experienced clinicians are also aware of how their own biases, needs, and behavior play into the communication with patients around clinical judgment.
- **Focusing on available information**: The most inexperienced clinician will be unable to sift through the information available to come to the key elements. As a result, clinical judgment is often based on a relatively arbitrary and poorly prioritized sampling of the information and is limited by the time available. With increasing experience, one is able to focus on key elements of information early and then augment from the remaining sources of information as necessary. An example might be a patient with multiple medical problems who comes for a health supervision visit to the outpatient setting. The inexperienced clinician will be unable to navigate the long medical record in a meaningful way in the time allotted, resulting in less than optimal use of the time to plan patient management. The experienced clinician, conversely, will zero in on the key information from the medical record in the time allotted, prior to entering the examination room, allowing optimal use of the time to plan care.
- **Being directed by the organization**: Junior physicians cite that they often develop management plans due to perceived or real health care organization directives (e.g., "The Joint Commission makes me do this.") without an understanding of the rationale or importance to the patient. Of note, senior clinicians do not cite this as an issue for them in clinical judgment, even though they follow the organizational guidelines. For them, directives become a matter of habit and form the basis, rather than the entirety, for the discussion around management.

These differences inform the milestones outlined below and aid in creating a picture of the continuum of competency in developing and carrying out management plans.

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Developmental Milestones

❖ Develops and carries out management plans **based on directives from others**, either from the health care organization or the supervising physician. **Unable to adjust plans** based on individual patient differences or preferences. **Communication about the plan is unidirectional** from the practitioner to the patient and family.
❖ Develops and carries out management plans based on one's **theoretical knowledge and/or directives** from others. Can **adapt plans to the individual patient,** but only within the framework of one's own theoretical knowledge. Unable to focus on key information, so conclusions are often from **arbitrary, poorly prioritized, and time-limited information gathering**. Management plans based on the **framework of one's own assumptions and values.**
❖ Develops and carries out management plans **based on both theoretical knowledge and some experience**, especially in managing common problems. Follows health care institution directives as a matter of habit and good practice rather than as an externally imposed sanction. Able to more effectively and efficiently **focus on key information**, but still may be limited by time and convenience. **Plans begin to incorporate patients' assumptions and values through more bidirectional communication.**
❖ Develops and carries out management plans **based most often on experience**. Effectively and **efficiently focuses on key information** to arrive at a plan. **Incorporates patients' assumptions** and values through **bidirectional communication** with **little interference from personal biases.**
❖ Develops and carries out management plans, even for complicated or rare situations, based primarily on **experience that puts theoretical knowledge into context**. Rapidly **focuses on key information** to arrive at the plan and augments that with available information or seeks new information as needed. Has **insight into one's own assumptions and values** that allow one to filter them out and focus on the patient/family values in a bidirectional conversation about the management plan.

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8. *Prescribe and perform all medical procedures*

Primary Author: Patricia Hicks, MD

Background

All of the competencies are involved in prescribing and performing medical procedures. In an integrated fashion, development of elements of competence in the performance of procedures takes place along a continuum, with ongoing deliberate practice required to achieve and sustain competence.

Prescribing medical procedures is a process that includes the ability to weigh many factors to achieve the optimal outcome for an individual patient. Prescribing medical procedures requires careful consideration of the indications, contraindications, benefits, risks, anticipated undesirable outcomes, and complications, all within the specific anatomic and physiologic state of a specific patient's condition. Consideration of these many factors and their complex interplay results in determining the best short- and long-term therapeutic outcome. Awareness and appreciation of unintended, but known, consequences or risks is part of the decision-making process, as well as the post-procedure management process. The prescribing process as part of procedural competency involves other milestones, such as diagnostic reasoning, clinical decision-making, and communication; informed consent is a related but separate area of competence embedded within the achievement of performance of medical procedures. The prescribing process may be undertaken for the purpose of achieving an immediate, desirable, therapeutic outcome as the primary goal (e.g., bladder catheterization for a neurogenic bladder or suturing of a laceration), or the procedure might be prescribed as a beneficial means to an end (e.g., obtaining evidence in the form of laboratory data or providing access to

administer medications into a vein). Thus, developing competence in prescribing and performing procedures involves cognitive and communication skills as well as psychomotor skills.

The problem of assessing competence in the performance of procedures has been reported for over 2 decades. In 1989, Wigton et al[1] surveyed 2500 general internists and reported that newer graduates were performing more and more procedures. However, a survey of internal medicine training program directors conducted at the same time reported that while 53% had developed a list of procedural skills that all their residents must master, only 21% had developed specific criteria for competence in procedural skills. Fifty-six percent of the 389 program directors surveyed stated that they planned to develop criteria for competence in procedural skills. Eighty-two percent stated that a "uniform system to be used by all programs to document procedures would be helpful."[2] Today, there is still not a uniform system for demonstrating graduate competence in procedural skills.

In 1992, responders to a survey of internal medicine graduates reported that they had not mastered the procedures that their program directors thought they should master. Their program directors had approved privileges for these procedures on credentialing applications, allowing those graduates to perform those procedures without supervision. Many of the survey's responding graduates reported learning procedures without supervision, often after they entered practice.[3]

Confidence, or operator comfort with performance of procedures has not been shown to be a useful proxy in providing evidence of competence of performance of procedures.[4] The popularity of evaluating curriculum at Kirkpatrick's lowest stage,[5,6] which is learner satisfaction, has been addressed by Kirkpatrick in the following judgment: "Evaluating reaction is the same thing as measuring customer satisfaction."[6] Enjoying simulation training sessions and leaving those sessions with a great confidence, comfort, or satisfaction may not necessarily equate to competence in performing those procedures. Just as the physician's ability to self-assess his cognitive skills is often flawed, so is self-assessment of procedural competence.[7] Some examples follow:

- Carbine et al[8] videotaped individuals providing neonatal resuscitation, to compare the resuscitation methods applied against the standards set forth by the Neonatal Resuscitation Program (NRP). Their group found a "significant number of deviations from the NRP guidelines"[8] demonstrated on video recordings; 30% of NRP steps were not performed or were performed incorrectly despite having completed NRP training.
- Adams et al[9] reported that despite going through NRP training, residents were less successful at intubation on the first attempt than respiratory therapists on a transport team.
- Eighty-seven percent of pediatric residents in training in a study by Falck et al[10] reported confidence in their ability to intubate neonates. Yet, 35% of the intubation attempts were never successful by the pediatric house officers in that study. These individuals were surveyed post graduation, and 71% of the group's respondents stated that they were practicing general pediatrics and 36% were attending deliveries.

There is abundant evidence that counting procedures alone is not adequate evidence of competence. Colliver et al[11] conducted a study comparing the number of procedures performed to performance of those procedures using a gold-standard competency assessment model of simulation and animal models. His work demonstrated that the number of procedures needed to demonstrate competence far exceeded the number recommended by most residency programs.

Lastly, the particular group of procedures a pediatrician wishes to perform without direct supervision depends largely on their individual career goals. Jones and McGuinness[12] have described an educational approach that considers this differentiation. For the majority of procedures in pediatrics, the pediatrician may prescribe and manage the patient, but may not directly perform many procedures. A relatively short select list of procedures has been deemed by the American Board of Internal Medicine (ABIM) as appropriate for generalists to perform without direct supervision.[13] It is anticipated that a finite group of procedures will be recommended for a categorical pediatric resident who anticipates hospital privileges as a general pediatrician; deliberate training for this subset of procedures is anticipated. Thus, the categorical general pediatric graduate would seek to be competent in the cognitive and psychomotor components of a select group of

procedures, have awareness of these components for another group of procedures, and the ability to assist in yet another group of procedures.

With competence, performing any procedure without ongoing deliberate practice results in extinction or attenuation of skills. Li kewise, deliberate practice is required to achieve more highly reliable functioning associated with proficiency and mastery. T here are no data to address the intervals recommended for reassessment or retraining in procedural competence, but there is evidence that current intervals may be inadequate.[14] Therefore, ongoing re-assessment will need to be part of continuing professional development such as maintenance of certification, maintenance of licensure, or the granting of hospital privileges, and relate directly to the type of practice (and therefore the type of procedures encountered or performed).

Table 1. Assessments by Procedure and Along a Developmental Continuum

Early Learner . . . → . . . .→. . . .→. . . . →. . . .→. . .→ . . .→Developmentally Advanced

			Cognitive Knowledge Related to Procedures: Knowledge & Clinical Application of Knowledge							Procedural Motor Skills	Post-Procedure Management
	Competency in Performance [A] of Specified Procedure		Anatomy & Physiology	Indications & Benefits	Contra - indications & Risks	Informed Consent	Pain Management; Patient Psychological Preparation	Specimen Handling	Interpretation of Results (of labs on specimens; of post-procedure radiographic images; of therapeutic changes…)	Checklist driven task analysis	Anticipates complications and manages those complications; ongoing monitoring and assessment of patient with escalation of care as needed; communication of status with family and care team
Group #	Required Procedures	Optional [B] Procedures									
1	Lumbar Puncture		X	X	X	X	X	X	X	Operator	X
3		Umbilical Arterial Catheter Placement	X	X	X	*	X	X	X	Assistant	X
1		Suturing of Scalp	X	X	X	X	X	X	X	Operator	X
2		Suturing Laceration Across Lip Border	X	X	X	*	X	N/A	X	Assistant	N/A
3		Thoracentesis	X	X	X	*		X	X	N/A	X

[A]Includes: indications, contraindications, complications, limitations, interpretation of findings and technical (psychomotor) skills

[B]These additional procedural skills may be pursued if the residents' practice expectations indicate a use for such skills and if and only if the training environment is able to provide such training (includes availability of skilled teaching faculty[15]). It is beyond the scope of these milestones to propose pediatric program requirements and the examples here are listed simply as examples of possible procedures by category.

*Informed consent elements may be known but the actual informed consent must take place by the primary operator for the procedure

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Developmental Milestones

The component KSA of each procedure are numerous and complex. They include:

- Anatomy and Physiology
- Indications and Benefits
- Contra-indications and Risks
- Informed Consent
- Pain Management, Patient Psychological Preparation
- Specimen Handling
- Interpretation of Results or Outcomes
- Procedural Technique (multiple elements unique to procedure; common elements to all [e.g., sterile technique, situational awareness, course correction])
- Post-procedure Management

This approach to assessment makes some assumptions:

- Performance level is specific to each procedure based on the relevant components and level of responsibility of the physician.
- Given the variability of required components, measures of competence are based on all of the relevant components for that procedure.
- Performance level for a given procedure, therefore, requires reaching the desired performance level for each of the individual components.

The developmental progression is outlined in **Table 2** below:

Table 2. Developmental Spectrum of Elements of Milestone on Prescribing and Performance of Procedures

Element	Beginning of Spectrum			Verification of Training Complete
Anatomy and Physiology Indications and Benefits Contra-indications and Risks	2 SD below mean on knowledge test	1 SD below mean on knowledge test	1 SD above mean on knowledge test	2 SD above mean on knowledge test
Informed Consent[16]	Informed consent represents a process limited to obtaining a signature; knowledge of elements of informed consent lacking; dialogue with family/patient lacks ability to inform, invite inquiry, and respond to questions in a way that allows for declination. The document becomes the process, rather than achieving true informed consent.			Informed consent takes place as part of a continuous dialogue, beginning prior to the decision to perform the procedure and continuing after the procedure is completed. Elements of the informed consent are presented in comprehensive fashion, with open opportunity to question and consider options. True understanding and agreement are measured by the parent or patient's ability to explain key elements of risks, benefits and options.
Pain Management, Patient Psychological Preparation	Pain management is not considered, offered, or effectively discussed. Consideration of efficiency or ease for the operator exceeds patient and family adjustment or readiness.			Consideration for and anticipation of psychological and physical pain associated with procedure or preparation for procedure is undertaken by multi-disciplinary team, when indicated. Coordination of team is either managed by the operator or delegated to others, with direct involvement of the operator.
Specimen Handling	Little understanding of how samples should be handled, resulting in need to repeat procedure or sub-optimal results/interpretation.	1 SD below mean on knowledge test	1 SD above mean on knowledge test	Pre-procedure planning with identification of needed studies. Contact made with special laboratories to assure that the samples can be transported and analyzed properly; scheduling of procedure is done with regard to special transporting, storage, or testing issues.
Interpretation of Results or Outcomes	Understanding results is limited to reading of a report; inability to determine what results mean in the context of the patient's clinical condition; "normal" and "abnormal" are taken at face value without understanding of true meaning; analytical information about test specificity, sensitivity and confounding factors are not appreciated.			Consideration of patient age and the physiological conditions under which the results were obtained are appreciated with consideration of baseline patient status, disease process, validity of evidence/results, co-existing conditions, and other confounders.
Procedural Technique	2 SD below mean on procedure performance, as measured by a standardized checklist, standardized simulation assessment or other assessment method proven to have high-validity evidence. Hierarchical task analysis (the assessment of each step in the sequence of a psychomotor task)[17,18] is used to rate individual elements as well as measure fluidity and states such as situational awareness and course correction.	1 SD below mean	1 SD above mean	2 SD above mean
Post-procedure Management	Does not follow-up post-procedure or only follows-up on assigned tasks (e.g., checking an x-ray). Lacks knowledge and clinical understanding of anticipated and undesirable outcomes; fails to escalate (due to lack of recognition) in the face of unanticipated adverse outcomes; lack of generalized vigilance and consideration of possible association of adverse outcomes to the procedure.			Follows clearly outlined protocol for post-procedure management, adjusting the care plan as needed to respond to patient-specific outcomes. Considers unexpected patient care status changes or events post-procedure with appropriate level of uncertainty and seeks resources in an escalating manner until resolution. Communicates with patient, family, and care team about such uncertainty in a fashion that is transparent and informative.

9. *Counsel patients and families*

Primary Author: Susan Guralnick, MD

Background

Counseling of patients and families should be patient-centered, requiring the practitioner to "meet the patient's/family's need for obtaining information about the disease, providing guidance and solving problems collaboratively, all of which are aimed at helping the patient to better manage the health problem."[1] The practitioner's level of knowledge and self-confidence about a specific topic are key components of how well she will counsel patients. Essential to effective counseling is clarification of the desired outcome. The ideal approach balances the "discrepancy between the best possible care and the inevitable compromises in adapting management to the real patient's circumstances."[1] For example, in the case of an asthma patient with frequent exacerbations, the practitioner must first determine whether the patient is taking the prescribed controller medications. If the patient is not, the practitioner must identify the reason(s) for this nonadherence. There are many reasons why this may have occurred, including patient/family misunderstanding, inadequate resources, living conditions, or significant family issues that impede following the prescribed regimen. The practitioner will be unable to help the patient/family develop a plan for behavior change without an assessment of the patient/family situation and a behavioral management plan that takes the context of the patient's/family's lives into account.

The method of appreciative inquiry, in which the clinician "engages in a dialogue that draws out, builds on, and reinforces stories of what the [patient/family] feels works or has worked in his or her life, affirming [the patient/family's ability] to make decisions"[2] can be effectively applied here. Appreciative inquiry was defined in the 1980s as a "method of organizational development in which the 'best of what is' is made better."[2] Medical practitioners have begun to successfully apply this approach to patient counseling. As applied to the asthma case above, the practitioner would engage the patient/family in a discussion of past successful behaviors. Through this process they discover that in the past the patient has been most successful in completing prescribed medication courses when he consistently takes the medicine before bedtime or at mealtime, using a temporal cue as a reminder. A plan would then be developed using a temporal association to improve controller medication adherence.

Independent of the method, physicians must develop skills in each step of the counseling interaction. As defined in the literature, the critical steps of counseling include determining the magnitude of the problem, strongly encouraging behavior change, determining the patient's willingness to change, and helping the patient change the behavior.[3] In order to accomplish this there must be use of language that is clear and understandable, open discussion, movement away from authoritarian recommendations to shared decision-making, and empathy for the patient's circumstances, goals, values, and culture.

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Developmental Milestones

❖ **Does not initiate discussion** of healthy behavior change. **Responds** to patient's/family's questions **without an adequate knowledge base**. The conversation contains frequent **medical jargon** and **displays personal biases**. **Does not consider patient's specific circumstances**. **No plan for change** is discussed.

- ❖ **Recommends** healthy behavior change, but provides **little opportunity for discussion or questions.** The conversation contains frequent **medical jargon** and may display **personal biases**. Shows **little empathy/adaptation** for patient's specific circumstances. **Defines a plan for the patient.**
- ❖ **Encourages** healthy behavior change and **answers** the patient's/family's questions. **Listens** to the patient/family and begins to express caring, concern, and empathy. Maintains a respectful tone and rarely uses medical jargon. Incompletely or **inconsistently assesses patient/family understanding**. Superficially addresses the patient's options. **Recognizes that patients have varying circumstances** and **begins to involve patient/family in developing a plan.**
- ❖ **Promotes** healthy behavior change. The **patient/family is encouraged to ask questions**. Uses **active listening** and expresses caring, concern, and empathy. Maintains a respectful tone and avoids medical jargon. **Checks the accuracy of the patient's/family's understanding. Explains choices in light of patient's circumstances, goals, values, and culture. Acknowledges** the patient's/family's accomplishments, progress, and challenges and **negotiates mutually acceptable plans**.
- ❖ **Partners** with the patient/family to achieve healthy behavior change. The patient/family is encouraged to ask questions. Uses **active listening** and expresses caring, concern, and empathy. Maintains a respectful tone and avoids medical jargon. **Identifies the patient's/family's strengths through appreciative inquiry** and builds on them. **Partners with the patient/family to develop plans for change that are realistic and achievable within the context of their lives** and assesses the accuracy of the patient's/family's understanding.

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10. *Provide effective health maintenance and anticipatory guidance*

Primary Author: Susan Guralnick, MD

Background

Health maintenance and anticipatory guidance are fundamental to pediatric practice. Up to two thirds of pediatric office visits are for well child care, and a gr eat portion of each well child care visit is spent addressing behavior, development, immunizations, nutrition, and injury prevention.[1] Many of these issues are attended to during acute care visits as well. It is therefore essential that pediatricians be trained to provide appropriate health maintenance and anticipatory guidance. "Anticipatory guidance consists of the information that clinicians give families about what they should expect in their child's development, what they should do to promote this development, and the benefits of these healthy lifestyles and practices. It is distinct from counseling, which is advice given in response to specific problems."[2] Anticipatory guidance can be of fered in many forms, including personal discussion, written information, video, and via the internet.[2] There are several tools available that provide a systematic approach to this process. While it is clear that this is an important skill, evidence shows that physician performance in this realm is highly dependent on physician attitude, knowledge, and comfort.[3,4] Another key factor is "confidence in their ability to motivate behavior change".[4] The pediatrician must be prepared and willing to offer age-specific anticipatory guidance ranging from choking prevention in a toddler to drug and alcohol use prevention in an adolescent. The practitioner must be ready and available to work with the family to enable lifestyle and practice change with consideration of the family-specific situation. Beyond the basics of knowledge, skills, and attitudes, the practitioner has a lifelong responsibility to remain up to date with current guidelines and resources available for health maintenance. The medical education experience in the United States is often not ideally designed to prepare physicians as preventive medicine practitioners, emphasizing the diagnosis and treatment of disease over preventive care. Thus, many practitioners are not well equipped at the time of graduation from residency to provide the preventive care that is required in practice.[3] Knowledge of the precepts of health maintenance, the use of appropriate screening procedures, moving from external to internal prompts for offering anticipatory guidance, and the ability to elicit and address unhealthy behaviors are the core elements necessary for competence in this domain. Opportunities to develop these skills must be pr ovided and nurtured during training in order to develop the habit of emphasizing preventive care in practice.

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Developmental Milestones

❖ **Not familiar with health maintenance concepts**. **Does not perform age-appropriate screening procedures unless instructed** to do so. Answers patient's and families' questions, **but does not offer anticipatory guidance**.
❖ **Familiar with the concept of health maintenance**, **but has little knowledge** in that area. **Uses resources made available to her** for health promotion and disease prevention, but **does not seek new information or resources**. **Often performs age-appropriate screening** procedures. **Inconsistently offers anticipatory guidance without prompting. Begins to identify unhealthy behaviors during patient interactions and will intermittently address these** with the patient/family.
❖ Has **some knowledge of health maintenance concepts**. Uses available resources and **begins to seek new and current resources, guidelines, and recommendations** for health promotion and disease prevention. **Usually performs age-appropriate screening** procedures. **Typically offers anticipatory guidance without prompting. Frequently identifies unhealthy behaviors during patient interactions and addresses those** with the patient/family.
❖ **Knowledgeable** about health maintenance concepts. **Routinely identifies and accesses current best evidence-based resources and recommendations** for health promotion and disease prevention. **Habitually performs age-appropriate screening and provides anticipatory guidance**. **Characteristically communicates information** about expected behavior, development, and safety needs as well as promoting a healthy lifestyle. Readily **works with individual patients and populations of patients to promote healthy behaviors, change unhealthy behaviors, and enhance adherence to improved behaviors**.
❖ **Assesses** health maintenance or anticipatory guidance **needs at a local, regional, national, and global level and works to address those needs**. **Intuitively adapts** health maintenance and anticipatory guidance interactions to the current and expected needs of patients and families in the **context of their cultural and personal circumstances**.

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11. ***Use information technology to optimize patient care (combined with Practice-based Learning and Improvement (C.7. below)***

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12. *Provide appropriate role modeling*

Primary Author: Susan Guralnick, MD

Background

Role models play an essential role in character and professional development. The *Merriam Webster Dictionary* defines a role model as "a person whose behavior in a particular role is imitated by others."[1] The term "role model" was coined by Dr. Robert K. Merton, the pioneering sociologist, in his publication of

a 5-year study of the socialization of medical students. Dr. Merton theorized that individuals identify reference groups to which they may or may not belong for purposes of self-comparison. In addition, individuals identify social groups, each having a set of social roles that is associated with a specific set of behaviors, to help learn appropriate social roles.[2] Merton's work defines socialization as the learning of those social roles. "Socialization takes place primarily through social interaction with people who are significant for the individual. In its application to the medical student, socialization refers to the processes through which he develops his professional self, with its characteristic values, attitudes, knowledge, and skills, fusing these into a more or less consistent set of dispositions which govern his behavior in a wide variety of professional (and extra-professional) situations."[3] Professional socialization refers to the aspect of socialization that must occur for an individual to be accepted into an occupational group that is he must "accept the common core of relatively homogeneous values, norms, and role definitions of that group."[4]

"Role models—people we can identify with, who have qualities we would like to have, and are in positions we would like to reach—have been shown as a way to inculcate professional values, attitudes, and behaviors in students and young doctors."[5] Role modeling using both positive and negative examples is a core element in the training of physicians. Any interaction in any setting is a teaching opportunity, an opportunity to teach by example. "The informal curriculum, which consists of unscripted, unplanned, and highly interpersonal forms of teaching and learning" is a very powerful teaching tool for passing on the knowledge, skills, and values of the medical profession.[6]

The skills and attributes of role modeling can be taught and developed. Physicians must become aware of the impact of their behaviors on others and begin to reflect on and articulate to learners what they are modeling "to make the implicit explicit."[6] When shared with learners, reflection in action, the practice of analyzing one's performance as it occurs, and reflection on action, which takes place after the event, are extraordinary opportunities for role modeling. Reflection in action occurs when encountering a situation that is outside one's experience or knowledge, leading the physician to immediately define the problem and identify a solution. For example, an intern enters a room and encounters an angry family. He must act to diffuse the situation, but may have little or no ex perience. He will have to evaluate the circumstances and develop an immediate action plan based on information available and the dynamics in the room. In the next stage of development, reflection on action, the physician reflects on events after the fact, critically evaluating the situation and seeking alternate and possibly better solutions for future encounters. Absent the active and shared reflection, the passing on of these attributes to learners may not take place. "Awareness of being a role model, the conscious recognition of the importance of role modeling as a teaching and learning strategy, and the positive or negative impact of what we are modeling, is fundamental to improving performance. We are role models at all times."[6]

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Developmental Milestones

❖ Performs routine duties and behaviors of profession **without awareness of the impact** on those around her. **May or may not reflect** on actions as they occur (reflection in action) and does **not share reflections** with others.

❖ **Inconsistently aware of the impact** of one's behaviors and attitudes on others. **Sometimes teaches by example**. **Occasionally will reflect openly** on events as they occur (reflection in action) and privately on events that have already taken place (reflection on action).
❖ **Conscious of being a role model** during many interactions. Frequently **teaches by example** and **often reflects in action openly** in the presence of learners. Behavior change implies **frequent private reflection on action.**
❖ **Conscious of being a role model** during most interactions. Routinely **teaches by example**. Regularly **reflects in action** and frequently **reflects on action,** sharing this analysis of practice with learners.
❖ **Role modeling is a habit. Recognizes** that she is a role model in all actions and behaviors at all times. Characteristically **teaches by example**. Routinely **reflects** both **in action** and **on action**. **Examines, analyzes, and explains** actions/behaviors in the presence of learners and colleagues.

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13. *Provide appropriate supervision*

Primary Author: Carol Carraccio, MD, MA; Graphic: Daniel Schumacher, MD

Background

The definition of supervision embraces both the promotion of professional development and t he assurance of patient safety, with positive effects on both patient outcome and trainee development when direct supervision is combined with focused feedback.[1] Review of the literature highlights the critical importance of the relationship between the supervisor and the supervisee. To build this relationship, there must be continuity over time, reflection by both parties, and the ability of the supervisee to have some control over and input into the supervisory process.[1] Helpful supervisory behaviors include giving direct guidance, aligning theory with practice, joint problem solving, and offering feedback, reassurance, and role modeling.[1]

Role in Professional Development and Patient Safety
When thinking about the role of supervision in promoting professional development, there is an important construct to be considered. Ten Cate et al[2] speak to the delicate balance between guidance and self-regulation—too much or too little of either may have adverse effects on learning. "Constructive friction" is the name given to this balance, which is related to Vgotsky's zone of proximal development (ZPD).[2,3] The latter is described as the distance between the actual developmental level, as determined by independent problem solving, and the level of potential development when problem solving under the guidance of a more capable peer or more senior teacher.[3] According to Vgotsky,[3] the most essential feature is that the "developmental process lags behind the learning process; this sequence then results in zones of proximal development." Harland[4] builds upon this construct by speaking to the need for scaffolding, or providing higher levels of initial support for learners as they enter a new ZPD, and then gradually pulling back the support as they progress toward independence. As one scaffold is withdrawn, a new one is built for the learner as she enters a new ZPD.

As an example of a ZPD, consider the resident covering as night float when she encounters a child with an unfamiliar clinical situation. Her past experience allows her to apply what she learned in caring for patients with similar signs and symptoms, ultimately diagnosed with scarlet fever, to initiate a diagnostic work-up and supportive care for this new patient. She calls her attending with the laboratory results, and he asks her to prioritize her differential diagnosis. He leads her in formulating a di fferential expanded beyond scarlet fever, which ultimately includes an ac curate diagnosis of Kawasaki disease. T his is an example of the gap between her actual developmental level and her potential developmental level with senior guidance, as illustrated by ZPD 1 in **Figure 1**. By providing a higher level of support as she entered this new ZPD, she learns new information and skills that take her to the next developmental level of competence. When later confronted with a c hild who has streptococcal toxic shock syndrome who presents with some similar signs and symptoms, but this time in extremis, she is able to immediately intervene and stabilize the child while calling for help. In this way, she demonstrates her ability to enter

ZPD 2 in **Figure 1** and with mentored support again learn new information and skills that will take her to the next developmental level of competence. As she transcends each ZPD, she widens her realm of certainty and pushes further into her realm of uncertainty. The latter continually changes as she closes the gap between her actual and potential developmental levels within each successive ZPD.

Before we can assimilate this and relate it in a meaningful way to supervision, one more construct needs to be introduced—that of capability. Fraser and Greenhalgh[5] define capability as "the extent to which individuals can adapt to change, generate new knowledge, and continue to improve their performance." In contrast, they define competence as what "individuals know or are able to do in terms of knowledge, skills and attitudes."[5] Of note, they emphasize "capability is enhanced through feedback on performance and the challenge of unfamiliar contexts."[5] In the above example, the resident demonstrated *competence* in caring for the familiar child with scarlet fever. When confronted with the child who had Kawasaki disease as well as the one with toxic shock, she demonstrated *capability* in caring for these patients. It is here that the striking analogy with supervision unfolds. In order to balance the two goals of supervision, it is essential to determine a trainee's current level of competence and then provide the degree of support or scaffolding needed. In the case of supervision, the goal is the minimal type of supervision needed to ensure the safety of the patient. This requires continuous re-evaluation of the support or scaffolding needed and the gradual shift to a lesser degree of supervision as the trainee becomes more capable. This process is an iterative one that allows for progressive self-regulation and fulfills the ultimate goal for the trainee to practice without direct supervision.

When thinking about the relationship between supervision and patient safety, the most enlightening literature comes from the work of Kennedy and colleagues[6-8] and focuses on the facet of supervision that they term "clinical oversight." Effective clinical oversight requires the alignment between the clinical skills of the supervisee and the supervisory skills of the physician providing the oversight. The complexity of this sub-competency is based on the need for the supervisor and the supervisee to move along the developmental continuum in tandem. A supervisee requires interaction with a supervisor who is developing or has developed the skills to progressively move along a continuum that provides the type of supervision that balances patient safety with the professional formation of the supervisee. In order to attain the milestones that span this developmental continuum, both supervisees and supervisors need to continually operate within their respective ZPDs, with the former developing the capability to expand their clinical skills in order to ultimately practice without direct supervision and the latter developing their ability to step back from direct care, judge the competence and capabilities of their supervisees, and award them the appropriate amount of self-regulation to balance safe patient care with continuous professional development.

Types of Clinical Oversight
Clinical oversight has been described in terms of the following levels of supervision: routine, responsive, direct care, and back stage.[6] The type of oversight is context specific; each trainee may need differing types of supervision based on prior experience and the current clinical situation.

Routine Oversight
Routine oversight is supervision that is planned in advance, such as rounds or precepting in clinic, where the expectation from the beginning is that every case is reviewed.[6] This type of oversight involves discussion, probing, confirmation, and refinement. In essence, these activities can be encompassed under the broad heading of monitoring.

Responsive Oversight
Responsive oversight goes beyond the routine and involves an escalation in intensity based on the needs of the patient, the trainee, or the supervisor. "Situation-specific triggers for responsive over-sight involve 3 main categories: 1) clinical cues, 2) information from a secondary source, and 3) language discrepancies/inconsistencies in clinical information."[6] Examples of these categories include, respectively, 1) a presentation about an infant in which "lethargic" is used to describe the general appearance of the infant that the learner assesses as having an upper respiratory infection; 2) the nurse's triage note differs from the story that the resident is presenting; and 3) the CBC demonstrates a significant left shift in a child with a fever who the trainee describes as fine and plans to send home from

the ED without further work-up or follow-up. Prior experience with a trainee can also stimulate responsive oversight, such as when past encounters have demonstrated trainee-specific red flags (e.g., inaccuracies in physical examination).

Direct Care

When a supervisor feels the need to go beyond responsive oversight, he becomes involved in direct patient care. The latter may be limited to a specific aspect of care or taking over care based on concerns regarding a trainee's competence.[6] An example is precepting in clinic when the trainee's recounting of the history and physical examination does not make sense and upon going back into the room, the supervisor encounters a very sick patient and immediately takes over care based on the trainee's lack of recognition of illness severity.

Backstage Supervision

Backstage supervision, unlike the types of clinical oversight described previously, involves checking that is not transparent to the learner.[6] An example is the supervisor who reviews the laboratory values on a patient before coming to rounds, although he knows that these values will be presented during the case discussion.

In addition to these types of supervision described by Kennedy and colleagues,[6] we propose another type of supervision- retrospective supervision. This type of supervision is exercised as a stopgap measure to ensure that elements of prospective supervision did not fail. Retrospective supervision is most appropriate for learners for whom supervision from a distance is warranted. An example of this type of supervision is when a faculty member reviews charts from the prior day's clinic visits, ensures that documented care is appropriate, and gives either written or verbal feedback to the resident, allowing patient safety and learner professional development to be optimized.

For the supervisor, patient safety, direct observation of a trainee's skills, prior experience with and knowledge of the trainee's limits, perceived level of complexity of the task, feedback from others who have worked with the trainee, and the local clinical environment have all been described as playing a role in his ability to grant increasing independence.[9] Trainee confidence and self-efficacy, as well as supervisor "audacity," were also a part of the supervisor's decision to provide less intense clinical oversight.[9] The qualitative study by Kennedy et al[7] of how supervisors determine the intensity of the oversight provided found that four dimensions are influential: knowledge and skill, discernment (ability to identify limits), conscientiousness, and truthfulness. These four dimensions formed the basis for what they termed "trustworthiness." (See the milestone on trustworthiness for a detailed explanation).

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Developmental Milestones

Milestones for Supervisor

❖ **Limited experience** as a supervisor makes it difficult to step back from direct care.
❖ Supervisor **recognizes** the need to entrust care to his supervisee, but is **not able to accurately assess the current level of competence** of the trainee. This results in a **mismatch between the level of competence of the trainee and the type of supervision** provided, particularly for trainees who are not at either end of the performance spectrum.
❖ Supervisor **accurately assesses the competence** of the trainee and is **able to align type of supervision to demonstrated level of competence. However, a personal need for greater involvement in care often results in an inability to empower the trainee to reach beyond her current level of comfort and competence** to become capable of dealing with less familiar types of patients and clinical circumstances.
❖ Supervisor **accurately assesses both the competence and the capability** of the trainee and provides a **level of supervision that balances patient safety with the trainee's professional development**. Is **dependent on a self-directed supervisee to provide the needed resources to support her own learning** in managing less familiar types of patients and clinical circumstances (e.g., the trainee who seeks out new learning opportunities, such as asking to do a procedure that she has never done before when her supervisor does not offer this experience).
❖ Supervisor **accurately assesses the competence as well as the capability** of the trainee, aligning the type of supervision **to maximize and balance patient safety and the trainee's professional growth**. Continuously evaluates the potential for the trainee to develop new capabilities and **adjusts the type of supervision necessary to optimize professional development**.

Milestones for Supervisee

❖ Lack of clinical experience requires **direct supervision** to ensure safety and quality care for the patient.
❖ Limited clinical experience requires **direct supervision** in most cases, but in **previously encountered situations responsive supervision** is warranted.
❖ Prior clinical experience allows for demonstration of competence, requiring **routine supervision in most cases**; may require **responsive supervision** or rarely direct care **in cases of high acuity and/or complexity**.
❖ Prior clinical experience and ability to demonstrate competence, combined with **trustworthiness** (knowledge/skill, knows limits, conscientiousness, truthfulness), allows for **supervision at a distance**, with the supervisee calling the supervisor as needed. The trainee often relies on her **supervisor for prompts to expand her learning** by entering unfamiliar clinical situations, but **demonstrates capability when given appropriate support** to do so.
❖ The supervisee is ready to practice **without direct supervision** based not only on competence but also on demonstrated **capability** in safely caring for patients with unfamiliar problems and the drive to **continually push herself beyond her realm of experience into new clinical circumstances; self-regulates and judges level of support needed** for safe and quality patient care as she expands her capabilities.

Figure 1. Zones of Proximal Development

Figure 1. Zones of Proximal Development

ZPD 3

ZPD 2

ZPD 1

Realm of Uncertainty

Realm of Certainty

Competent ← Capable ← Competent ← Capable ← Competent ← Capable

Actual Developmental Level → Potential Developmental Level → Actual Developmental Level → Potential Developmental Level → Actual Developmental Level → Potential Developmental Level

Competent = Able to manage patient with familiar problem based on previous experience

Capable = Able to apply previous experience to manage patient with unfamiliar problem

Actual Developmental Level = Independent level of development

Potential Developmental Level = Level of development with senior guidance and/or mentoring

B. COMPETENCY: MEDICAL KNOWLEDGE

1. ***Demonstrate sufficient knowledge of the basic and clinically supportive sciences appropriate to pediatrics***

Primary Author: Carol Carraccio, MD, MA

Background

Bloom's taxonomy is helpful in thinking about both the types of knowledge and the progression of sophistication by which knowledge can be processed. According to Bloom,[1] there are four types of knowledge: factual, conceptual, procedural, and metacognitive:

- Factual knowledge represents the information that one must know to be acquainted with the discipline. This includes the basic terminology and technical vocabulary and is the kind of knowledge that typically would be taught during a medical school clerkship experience.
- Conceptual knowledge focuses on the relationships between the basic facts. This enables the learner to classify, categorize, synthesize, generalize, and frame knowledge in the context of models and theories.
- Procedural knowledge encompasses the "how to" and includes algorithms and methods as well as criteria for when to use these tools.
- Metacognitive knowledge includes knowledge of how one goes about learning information and knowledge of self, including one's awareness and knowledge of one's own cognition. A learner with metacognitive knowledge knows what he does not know and also knows the processes and strategies that will work for him to learn new information.

If the types of knowledge described by Bloom are juxtaposed with his hierarchy of complexity in cognitive processing, an integrated developmental progression of gaining and using the basic and clinical knowledge of pediatrics can be observed (**Table 1**). Bloom[1] proposes the following order for cognitive processes: remember, understand, apply, analyze, evaluate, and create. As a learner progresses from remember to create, each step requires greater mental effort to achieve.

Table 1. Matrix of types of knowledge advancing from the lowest (factual) to the highest (metacognative) and the hierarchy of cognitive processes advancing from the easiest (remember) to the most challenging (create). Adapted from Bloom.[1]

Types of Knowledge	Cognitive Processes					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual						
Conceptual		Increasing Complexity →				Increasing Complexity
Procedural						
Metacognitive						
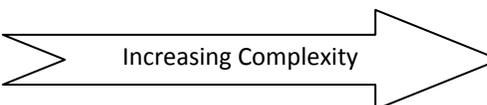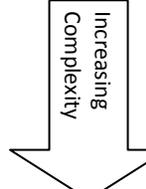
The two-dimensional framework shown above with types of knowledge along the y-axis and the stages of cognitive processing along the x-axis illustrates a more integrated progression of the cognitive process. In this graphical representation, the most basic task is remembering factual knowledge and the most

difficult task is creating metacognitive knowledge. An example of the latter is a self-directed learner who is aware of his knowledge gaps and can create a realistic and effective learning plan based on knowledge of his learning style, his time management, and the types of resources that are most helpful to him.

The two-dimensional framework should be us ed in conjunction with a t ool, such as an I n-Training Examination, to judge the breadth and d epth of content knowledge. The latter provides for the broad sampling of content that is necessary to make a v alid judgment. The typical faculty member does not have the opportunity to sample broadly. Thus, the milestones below are focused more on the types and the facility with which one uses knowledge rather than on the learner's knowledge bank.

As with other sub-competencies, an individual learner's level of competence varies with specific content areas, just as it would with specific skills. For example, a given learner may be able to evaluate and apply knowledge about a common disease process, such as streptococcal pharyngitis, but when seeing a child with a rare metabolic disorder for the first time this same learner may have to review the basic science of the biochemical pathways in order to understand the disease process and the clinical manifestations.

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Developmental Milestones

The following milestones apply to factual, conceptual, procedural, and metacognitive knowledge.

❖ Does not know or **remember** the basic content knowledge of common pediatric problems and illnesses.
❖ **Understands** the basic content knowledge of pediatrics, but is still learning to apply it to clinical situations.
❖ Understands the basic content knowledge of pediatric practice, and is able to synthesize and **apply** it in a clinical situation.
❖ Able to **analyze** and categorize knowledge in a way that allows the generation of a meaningful differential diagnosis.
❖ Able to **evaluate** knowledge and use it appropriately in a given clinical encounter to develop meaningful clinical management plans.
❖ Learns from experience; analyzes a situation, evaluates what worked well and what did not work well in the past, and **creates,** adapts, or extrapolates information appropriately to new clinical situations and encounters.

2. *Critically evaluate and apply current medical information and scientific evidence for patient care (combined with Practice-based Learning and Improvement- C.6. below)*

C. COMPETENCY: PRACTICE-BASED LEARNING AND IMPROVEMENT

1. *Identify strengths, deficiencies, and limits in one's knowledge and expertise*

Primary Author: Patricia Hicks, MD

Background
Residents' *ability* to identify their strengths, deficiencies, and limits in knowledge and expertise are related to their ability to self-assess and t heir ability to use feedback from external assessment. A n early

learner's *awareness* of his performance against an internal or external standard is often *prompted* by consequences or rewards within the educational system or other regulatory or institutional oversight. The motivation and vigilant awareness of this performance becomes more intrinsic with development. Guidance and external measures of knowledge and expertise will most likely continue to provide oversight (e.g., maintenance of certification processes), although such oversight cannot determine the learning needs for individual physicians.[1]

The stimulus for identifying strengths, deficiencies, and limits in knowledge and expertise, when intrinsically motivated, usually arises from recognition of a gap in knowledge or skills identified in a particular clinical context. The learner may be prompted to identify a gap when: 1) a patient's problem is novel or outside of the scope of previous experience; 2) tension or dissatisfaction about perceived competence occurs during a learning activity; or 3) he is unable to meet the expectation (from self or others) to manage, teach, or elaborate about specific knowledge and skills and their application.

The resident's ability to make "sense of the world," in the words of John Dewey,[2] is often influenced by doubt, uncertainty, or perceived difficulty. Kolb[3] suggests that reflection on previous experiences helps us formulate hypothetical questions (prompted from recognition and response to perceived gaps in knowledge, skills, and attitudes [KSA]) and engage in active experimentation (e.g., reading, applying various new strategies/approaches), both of which inform our learning going forward. Schön[4] describes a process whereby one reflects on a clinical issue either during or outside of the immediate clinical situation. Such reflection, which embraces uncertainty, conflict, and ambiguity, pushes the physician towards seeking new knowledge or skills in an attempt to understand and then incorporate this new learning into practice. It is not only the identification of the presence of tension but the identification of specific deficiencies or limitations in KSA that is critical.

Resource-seeking and question-asking skills are critical to identifying and specifically sorting out strengths versus deficiencies. The formation of questions enables a learner to more clearly determine the difference between their current versus ideal knowledge and skills, to develop a vision of the ideal competencies and behaviors, and to reflect on the forces encouraging and impeding change.[5] Developing questioning skills was identified as a critical first step. The nature, clarity, and specificity of the questions, as well as the resources sought to answer those questions, are critical to the learner's identification of knowledge and expertise. Gorman[6] and Ely et al[7] report on the large number and the type of questions raised by those in practice. The nature and quality of the questions spanned a wide range, and the resource seeking for answers varied as well. King[8] designed a tool to help students in large-group learning sessions develop questions by introducing them to a generic stem template (**Table 1**).

Table 1.* Facilitator Guide for an interactive case-based discussion in which residents' discussion could be observed, scored, and critiqued based on the level and nature of inquiry as it relates to their level of KSA. Questioning by the learner reveals the current state of knowledge as well as that learner's ability to identify gaps in knowledge and understanding.

Generic Question	Specific Thinking Skills Induced
What are the strengths and weaknesses of X?	
Why is X happening?	Analysis/ability to draw inferences
What are the implications of X?	
What is the difference between X and Y?	Compare–contrast; Differentiate
Explain why X (Explain how X)?	Analysis
What is the nature of X?	
What would happen if X?	Prediction/hypothesizing
What is a new example of X?	Application
How could Y be used to (achieve or result in) X?	
What is X analogous to?	Identification and creation of analogies and metaphors
What do we already know about X?	Activation of prior knowledge
How does X affect X?	Analysis of relationships (cause–effect)

*Modified from King.[8]

Table 2. A guide for the continuum of learner identification of level of knowledge, skills, and attitudes (KSA), including deficiencies and areas of strength. Achievement of this sub-competency involves multiple areas of development and is therefore contingent upon achievement across all of these elements. Scoring this item is complex and may not reflect a synchronous progression along each of the elements, but rather a slower rate of achievement in some with a more rapid compensatory progression in others.

Early learner . . . . . → . . . . . → . . . . . → . . . . . → . . . . . → . . . . . → . . . . →Developmentally Advanced Learner
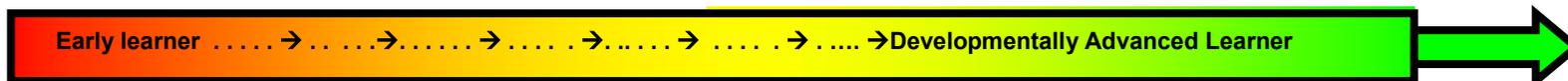
Aspect of Milestone	Level 1	Level 2	Level 3	Level 4
Level of learning hierarchy that is identified as present	*Identifies ability (or inability)* to follow instructions (to **do** what is told) for KSA Can compare and contrast with simple KSA to identify basic algorithms, patterns, or rules	*Identifies ability (or inability)* to actually **comprehend** the KSA	*Identifies ability (or inability)* to actually **apply** the KSA Accurately predicts ability to solve clinical questions	*Identifies ability (or inability)* to **apply** KSA in a **differentiated fashion**, **elaborating** on content (able to apply KSA to abstract or novel clinical situations with specificity of case) Demonstration of KSA in teaching or supervisory role aligns with self-assessment of KSA
Whether (or not) the identification of strengths, deficiencies, etc. is sought out or occurs due to external influence	External: (negative) consequence-driven	External: consequence → external rewards-driven	Intrinsic: rewards from learning, ease of work, comfort, satisfaction	Intrinsic: desire to acquire more knowledge and expertise for self-development, to better serve patients, to become the best physician possible (even when no one is looking or would notice)
Factors influencing likelihood of identification of strengths, deficiencies, gaps, etc. (whether internal or external)	Recognition or anticipation of consequence or threat of (negative) consequence (external)	External prompts (pretest, priming assignment, other external query of KSA)	(Spontaneous or self-initiated) self-reflection or self-questioning (with or without acknowledgement of tension, uncertainty, ambiguity)	Learner response to dissonance with self: ideal model/image leads to broader self-assessment, needs assessment, or analysis of mastery/expertise
Degree of Correlation of identified strengths…compared to absolute or gold-standard measure	Blissfully and unconsciously clueless of knowledge deficits	Aware, but unresponsive or unable to reconcile evidence of identified gaps	Able to globally identify extreme deficiencies or strengths; lacks gradation of assessment gaps	Able to understand strengths, deficiencies, and limits of KSA

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Developmental Milestones

❖ The learner **acknowledges external assessments, but understanding of his performance is superficial** and limited to the overall grade or bottom line; there is little understanding of how the performance measure relates in a meaningful way to their specific level of KSA.   Example: *During a semiannual review a learner is unable to describe in any specific terms how he has performed when asked to do so by his mentor. In response, the mentor reviews and interprets the learner's evaluations and then asks the learner to reflect on the discussion. The learner repeats the language used and recites the overall score/grade without interpretation of further meaning or inference regarding the reported performance assessment.*
❖ **Assessment of performance is seen as being able to do or not do the task** at hand **without appreciation for how well it is done** and whether there is a need to improve the outcome.   Example: *The learner seeks external assessment of performance as ability "to do" or "not able to do" with little understanding of what the assessment means. "Are these orders written correctly?" "Did I do that correctly?" Seeks feedback approval on whether KSA were "right" or "wrong." Does not seek "How?" or "Why?" as part of request for feedback to assist identification of KSA.*
❖ **Prompts for understanding specifics of level of performance are internal** and may be identified in response to uncertainty, discomfort, or tension in completing clinical duties. Evidence of this stage demonstrated by **active questioning and application of knowledge** in developing a rationale for care plans or in teaching activities.   Example: *Learner requests elaboration, clarification, or expansion on patient-care related task. "Why would we use this antibiotic for this condition?" or "The patient has underlying condition x. Does that alter therapy y for this patient?" or "I think we should order study w for this patient, since sometimes this disease presents with underlying condition z."*
❖ **Prompted by anticipation or contemplation of potential clinical problems, the learner self-identifies gaps in KSA through reflection** that assesses current KSA versus understanding of underlying basic science or pathophysiologic principles to generate new questions about limitations or mastery of KSA. Evidence of this stage can be determined by the **advanced nature and level of questioning or resource seeking**.   Example: *In caring for a patient with an illness not previously encountered, this practitioner says, "I have experience taking care of patients with this acute illness but have never had a patient with this acute illness who also had this particular underlying condition and wonder if the chronic condition might alter his clinical course?"*
❖ Prompted by a **self-directed goal of improving the professional self,** the practitioner anticipates hypothetical clinical scenarios that build on current experience and systematically addresses identified gaps to enhance the level of KSA. **Elaborate questioning** occurs to further explore gaps and strengths.   Example: *In caring for a patient a practitioner becomes aware of a gap in KSA, and in response (with*

> *or without consultation from a mentor) seeks to understand more about the identified KSA gap. A PICO-formatted question (P = Patient, I = Intervention, C = Comparison, O = Outcome) is constructed, followed by a process of identification of learning needed.*

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2. *Set learning and improvement goals*

Primary Author: Patricia Hicks, MD

Background

Malcolm Knowles[1] first established the following definition of self-directed learning (SDL) that guided work in this area. Defined as a process in "which individuals take the initiative (with or without the help of others) in diagnosing their learning needs, formulating goals, identifying human and m aterial resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes." As our understanding of SDL has grown, more recent definitions, such as the following by Hammond and Collins,[2] reflect the complexity of the phenomenon:

> A process in which learners take the initiative, with the support and collaboration of others, for increasing self and s ocial awareness; critically analyzing and reflecting on their situations, diagnosing their learning needs with specific reference to competencies they have helped identify; formulating socially and personally relevant learning goals, identifying human and m aterial resources for learning, choosing and implementing appropriate learning strategies; and reflecting on and evaluating their learning.

The very nature of practice, especially for residents, involves addressing a variety of patient problems. As such, the development of short- and long-term goals may require the collection and analysis of information from several sources. However, due to the task-centered, hypothetico-deductive* world experienced by the learner, the need to solve individual patient problems may only give rise to goals that are short-term in nature. Often, learners need assistance in envisioning longer-term or more elaborate goals within which shorter-term goals can be more systematically developed and staged. One method of developing these goals is through the use of learning partners, as described by Charles Campion-Smith,[3] in which physicians work in pairs to assist one another with the development of goals and with other steps in the SDL process, including evaluating achievement. This kind of partnership works well beyond the setting of goals and extends into actual learning. The work of activity theorists and of Vygotsky[4] suggest that one physician in the pair inevitably leads, pulls, or pushes the other to a new perspective or greater understanding. This dynamic can lead to accelerated learning and change that may not be achieved by the individual alone.

In setting learning and improvement goals, physicians respond most commonly to perceived needs. Discovery of these needs can be stimulated by several situations, including caring for a particular patient, discovering a s urprise that challenges usual practice, anticipating a needed skill generated through reading, engaging in conversation with a colleague, overhearing conversation among other physicians, or attending a f ormal educational session. Other prompts to learner self-directedness that contribute to initiating learning and improvement goals include motivation, self-regulation, and learner self-efficacy. For many, however, these self-directed needs may be unknown or subjectively understood and may not reflect actual learning needs.[5] This underscores the importance of structures, such as learning partners, supervisors/teachers, and oversight institutions, in the development and implementation of and accountability with learning and improvement goals.

* Hypothetico-deductive reasoning**:** A scientific method whereby 1) testable hypotheses are gathered from an existing set (from within the individual's knowledge or from an available source) and 2) then one systematically tries to falsify those hypotheses. T his approach presumes to have an established start point where a finite number of possible hypotheses or working models lead to an outcome, and one goes about eliminating those possibilities.   T his method is in stark contrast to an appr oach whereby one

accumulates favorable evidence to induce a theory, to construct a hypothesis, or to assemble a critical mass of evidence to support an evolving or existing theory or hypothesis.

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Developmental Milestones

❖ Clinical encounters are the stimulus for goal setting. These **goals are established at the "how-to" level of managing the acute needs of patients with well-defined conditions**. The goal is to find the answer to the "then this" in the "if this then this" with the larger goal of adding to pattern recognition in a first-order decision-making process.
Example: *Dr. Moore is admitting a patient with asthma and realizes the need to write admission orders. With internet and human resources available, he asks his supervisor for the asthma protocol and then proceeds to copy the orders line-by-line. When questioned on rounds about knowledge gaps, he cites the goal to adhere to a preprescribed set of instructions and responds to inquiry about goals as compliance with following instructions from a protocol.*

❖ Learning goals address questions identified in the context of care delivery and may be reinforced by other team members, perhaps through peer questioning or request for teaching. **These goals extend beyond the "how to" knowledge, skills, and attitudes (KSA) to include understanding the pathophysiologic basis or underlying basic science principles.**
Example: *Dr. Kim is on call at night with third-year medical students and is in the process of admitting a patient with an acute exacerbation of asthma. As Dr. Kim is writing the orders, the student asks about the steroid dose. Dr. Kim does not simply answer the student's question with the protocol's written dose/kg, but also includes the purpose of using an anti-inflammatory drug at this phase of asthma. This discussion prompts Dr. Kim to show the student materials designed for parents that describe the changes in the airways and to also show the student how to access some of the core reading material available on the program's intranet site that describes the inflammatory cascade involved in airway inflammation.*

❖ **Reflection and self-assessment stimulate goal setting** to include hypothetical patients who vary from the index case or those previously encountered and may require additional KSA abilities. **Anticipating role as supervisor, teaching may also prompt goal setting**.
Example: *Dr. Smith pulls the same articles off of the internet that he gave to a student when he told her to be prepared to teach others. He realizes that he would not be able to teach others about this information and studies the papers. Later, Dr. Smith develops new goals/questions (prompted by this directed reading) that he will pursue to gain better understanding of the concepts and to prepare for the next day's interaction with the student's presentation to the group.*

❖ Although learning and improvement goals remain patient-centric in content, **prompts extend beyond patient encounters and include goals that address readying self to teach and lead others**. Goals have a more elaborate contextual framework, with content areas of topics of primary focus linked to other content areas by common pathophysiologic grounding or other relationships, such as common clinical symptoms or signs.
Example: *As Dr. Doe reads about the management of asthma and the role of anti-inflammatory medications in the management of disease exacerbations, related questions arise, with new goals such as: 1) Why are anti-inflammatory medications used for prevention? 2) How does the mechanism of action of a steroid medication differ from a mast-cell stabilizer medication? 3) How would I ideally manage a currently asymptomatic child who was going to visit his grandmother (who*

has several cats) for the weekend, if that child had cat allergy-induced asthma exacerbations?
❖ **Learning goals are prompted by ongoing reflection and continual drive to expand KSA** to optimally care for any patient regardless of acuity or complexity and to improve teaching and leadership capabilities. **Goals are more elaborated and include short-term as well as long-term components**. At this stage, one is **prepared to teach others how to engage in the process of goal setting.** (Relates to professionalism milestone of learning for the sake of becoming the best physician, ready for best practice.)   **Example:** *After seeing several patients in Continuity Clinic with asthma on the problem list, Dr. Jones realizes that many of the patients do not have an asthma action plan and that the parents are not able to explain the use of a spacer-chamber device. He realizes that an understanding of asthma, its management, and how to systematically achieve education, compliance, and behavior change in patients are all required to effectively manage patients with asthma. He sets new goals to learn about motivational interviewing and seeks the help of a master in achieving this goal.*

3. *Identify and perform appropriate learning activities to guide personal and professional development*

Primary Author: Patricia Hicks, MD

Background

The process of selecting learning resources requires 1) an understanding of how one is able to take in new information, sometimes referred to as a learning style or preference[1]; 2) the type of learning content (knowledge, skills, reasoning, behavioral or attitudinal change, or growth) and what instructional methods best address that type of learning content (**Table** 1)[2]; 3) awareness of available resources [3]; 4) skills in seeking those resources[3]; and 5) consideration of the appropriateness of the selected resource to achieve the intended outcome.

Understanding of one's preference of instructional methods and the effectiveness and efficiency of those methods to achieve growth in knowledge, skills, and attitudes (KSA) often require a significant amount of discussion and consultation, although experience with various strategies through a trial-and-error approach often leads to preferences (albeit perhaps inefficient or suboptimally effective ones). Applying learner preferences to identify resources, the availability and accessibility of the resources, and their effectiveness and efficiency with respect to learners' goals are important aspects in identifying what types of experiences will contribute to learning. Learners should be encouraged to select from both formal and informal educational resources and may need assistance to consider and weigh possible learning alternatives, such as clinical rotations or other clinical training experiences, formal courses, home-study modules, study groups, and online study.

The type of instructional method chosen for teaching various types of KSA is critical.[2] Acquiring competence in the psychomotor aspects of procedural skills is optimally done using simulation, where demonstration and then deliberate practice[4] can take place. Using simulation to expand one's content knowledge would not be as effective as other instructional strategies. The curriculum presented to a learner will often provide resources for core KSA, but assessment of this sub-competency aims to determine whether, when given a choice, the learner chooses a resource that uses an instructional approach that has been proven to effectively produce the desired outcome or achievement[2] or does she choose an ineffective resource (**Table 1**).

Also, the learner must identify outcome measures for those learning activities. Indeed, one of the most difficult tasks is selecting appropriate signposts of progress and valid indicators that goals are being met. It is important for each learner to participate in the selection of outcomes that are relevant and valid indicators of change. Further, where the desired goal may be long-term, learners may wish to identify indicators along the way. Mazmanian and Mazmanian[5] emphasize the importance of a written commitment to a specifically stated change or the level of dedication to learning specific KSA in bringing

about the change or the new learning.

Norman[6] challenged the notion that adult learners could self-direct their learning and suggested that the construction of goals and the selection of resources to reach those goals may be limited by self-awareness and knowledge and the ability to direct learning. Eva[7] claimed that external guidance would always be required for unfamiliar areas of practice, "thus reducing the validity of the rhetoric around nurturing learners to be self-directed." Schmidt[8] put forward similar arguments for his claim that the importance of self-directed learning skills in professional practice had been overemphasized. Seeking resources for guidelines, policy, or more systematic approaches to learning, development, and change, however, does benefit the learner. The dissemination of lessons learned assists the learner further when that individual chooses to teach others and shares resources.[9]

Table 1. **Matching Educational Methods to Objectives.***

Educational Method	Cognitive; Knowledge	Cognitive; Problem Solving	Affective; Attitudinal	Psychomotor; Skills or Competence	Psychomotor; Behavioral or Performance
Readings	Y	?	?	?	N
Lecture	Y	?	?	?	N
Discussion	Y	Y	Y	?	N
Problem-solving exercises	Y	Y	?	N	?
Programmed learning	Y	Y	N	?	N
Learning projects	Y	Y	?	?	?
Role models	N	?	Y	?	Y
Demonstration	?	?	?	Y	Y
Real-life experiences	?	Y	Y	Y	Y
Simulated experiences	?	Y	Y	Y	?
Audio or video review of learner	?	N	N	Y	?
Behavioral/ environmental interventions*	N	N	?	?	Y

  * Modified from Kern et al.[2]

Key: Y = recommended for instruction; N = Not recommended; ? = maybe appropriate in some cases, but best if used in combination with other methods

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Developmental Milestones

❖ Sets learning activities based on readily available curricular materials, irrespective of learning style, preferences, appropriateness of activity, or any outcome measures. **Example**: *After realizing a need to better understand what medications should be used in the management of a clinic patient with moderate asthma, the learner asks a peer who is working with him in clinic rather than pursuing the references suggested by his clinic preceptor.*
❖ Well-defined goals are mapped to appropriate learning activities and resources based on assigned curriculum. Assignment may be part of a teacher-constructed curriculum or part of a prescribed curriculum offered by others or sought by the learner in response to performance gap. **Example:** *A learner reads cases assigned for primary care in advance of coming to a scheduled clinic session where a discussion of the cases is to take place. Others have not read the case, and after the session the resident is left wondering about the case and its relevance to overall learning. The case is part of a core curriculum with learning goals and objectives. Later, in clinic a patient presents with a problem similar to last week's case discussion, and the learner is able to go back to that case to glean further information on how to manage the patient.*
❖ Learning resources are sought based on analysis of learning needs assessment and constructed goals and with consideration of *nature* of learning content and method. **Example:** *Having failed at intubation in the delivery room, the learner goes back to the simulation lab to receive further training on intubation with the manikin (and does not simply reread the Neonatal Resuscitation Protocol[10]).*
❖ Consideration of choice of activities is based on instructional methods that are known to be effective in the development of the relevant knowledge content, application of that knowledge, and development of skills or behaviors. Learning takes place through collaborative interface with experts in which learning activities sought are ones that allow for constant course correction and interactive sharing of alternative perspectives and differing lenses. **Example:** *A learner is planning an advocacy workshop for parents of children with complex medical needs to improve their skills with managing medical devices. In the process of preparing for this workshop, he discovers that there is an in-service for parents of hospitalized patients in how to care for devices and participates in this learning activity. Through this in-service, he identifies written resources, models useful for demonstrations, and video-recorded illustrations of anticipated complications with device use. He chooses to conduct a practice rehearsal with some families in the inpatient setting, with course correction from the hospital's nurse-educator.*
❖ Seeking resources to learn is undertaken with high efficiency and effectiveness, with open and flexible inclusion of the influences from outside sources (including regulatory and oversight groups). Fruitful pathways and resources for learning are readily shared with peers and self-assessment of learning drives further resource seeking. **Example:** *Seeks to expand the types of devices discussed in the workshop and looks to the work published by the Institute of Medicine Committee on Safe Medical Devices for Children.[11] Decides to pursue resources (experts in the field) to see if it would be possible to learn how to provide the instructional materials, plans, and workshops to parents throughout the state.*

4. ***Systematically analyze practice using quality improvement methods and implement changes with the goal of practice improvement***

Primary Author: Robert Englander, MD, MPH

Background

The ability to systematically analyze practice using quality improvement methodology, and to implement change as a result, is embedded in a variety of knowledge, skills, and attitudes (KSA). There are three important areas of content knowledge: the standards of medical care (e.g., evidence-based pathways and guidelines),[1] change management principles, and quality improvement methodology. From a skills standpoint, one needs to be able to apply this knowledge to one's practice beginning at the individual patient level and extending to populations of patients and, in the most expert sense, to the system of care.[2] From an attitudinal standpoint, one needs to develop the habit of reflective practice and to embrace change.

To some extent, the system in which one finds oneself will be a determinant of the capacity to master the requisite KSA for this sub-competency. The knowledge content may be determined by the local quality improvement methodology used (e.g., rapid cycle change using Plan-Do-Study-Act methodology), and the application of that knowledge will depend to some extent on the degree to which the system is predisposed to change. Additionally, the traditional medical model with a focus on episodic care and individual physician autonomy is often at odds with the precepts of quality improvement and population and systems management.[3] Hockey and Marshall[4] perhaps articulate this tension best: "…a defining role of the doctor of the future-and a justification for their intensive training, status, and remuneration-should be their willingness to balance the inherent tensions between providing all possible care for individuals and designing systems which make clinically effective care available to whole populations." Of particular importance to the milestones is understanding these precepts and their implications for resident education. Almost two decades ago, Ashton[1] underscored the importance of integrating residents into the hospital's and practice's quality improvement programs. With rare exceptions, we have made little advancement in this area in the interim.

Finally, the ability to analyze practice and improve generally requires a team approach. An example might be the pediatric practice that is trying to increase its compliance with known evidence-based care of patients with asthma by ensuring the documentation of a Home Management Plan of Care. The documentation of the asthma plan may initially be viewed as the sole purview of the doctor; however, on more in-depth analysis, improvement may require a front office practice to ensure the form is placed appropriately in all asthmatic patient charts, an ursing practice to review interval symptoms and medication adherence with the patient prior to the doctor's arrival, a patient care assistant's follow-up call, and a case manager's interface with the third-party payer for special but appropriate prescriptions or for home visiting nurse services to ensure adherence.

Despite the potential system and team limitations to an individual's development in this sub-competency, a clear pathway can be outlined, understanding that the degree to which one progresses may be limited by the practice environment in which one finds oneself. Individuals in the earliest stage of development in this sub-competency have a "surface learning approach." They accumulate unrelated facts and treat parts separately, show no evidence of reflection on purpose or strategy (i.e., lack reflective practice), and find an answer to a problem without grasping the underlying issues or principles (i.e., lack insight).[5] In addition, individuals in this stage tend to become defensive when others provide them with evidence of their opportunities for improvement. For example, the pediatric intensive care unit director in this stage of development, faced with a high rate of catheter-associated bloodstream infections, might focus on why his patient population differs from the norm and argue each individual case.

As one continues along the developmental stages, one demonstrates increasing ability to reflect. Initially, this reflection is focused on individual patient encounters or experiences that allow improvement without much reliance on the system or team. These physicians might have little knowledge of or experience with improvement methodologies, and their improvements will thus be limited to the individual patient

encounter and based to some extent on intuition. In addition, individuals in this stage tend to be dependent on external sources to delineate their performance and guide their priorities for improvement.

The more advanced physician in this sub-competency both understands and applies the precepts of quality improvement and does so both for individuals and populations of patients. However, the improvement is focused on and limited to one's own practice patients. These individuals demonstrate a "deep learning approach" by relating new ideas to their previous knowledge and ex perience and by focusing on the critical aspects of a pr ofessional situation.[5] They are also continuously evaluating their practice performance for opportunities for improvement and t hus are able to prioritize their change management.

At the most advanced stage of development, the physician has developed the habit of reflection on practice and continuous performance review and has applied those reflections using sound improvement methodology to his own patient population. He seeks to influence improvement at the broader population level, such as through publication of results that can be generalized. An example might be the endocrinologist who develops a s ystem of diabetic management that is far superior to the national benchmarks in outcomes (e.g., hemoglobin A_{1c}) and disseminates that change through publications and presentations at national meetings. The reader is also referred to another excellent example of mastery of this sub-competency demonstrated in a series of practices working with payers in the Minneapolis/St. Paul health care system to improve a population's overall care.[6]

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Developmental Milestones

❖ Unable to gain insight from encounters due to a **lack of reflection on practice**. **Does not understand the principles of quality improvement methodology** or change management. Is **defensive when faced with data on performance** improvement opportunities within one's practice.
❖ Able to **gain insight from reflection on individual patient encounters,** but potential improvements limited by **lack of systematic improvement strategies and team approach. Dependent upon external prompts to define improvement opportunities** at the population level.
❖ Able to **gain insight** for improvement opportunities **from reflection on both individual patients and populations. Grasps improvement methodologies** enough to apply to populations. **Still reliant on external prompts to inform and prioritize improvement opportunities** at the population level.
❖ Able to use both individual encounters and population data to drive improvement using improvement methodology. **Analyzes one's own data on a continuous basis**, without reliance on external forces, to prioritize improvement efforts. Uses that analysis in an **iterative process for improvement**. Able to **lead a team in improvement**.
❖ In addition to demonstrating continuous improvement activities and appropriately utilizing quality improvement methodologies, **thinks and acts systemically to try to use one's own successes to benefit other practices, systems, or populations**. **Open to analysis** that at times requires **course correction to optimize improvement.**

5. *Incorporate formative evaluation feedback into daily practice*

Primary Author: Carol Carraccio, MD, MA

Background

> Feedback is the control of a system by reinserting into the system the results of its performance. If these results are merely used as numerical data for criticism of the systems and its regulation, we have the simple feedback of the control engineer. If, however, the information which proceeds backwards from the performance is able to change the general method and pattern of the performance, we have a process which may very well be called learning.[1]

It is important to be precise about what feedback is and what it means. In his classic article, Ende[2] tells us that feedback occurs "when a student or house officer is offered insight into what he or she actually did as well as the consequences of his or her actions." He highlights the difference between feedback and assessment. The former is specific to individual aspects of a learner's performance, formative (i.e., intended to help form the learner into a more successful professional), neutral, and not intended to make commentary on overall performance. In contrast, the latter is more generalized, summative, and intended to provide commentary on a learner's overall performance. He also makes the critical point that "observations are the currency of feedback,"[2] with direct observation being the essential backbone of optimal feedback.

In the search for the development of responses to feedback, a seemingly sentinel article emerges from the higher education literature. In this article, Nichol and Macfarlane-Dick[3] remind us that it is important to ensure that feedback, per se, has occurred before we think about the appropriateness of a learner's response. The feedback message must not only be appropriately articulated but then "decoded and translated into action"[3] by the learner. At the same time, they point out that feedback messages are complex and not readily translatable into action without some discussion that leads to further understanding and processing. The authors also stress the point that, although we tend to think of feedback as being transmitted from external sources, internal feedback is critical. Focusing only on external transmission ignores the role that beliefs and motivation play in the response to feedback. This reference to internal and external sources calls into play the work of Forsythe[4] as it bears on identity development. In the earliest stages of identity development, there exists only one point of view for the individual—his own. In the next stage, one can understand the viewpoints of others, but they are translated and internalized in a way that serves one's own needs and interests. When applied to feedback, this suggests that the translation of the feedback may be different from the intended message and likely will not lead to the desired behavioral changes intended by the person giving the feedback. As one progresses along the continuum of identity development, one becomes able to see multiple perspectives simultaneously. At advanced levels of development, one is primarily motivated by personal expectations rather than the expectations of others. In other words, individuals at these advanced levels are proactive in seeking feedback because they want to improve rather than being reactive in responding to feedback because others would like them to improve.

Interestingly, Nichol and Macfarlane-Dick[3] reinforce Forsythe's construct of identity development using a model of response to feedback that is built on the foundation of self-regulation. The construct of self-regulation or self-monitoring has recently emerged in the medical education literature and provides some insight into an element of self-assessment that holds greater promise of accuracy than self-assessment. Archer[5] defines self-monitoring as "the ability to respond to situations shaped by one's own capability at that moment in that set of circumstances, rather than being governed by an overall perception of ability." While everyone is generally poor at self-assessment in the global sense of predicting how well we will do something, Eva and Regehr[6] suggest that we are much better at knowing our limitations when we are actively engaged in an activity at point of care. In essence, this type of reflection-in-action, or self-monitoring, is our response to internal feedback. For example, a learner may not be able to accurately assess his ability to resuscitate a newborn with perinatal asphyxia, but when called to the delivery room he knows when he is in over his head and appropriately requests help to avoid compromising patient care.

It is important for a teacher to discern the level of identity development of a learner in order to package feedback in a way that can best help lead to desired behavioral change. Other major influences that have been reported to affect response to external sources of feedback are its source, duration, and monitoring. Feedback from a supervisor or administrator (as opposed to participation in a research intervention), providing feedback over the long-term (years as opposed to months), and ongoing monitoring (as opposed to recording results of a short-term intervention) have been shown to enhance response to feedback.[7] Relevance, by linking feedback to goal setting, in conjunction with facilitated support, are other key ingredients in enhancing receptivity and bringing about positive change.[5]

Sargeant, Mann, van der Vleuten et al[8] summarize their findings from a number of studies involving feedback in an article entitled "'Directed' self-assessment: practice and feedback within a social context". In addition to many of the influences noted above, they also highlight that physicians were more likely to respond to feedback from patients than colleagues. The authors also emphasize that feedback that is inconsistent with one's self-perceptions may evoke strong emotional responses that inhibit assimilation and behavioral change. The recommended antidote to this emotional response is reflection, particularly facilitated or guided reflection. This is an important take home message for educators.

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Developmental Milestones

❖ Difficulty in considering others' points of view when they differ from her own, leading to **defensiveness and inability to receive feedback and/or avoidance of feedback; limited incorporation of formative feedback** into daily practice.
❖ **Dependent on external sources of feedback** for improvement; beginning to acknowledge other points of view, but **reinterprets** feedback in a way that serves her own need for praise or consequence avoidance rather than informing a personal quest for improvement; **little to no behavioral** change occurs in response to feedback (e.g., listens to feedback but takes away only those messages she wants to hear).
❖ Understands others' points of view and changes behavior to **improve specific deficiencies that are noted by others** (e.g., understands that the perceptions of others are important even when those perceptions are different from her own, such as when a nurse interprets a response as abrupt when it was not intended to be, causing her to examine what prompted this perception).
❖ Internal sources of feedback allow for insight into limitations and engagement in **self-regulation; improves daily practice based on both external formative feedback and internal insights** (e.g., is able to point out what went well and what did not go well in a given encounter, and makes positive

changes in behavior as a result).

❖ Professional maturity and deep emotional commitment that lead to **deliberate practice** and result in the **habits** of continuous **reflection, self-regulation, and internal feedback** that lead to **continuous improvement beyond a focus solely on deficiencies.**

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6. *Locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems*

Primary Author: Ann Burke, MD

Background

Evidenced-based medicine (EBM) is defined as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients."[1] Given the increasing amount of medical information and knowledge, physicians need to develop systematic strategies to deal with and manage all of the information regarding their patients. In this developmental milestone, we will examine the knowledge, skills, and attitudes (KSA) required for the actual steps involved in EBM, recognizing that in reality one cannot practice EBM without the ability to set learning and improvement goals or the motivation to be a life-long learner.[2]

The classic steps that need to be repetitively accomplished to practice EBM include[3-6]:

- Convert the need for information into an answerable question. This may also be described as formulating a clinical question typically in PICO format addressing the problem/population (P), intervention (I), comparison (C), and outcome (O). Again, to recognize the critical importance of this learning activity, one must have the requisite motivation and maturity to set learning and improvement goals.
- Search for best evidence to find answers. Residents need to learn, via practice, what to look for, how to look for it, and where to search.[1]
- Critically appraise the evidence for its validity, applicability, and impact. This step involves asking and answering the questions: What are the results? Are the results valid? Are the results relevant? Critical appraisal involves a complex series of cognitive tasks that include processing information in research studies, weighing evidence, and balancing the multifactorial information about the individual patient's unique situation to arrive at an evidence-informed medical decision. Critical appraisal is the art of EBM; it is far more complex than following steps to take care of generic patients (or to participate in so-called "cookbook" medicine).
- Integrate findings with clinical judgment, taking into account patient values and c linical circumstances. To accomplish this step, one must simultaneously move along the developmental continuum in other areas of Practice-based Learning and Improvement and other competencies.
- Bring about change by applying the evidence and then evaluating one's effectiveness and efficiency and seeking ways to improve both.

The following attributes and descriptions characterize learners in various stages of development:

Early Development of KSA for Evidence-based Practice is characterized by a learner who needs help identifying personal knowledge gaps and converting knowledge gaps into an answerable clinical question. The novice asks others with more perceived experience for answers to general questions. Initial forays into literature searching involve use of general search engines (e.g., Google) with excessive return of low-level evidence. In the searching process, there is an inability to filter searches to limit returns to high-quality studies with optimal methodology. A novice or early learner has minimal ability to critically appraise an article. Application of the study findings to a patient is often inappropriate.

Intermediate Development of KSA for Evidence-based Practice is characterized by a learner who is able to identify knowledge gaps in the course of patient care. The learner is additionally able to convert knowledge gaps into answerable clinical questions. Learners in this developmental stage begin to ask more specific questions (foreground questions) in areas where content knowledge is more advanced. They can successfully perform a literature search using Medline databases and retrieve high-quality evidence to answer clinical questions. They are also able to utilize methodologic filters to increase the quality and decrease the quantity of the citations returned. Critical appraisal is improving using standardized tools that are specific to each study design. The learner may begin to apply the findings of studies of populations to individual patients, taking into account the patient's own values and resources and the clinical context.

Advanced Development of KSA for Evidence-based Practice is characterized by demonstration of ongoing, habitual asking and answering of clinical questions from one's patient care as part of an ongoing commitment to continuous professional development. The learner demonstrates effective and efficient search strategies for complex clinical questions utilizing a variety of medical databases and best-evidence resources. Additionally, the learner is able to improvise to find clinical evidence when initial search strategies fail. This stage is characterized by advanced skill in critical appraisal of clinical studies of multiple methodologies (e.g., randomized controlled trial, cohort study, systematic review, cost-benefit analysis). Masterfully able to integrate evidence gained from literature searching into complex clinical decision-making; consistently taking the patients' values, resources, and the clinical context into consideration. Seeks out and enjoys the difficult clinical questions to continually push and expand capabilities in evidence-based practice.[7]

A number of guidebooks contain information on how to teach critical appraisal skills and attitudes via the systematic approach that is called EBM.[2,3] In terms of teaching and learning EBM, it is important to note that the literature informs us that the outcomes of teaching EBM are improved if there is practice- or case-based learning and time is set aside for this learning.[8,9] Thus, introducing EBM to undergraduates in their curriculum is a favored technique to allow learners to actively practice EBM in a clinical setting at a point when large time constraints are not present and to allow one to methodically respond to the steep learning curve. In a systematic review of the effectiveness of EBM and critical-appraisal teaching starting at the postgraduate level, Coomarasamy et al[10] concluded that the studies showed a significant improvement in knowledge, but not in attitude, skills, or behavior during residency. Most sources agree that to become proficient in EBM a learner must utilize interactive and clinically integrated activities in addition to interactive classroom-based activities and must begin this process early in their education.[4,11,12] Therefore, a sound strategy is to teach and practice EBM in undergraduate medical education, with subsequent practice of EBM on a regular basis to improve KSA as a resident. EBM skill development truly spans the continuum of medical education.[13]

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Developmental Milestones

❖ **Explains basic principles** of EBM, but relevance is limited by lack of clinical exposure. **Example:** *The senior resident asks each member of the inpatient team to answer a clinical question that he raised during rounds and to be prepared to discuss it the next morning. The learner goes to a more senior colleague for help, since he cannot work through a case or article using the critical appraisal approach, mainly due to lack of clinical context to work from.*
❖ Recognizes the importance of using current information to care for patients and **responds to external prompts** to do so. Able to **formulate questions with some difficulty,** but **not yet efficient with on-line searching**. Starting to learn critical appraisal skills. **Example:** *In response to a clinical question raised during rounds and the senior resident's request that everyone answer the question, the learner is able, with some difficulty, to frame the question in a PICO format. He has searching capability, but the search and the steps of analyzing and applying the evidence are time intensive so he is not prepared to discuss his findings on rounds the next morning.*
❖ **Able to identify knowledge gaps as learning opportunities. Makes an effort** to ask answerable questions on a regular basis and is becoming **increasingly able to do so.** Understands varying levels of evidence and can utilize advanced search methods. **Able to critically appraise a topic** by analyzing the major outcomes; however, may need guidance in understanding the subtleties of the evidence. **Begins to seek and apply evidence when needed**, not just when assigned to do so. **Example:** *In response to the clinical question raised during rounds, develops an answerable clinical question in PICO format and efficiently searches for best evidence. Volunteers to present on rounds the next day and demonstrates effective analytic skills and the ability to apply his findings to the current patient. Has a bit of difficulty interpreting and applying some of the secondary outcomes and, in the context of this discussion, another question is raised, which he volunteers to search and answer.*
❖ **Increasingly self-motivated to learn more,** as exhibited by **regularly formulating answerable questions**. Incorporates use of clinical evidence in rounds and **teaches fellow learners.** Quite capable with advanced searching. Able to **critically appraise topics** and does so regularly. Shares findings with others to try to improve their abilities. **Practices EBM** because of the benefit to the patient and the desire to learn more rather than in response to external prompts. **Example:** *In response to the clinical question raised during rounds, presents a second question that he has already researched in a PICO format as well as a critique of the evidence and its applicability to the current patient. He was motivated to be proactive by his interest in learning as well as the needs of his patient. He shares his tactics with team members by teaching them the steps he engaged in to learn and apply this information.*
❖ **Teaches critical appraisal of topics to others.** Strives for change at the organizational level as dictated by best current information. **Able to easily formulate answerable clinical questions and does so with majority of patients as a habit**. Able to effectively and efficiently search and access the literature. Seen by others as a **role model** for practicing EBM. **Example:** *An EBM practitioner, as observed by conversations during rounds, whom others try to emulate. He enjoys teaching colleagues how to become EBM practitioners by role modeling. He helps team members develop and refine their skills using his expertise to make a difficult task practical and doable.*

7. *Use information technology to optimize learning and care delivery*

Primary Author: Bradley Benson, MD

Background

Developing and maintaining competence in the use of information technology is vital in the modern practice of medicine, and its role will continue to expand and evolve.[1-7] The field has changed dramatically in a relatively short period of time due to several factors, which include the exponential growth in clinically relevant information, nearly universal access to this information enabled by the World Wide Web, commoditized technology that brings access to the classroom and to the point of care (e.g., netbooks, workstations on wheels, smartphones, iPads), and the widespread adoption of electronic health records[8] (EHRs) and learner portfolios.[9]

The Evolving Focus on Information Technology
In the late 1990s, the Association of American Medical Colleges[10] issued *Report II of the Medical School Objectives Project* in which they noted that, "Physicians will have to possess the knowledge, skills, and attitudes (KSA) required to be competent in medical informatics if they wish to incorporate into their practices systematic approaches for promoting and maintaining the health of defined populations." The report outlined learning objectives specifically related to medical informatics necessary to fulfill the following five roles of the physician:

- Life-long Learner
- Clinician
- Educator/Communicator
- Researcher
- Manager

As with many of the other milestones, significant overlap exists between medical informatics competence and attainment of competence in the other domains. Here we will focus on the specific KSA related to the use of information technology that enhance one's ability to fulfill each of the above roles.

Of note, since the introduction of the learning objectives for the roles related to information technology listed above, medical schools have made major investments in information technology, with nearly ubiquitous computer and internet access, creation of "virtual campuses," and widespread adoption of technology-enhanced learning.[11] A follow-up study 8 years after the initial report, however, showed that only a handful of schools taught and assessed medical informatics objectives that required interaction with patient health information,[12] underscoring the importance of intentional focus on these objectives at this time. The importance of these objectives has been emphasized by the Accreditation Council for Graduate Medical Education and the American Board of Pediatrics, with increasing requirements for the use of EHRs in training, and the use of information technology for data collection and reporting of quality improvement projects as part of maintenance of certification, respectively.

The Developmental Progression of Information Technology Capability
The Technology Acceptance Model (TAM), as originally described by Davis,[13] is a critical tool in understanding the progression of capability with respect to the use of information technology. This model identifies the drivers of user acceptance of technology and notes two major factors that impact usage behavior: **perceived ease of use** and **perceived usefulness**. Of these two factors, perceived ease of use is the more important and has the greater impact on behavior. Understanding the determinants of perceived ease of use is vital, as it is an initial hurdle that early learners must overcome for acceptance, adoption, and use of a system.[13,14] The work of Venkatesh[15] in this area has built upon the TAM by integrating four factors that determine early perceptions of the ease of use of a new system:

- Internal control – characterized by one's own sense of computer savvy or self-efficacy;

- External control – perception of support/facilitators in the environment to help with use of the new system (i.e., availability of 24/7 tech support during Epic implementation);
- Intrinsic motivation – characterized by "computer playfulness" or one's intrinsic enjoyment in interacting with a new gadget or information system; and
- Emotion – characterized by "computer anxiety" and a negative affective reaction to computer use.

In applying this model to early learners in a medical setting, it is clear that the factors above affect each individual in a unique way, directly affecting their likelihood of embracing use of the new technology and ultimately their behavior. As each individual gains personal experience with the technology, however, these factors attenuate based on their objective experience with the system and modify their perception of the system's ease of use. Anyone with experience in implementing an EHR system has seen the variation in user acceptance and evolution over time. This literature is of great importance to information technology developers and consumers alike, as many investments in information technology have failed to yield the expected improvements in productivity or outcomes because of a lack of user acceptance.

In proposing developmental milestones related to the use of information technology, we rely heavily on the scholarly work above as well as the Dreyfus Model[16,17] and the work on expertise by Bereiter and Scardemalia.[18] While it is widely perceived that the new generation of physicians-in-training is technologically savvy, there will always be variations in computer self-efficacy, playfulness, and anxiety that directly affect each learner's progression and level of skill. Learners on the anxious and less confident end of the technology spectrum must gain enough objective experience and have enough success with the information technology to overcome their initial misgivings if they are ever to progress. Early attempts at literature searching or accessing a patient's medical record may be overwhelming due to the number of information retrieval tools available, the volume of information retrieved, and minimal ability to filter or prioritize. As skills develop, learners are better able to choose which database to search to best answer a specific question, to know where to look in an EHR for a specific piece of patient information, and to develop a repertoire of experience in filling their own knowledge gaps. The competent user of information technology has an emotional investment in the outcome; they feel good when they are able to successfully answer a clinical question using information technology resources and feel bad when they cannot. Similarly, if an EHR query or use of a new standardized best practice order set for a patient admitted with bronchiolitis goes well, then satisfaction results; if errors or difficulties occur, then dissatisfaction results. This emotional investment is evidence of an internal motivation that will help the competent learner continually improve and progress to a higher skill level. In these later stages, efficiencies develop and the use of new information technology is often intuitive and enjoyable. Troubleshooting and problem-solving are the responses to any failed attempts to use information technology for learning or patient care. As use of the EHR for individual patient care is streamlined, the gained time can be reinvested in use of the EHR for activities such as population health initiatives. At the highest stages of professional achievement, one contributes to the continuous improvement of current information technology systems and the development of new ones to improve patient care and learning.

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❖ **Reluctant to utilize information technology.** Generally **does not initiate** attempts to use information technology without **mandatory assignments and direct help**. **Inability to choose between multiple available databases for clinical query** and **inability to filter or prioritize the information retrieved** results in **too much information**, much of which is not useful. Failure to achieve success may worsen perception of information technology ease of use, leading to **resistance to adopting new technologies**.
❖ Demonstrates a **willingness to try new technology** for patient care assignments or learning. Able to **identify and use several available databases**, search engines, or other appropriate tools, resulting in a **manageable volume of information**, most of which is **relevant to the clinical question**. Basic use of an EHR is improving, as evidenced by **greater efficacy and efficiency in performing needed tasks**. Beginning to **identify shortcuts to getting to the right information quickly**, such as use of filters. Also beginning to **avoid shortcuts that lead one astray** of the correct information or perpetuate incorrect information in the EHR.
❖ **Efficiently retrieves (from EHR, databases, and other resources), manages, and utilizes biomedical information for solving problems and making decisions that are relevant to the care of patients and for ongoing learning.**
❖ In addition to the above, the **emotional investment in the outcome** (improved patient care, deeper understanding, or successful resolution of a query) leads to the **habit** of **utilizing familiar information technology resources and seeking new ones to answer clinical questions and remedy knowledge gaps identified in the course of patient care**; utilizes the EHR platform to **improve the care not only for individual patients but populations of patients**; and **utilizes evidence-based (actuarial) decision support tools** to continually supplement clinical experience.
❖ Along with the above capabilities and behaviors, the mental energy freed up by comfort level and experience with information technology systems is reinvested to contribute to the **continuous improvement of current systems and the development and implementation of new information technology innovations for patient care and professional learning.**

8. *Develop the necessary skills to be an effective teacher*

Primary Author: Ann Burke, MD

<u>**Background**</u>

What is an effective teacher and what characteristics do they possess? In this sub-competency, a number of knowledge, skills, and attitudes (KSA) form the conceptual framework for effective teaching. It is important to note that the definition of "effective" may be difficult to quantify because much of the literature on this ability is based on perceptions and not on learner outcome measures. The KSA may progress at similar rates, or some elements may lag behind while others progress. For example, someone may be very learner-centered and adaptable, but may feel inadequate due to insufficient content knowledge. A few overarching themes that progress through the developmental process towards a good or effective teacher are:

- Teacher-centered versus learner-centered
- Fixed approach with teaching methods versus adaptability
- Inadequacy versus confidence

Teacher-Centered versus Learner-Centered
A learner-centered teacher asks learners about their needs and aims to align the teaching method and content with the specific learner at hand. This concept also includes creating a learning climate that facilitates optimal learning. For example, a teacher who shows enthusiasm and empathy for learners, does not interrupt presentations on rounds, and encourages questions is learner-centered. In contrast, a teacher-centered approach is one that focuses on the teacher's needs. Very little to no effort is put into assessing what the learner may need. This approach is typically symptomatic of a lack of insight and of feelings of inadequacy about the knowledge and skills for teaching, thus wanting to stay in a prepared and rehearsed mode of teaching to remain safe. Alternatively, it may be due to lack of interest and enthusiasm for the task of teaching. An example of this concept is a new teacher who prepares every bit of detailed medical information about a topic so as not to appear to be lacking in knowledge; however, his talk may be overwhelming, too expansive and unfocused, and thus unhelpful to the learners. Another example is a professor who is lecturing about a topic with no attempt to make it relevant to the particular audience. He may even speak for 10 minutes over time, again focusing on his desire to talk about everything he prepared rather than on the learner's desire to have their time respected.

Fixed Approach versus Adaptability
Adaptability refers to the willingness of teachers to modify the form and content of instruction, their ability to change style based on subtle cues from learners, and their capability to not be fixed or limited in style. This theme includes the creativity of the teacher. Inflexible teachers do not change based on the situation. For example, a fixed or inflexible teacher would likely not shorten rounds to allow a resident to get to clinic because "that is how they always run rounds." Another example is a resident who continues lecturing students long after a number of them have dozed off.

Inadequacy versus Confidence
Confidence in teaching may stem from a number of factors, including positive reinforcement, enthusiasm, experience, and self-identity as a teacher. Some of these thoughts about self-efficacy and self-perception may be inaccurate or over valued. That is to say that although confidence is a characteristic of effective teaching, one who is confident alone may not be an effective teacher. Often, early-stage teachers may be so focused on their own knowledge content and learning needs that they may feel inadequate and unsafe teaching others. A master teacher, on the other hand, probably has appropriate confidence in an insightful way and a positive self-image as a good teacher.

In one study, the following three key themes seem to emerge when faculty and residents are attempting to characterize and describe good teaching attributes: 1) enthusiasm for teaching (current and future), 2)

learner-centeredness, and 3) self-knowledge about teaching.[1] In this qualitative study, the intervention group of residents received 13 more hours of resident–as-teacher development compared to the control group. The study took place in a university medical center with primary care residents. Qualitatively analyzed resident interviews identified the above themes and found that their self-perceptions of their teaching roles persisted for over 1 year after the intervention. Other descriptions of effective teaching and precepting include similar themes, such as respect for learners, positive role modeling, and demonstrable patient care skills.[2,3] In another study, the authors developed a validated faculty peer evaluation on teaching skills, which resulted in the following list of behaviors of effective teachers[4]:

- Establishes a safe and positive learning environment and learner involvement
- Leads teaching sessions
- Communicates goals of teaching and is learner-centered
- Uses appropriate methods and materials
- Primes the learner by asking for commitment, plan, and responses (in a learner-centered manner)
- Gives feedback to learners
- Encourages learners to continue their learning

In a study by Beckman,[4] peer-to-peer evaluations occurred between faculty attendings on a general internal medicine hospitalist service. Many of the categories utilized were adapted from the Stanford Faculty Development Program-26 (SFDP-26),[5] which is a validated questionnaire for students and residents to use in evaluating attendings. However, it is important to recognize that students may not have views completely similar to faculty and/or may not value the same teacher attributes that faculty value.[6]

Being a teacher is generally perceived as a favorable quality or skill for a physician to have; however, it does require time and effort. The quality of teaching can become subject to contextual circumstances and can advance or regress through the milestones. In general, the progression through the milestones follows the three overarching concepts detailed above.

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- ❖ **Completely teacher-centered;** focused on her perception of what needs to be taught rather than the learning needs of the students. Barriers to effective teaching include lack of content knowledge and lack of teaching skills and repertoires. **Not adaptable** because of need for preparation and scripted teaching. **Fear of inadequacy, lacks confidence.**
- ❖ **Quite teacher-centered.** Is able to identify a good teacher, but lacks insight into the discrete qualities that contribute to this skill. Has no internalized plan, technique, or mindful practice of teaching. **Not adaptable to others' learning needs.** Does not see learners as barriers/nuisance, but may be somewhat ambivalent towards them. Feels **inadequate** due to limited teaching repertoire and

experience.
❖ **Exhibits some learner-centered teaching behaviors, but remains mostly teacher-centered.** Able to identify a few of the discrete qualities of effective teaching behaviors. **Teaching methods and repertoire are expanding, therefore less limited and more adaptable.** May be developing self-identity as one who likes to teach. **Gaining confidence in teaching abilities,** which allows for interaction with learners and enthusiasm for assisting them in learning.
❖ **Exhibits mostly a learner-centered approach to teaching.** Assesses learner needs and wants to advance learners. Eager and enthusiastic to teach. Shows enriched insight and understanding of some teaching concepts and is **able to adapt and modify teaching** to unforeseen learner needs in most situations. More relaxed and **confident** with teaching, with obvious enjoyment in this role.
❖ **Consistently demonstrates a learner-centered** approach to teaching. Understands and seeks new information regarding teaching and learning. Seen as a dedicated teacher based on the time and energy committed to teaching, which is part of the core of her self-image. **Confidence in teaching skills** allows for **creative and adaptive teaching abilities.**

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9. *Participate in the education of patients, families, students, residents, and other health professionals*

Primary Author: Ann Burke, MD

Background

This milestone will focus on patient and family education; other milestones focus on students, residents, and other health professionals.

The concepts of educating oneself and educating others share many of the same features and abilities. Another sub-competency, "Develop the necessary skills to be an effective teacher," outlines three themes that establish the context within which effective teaching is considered. These three overarching themes are teacher-centered versus learner-centered, fixed approach versus adaptability, and inadequacy versus confidence. That sub-competency is, perhaps, more pertinent for medical teaching. This sub-competency will focus on the additional aspects of exemplary educational interactions with patients and families.

Patient education involves a complex set of skills and capabilities, which span a number of competency domains described elsewhere in the Milestones document, and requires:

- Knowledge about the particular disease process and/or health promotion concepts that pertain to each individual patient *(medical knowledge)*
- The ability to navigate the medical interview and encounter *(patient care)*
- The capability to counsel patients and families *(patient care)*
- The capabilities that allow physicians to communicate effectively with others across a broad range of socioeconomic and cultural backgrounds *(interpersonal and communication skills)*

One difference between patient education and education of trainees and peers involves the dimension of professional satisfaction associated with demonstrating behaviors consistent with effective patient education. Consider that the profession recognizes and acknowledges medical trainee teaching with awards. Additionally, teaching medical students, residents, and peers is documented and valued in curriculum vitae. Physicians rarely receive formal recognition for ongoing, habitual, effective patient and family education; however, the professional and personal satisfaction gained is noteworthy. Thus, patient and family education seems to be rooted in altruism and mindful practice.[1]

One author considers the term "patient education" to be "unfortunate" because it suggests passive reception of information by the patient. In reality, the interplay of physician and patient/family is optimized when it is dynamic and interactive and consists of two-way discussion.[2] Patients who take an active role in

their own care have better outcomes in terms of quality of life, health, and satisfaction.[3] Physicians demonstrating capabilities at the more expert end of the developmental spectrum in this milestone are completely aware of and incorporate this concept into practice.

The medical encounter with patients/families serves three functions, as outlined in the sub-competency, "Interviewing patients/families about the particulars of the medical condition for which they seek care, with specific attention to behavioral, psychosocial, environmental, and family-unit correlates of disease." The three functions are to 1) gather biological and psychological information, 2) respond to the emotions of patients/families, and 3) educate patients/families to ensure desired outcomes.[4-6] The content areas of the last two functions, which are pertinent here, are listed below[2]:

Respond to the emotions of patients/families:

- Define the nature of the relationship
- Communicate professional expertise
- Communicate interest and empathy
- Recognize potential relationship barriers in the doctor-patient relationship
- Gain insight into the patient's perspective

Educate patients/families and subsequently implement treatment plans:

- Negotiate and resolve any issues or conflict between physician and patient
- Communicate about the diagnostic and prognostic characteristics of the diagnosis
- Negotiate and recommend appropriate diagnostic procedures and treatment
- Negotiate and recommend appropriate preventative measures, such as lifestyle change
- Enhance coping skills and ability by enhancing understanding of health issues

Additionally, some authors suggest that the medical encounter can be divided into the following four distinct functional components[4,6-8]: 1) data gathering, 2) building relationships, 3) patient education and counseling, and 4) activating and partnering. Activating implies the function that "facilitates the expression of patients' expectations, preferences, and perspectives so that they may more meaningfully participate in treatment and management decision making."[4,6] Phrases such as "What do you think is going on?", "I understand you don't like that", "Does that seem to be clear to you?", that express concern for patient opinion and check for understanding are components of activating and partnering behaviors. In the progression of these milestones, the partnering aspect of patient education will be emphasized. Further, there is an instrument to assess these interactions—the RAIS or Roter Interaction Analysis System.[4,6,7] This instrument can be used to assess resident progression through this milestone.

To clarify and further define the terms "activation" and "partnering," a few points need to be emphasized. There can be a wide spectrum of effectiveness of interactions with patients from ineffective to effective in modifying behavior. Progressing through these milestones, one would become increasingly focused on the outcomes. A physician who habitually asks herself, "How can I modify behavior and have good patient care outcomes from partnering with and activating the child and family?" is far advanced beyond the doctor who simply goes through the motions of patient education without deliberate thought. Some evidence about patient encounters to consider when using a framework of enhancing change and promoting compliance include[2,3,6]:

- Few patients change behavior with unilateral physician communication of information/lecturing-type education.
- Rates of patient compliance and behavior change increase with the simple addition of patient handouts/literature.
- Health literacy, or the level of understanding by reading and/or listening that a patient possesses, needs to be taken into account.

<u>Additional Considerations</u>
What characteristics aid a physician in becoming one who participates in education of patients and families? One study looked at characteristics, capacities, and skills that distinguish physicians as good at patient communication/education.[9] In this particular study, the term "capacities" refers to physicians' values, beliefs, and intentions concerning the patient. Thus, capacities encompass constructs such as compassion, empathy, respect, honesty, and integrity. In this study, the patients were adolescents, and the components that appear to be necessary to educate and communicate with this group of pediatric patients are empathy, nonjudgmental attitude, and self-reflection.[9] In pediatrics, physicians must utilize the principles outlined above, but they must also modify and be flexible with regard to various ages, developmental stages and literacy levels.

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❖ **The learner has gaps in knowledge and experience that result in a rigid, scripted** type of patient education and counseling that may not meet the needs of the patient. **Doctor-centered interaction.**
❖ **The learner is closing gaps in knowledge**, allowing him to educate patients and families in a **somewhat flexible** way that begins to meet the needs of the patients. Education varies between **doctor-centered and patient-centered depending upon the circumstances and the family dynamics**. Responsive to patient's educational needs. Learning the importance of the concept of checking for patient understanding.
❖ **The learner has** a **solid breadth of both knowledge and experience**, resulting in the ability to **modify teaching** to meet the needs of the individual patient. Educational efforts are typically **patient centered** and the learner is **able to modify strategies** to adapt to complex patient characteristics. **Checks for patient understanding** inconsistently.
❖ Broad **knowledge base and significant experience** with a variety of disease processes and patient characteristics. Facilitates the participation of patients in all discussions about their health. Able to be quite **flexible** with strategies of educating patients. **Patient-centeredness** is clearly a priority and a conscious effort. Consistently checks for patient understanding. **Empowers and motivates patients**.
❖ Similar to level four in terms of knowledge and flexibility. **Patient-centeredness is a habit**. Seamlessly, skillfully, and comfortably educates and interacts with patients in a way that satisfies the patients. Uncanny ability to **motivate and empower patients** to make healthy changes and choices. Does not leave the patient encounter without knowing that the **patient understands the counseling.**

10. ***Take primary responsibility for lifelong learning to improve knowledge, skills, and practice performance through familiarity with general and experience-specific goals and objectives and attendance at conferences***

Primary Author: Ann Burke, MD

Background

Responsibility for one's own lifelong learning (practice-based learning and improvement) is a process that involves a c omplex framework of self-direction, self–efficacy, and insight.[1-3] The concepts of lifelong learning and self-directed learning continue to be elusive, with learners and educators finding it difficult to define and to agree upon their role in professional formation and continued learning.[1]

A framework based on the work of Malcolm Knowles[1,2] defines self-directed learning as a p rocess in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating goals, identifying resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. In 1977, Guglielmino[3] developed an instrument to measure self-directed learning. She defines a s elf-directed learner, or one who takes responsibility for lifelong learning, as "one who exhibits initiative, independence, and per sistence in learning; one w ho accepts responsibility for his or her own learning and views problems as challenges; one who is capable of self-discipline and has a high degree of curiosity; one who has a strong desire to learn or change and is self-confident; one who is able to use basic study skills, organize his or her time and set an appropriate pace for learning, and to develop a plan for completing work; one who enjoys learning and has a tendency to be goal-oriented."[3]

An excellent exploration of the theories, frameworks, and complex considerations of self-directed learning, *Self-Direction for Lifelong Learning* by Candy[4] explores the ontogeny of self-direction. It is clear from this reference that there is active discussion and debate about what constitutes lifelong learning. When discussing the skills and competencies of a self-directed learner, Candy points out that while the approaches to developing a profile of a s elf-directed learner have varied enormously amongst authors, the lists of skills and c ompetencies have a r emarkable degree of congruence in their qualities and characteristics. These qualities include the following: methodical and di sciplined, reflective and self-aware, confident with a positive self-concept, developed information-seeking and retrieval skills, curiosity, openness, and motivation. Many of these qualities are utilized and embedded in the Jefferson Scale of Physician Lifelong Learning, one of the few instruments specifically validated for physicians.[5,8]

The value in diagnosing the stage of self-directness lies in helping the learner move from a less advanced to a more advanced stage. Grow[9] speaks to the levels of self-directedness beginning with dependent, moving through interested and involved, and finally culminating in self-directed. He provides strategies for teaching learners at each of these levels as well as tips for helping learners progress along this continuum.

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Developmental Milestones

❖ **Dependent on external direction** to learn. Learns what is required with little ability or motivation to develop the concepts more deeply. **Little self-confidence or insight** into learning process.
❖ Starts to take **some initiative**, **but dependent** on the help of others for self-assessment and identification of learning needs. **Emerging insight** into the learning process can be exhibited by **developing learning strategies, understanding methods that work for the individual, and actively seeking ways to use those strategies and methods.**
❖ Develops an **internally motivated** process of inquiry and reflection that drives learning with **limited external guidance**. Demonstrates the **self-confidence and insight** into abilities to identify learning needs, develop learning objectives, and identify appropriate resources.
❖ Learning is **internally driven, with self-confidence** in abilities to pursue a learning goal and learning plan. **Insightful, with a high degree of curiosity, as demonstrated by asking complex, thoughtful, and probing questions.**
❖ Demonstrates **self-efficacy, insightfulness, and reflection** in developing learning plans and evaluating one's own learning process. **Self-confident** in ability to learn and continually reviews the process and progress of learning.

D. COMPETENCY: INTERPERSONAL AND COMMUNICATION SKILLS

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1. *Communicate effectively with patients, families, and the public, as appropriate, across a broad range of socioeconomic and cultural backgrounds*

Primary Author: Bradley Benson, MD

Background

The ability to communicate effectively with patients, families, and the public is a c ritical skill for the medical professional and has been directly related to the outcomes of clinical care.[1]   The importance of this is reflected in the medical education literature in consensus statements on essential elements of communication,[2,3] in guidelines for medical school curriculum development,[4,5] and through increased emphasis placed on c ommunication skills by professional practice organizations and accrediting bodies.[6,7]

The task approach is useful in conceptualizing the skills needed f or effective physician-patient communication and has been the cornerstone of teaching this competency in medical education. T he Kalamazoo Consensus Statement[3] clearly summarizes these essential communication tasks. The simplified list is as follows: 1) build the doctor-patient relationship, 2) open t he discussion, 3) gather information, 4) understand the patient's perspective, 5) share information, 6) reach agreement on problems and plans, and 7) provide closure. Multiple other models of effective communication have been proposed; however, the essential elements are similar to those above, and multiple validated tools are available to assess learners' competence in these tasks.[8] While the literature on how medical learners

develop this competence is limited, there is a large body of literature in other fields (particularly education) that informs the developmental progression proposed below.[9-11]

Early Physician-Patient Communication Competence

Early communication by the novice learner is predicated on the use of externally provided scripts or templates. During the interactions, the learner is focused as much on remembering the next question as on the responses of the interviewee. The ability to tailor the scripts to patients of different socioeconomic and cultural backgrounds is limited.

Intermediate Physician-Patient Communication Competence

As the templates become habit, the learner is freed in communication both to be more attentive as a listener and to reflect on barriers (physical, cultural, psychological, and social) to the communication. During this stage of development, however, the learner has little experience to draw from to mitigate these barriers. As experience accrues and is reflected upon, the learner can both identify and mitigate barriers to communication under most normal circumstances. When communication does not go well, or a new circumstance is encountered, the competent communicator reflects on the experience and applies lessons learned to future communication.

Advanced Physician-Patient Communication Competence

Progression through the proficient and expert stages of communication involves appropriate responsiveness to an ever-expanding set of circumstances that elicits deviations from traditional scripts in order to optimize the encounter and establish/maintain rapport. The master communicator demonstrates continuous assessment of the interaction and intuitively extrapolates from previous experience to meet the needs of the patient, family, or public in the communication. This individual can adjust to any circumstance, even when engaged in crucial or difficult conversations and even when a similar experience has not been encountered in the past.

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Developmental Milestones

❖ Uses **standard medical interview template** to prompt all questions. **Does not vary the approach** based on a patient's unique physical, cultural, socioeconomic, or situational needs. May feel intimidated or **uncomfortable asking personal questions** of patients.
❖ Uses the medical interview to **establish rapport** and focus on **information exchange** relevant to a patient's or family's primary concerns. **Identifies** physical, cultural, psychological, and social **barriers to communication, but often has difficulty managing them**. Begins to use **nonjudgmental questioning scripts** in response to sensitive situations.
❖ Uses the interview to effectively establish rapport. **Able to mitigate** physical, cultural, psychological, and social **barriers in most situations**. Verbal and nonverbal communication skills **promote trust, respect, and understanding**. Develops **scripts to approach most difficult communication scenarios.**
❖ Uses communication to establish and maintain a **therapeutic alliance**. Sees beyond stereotypes and works to **tailor communication to the individual**. A wealth of experience has led to development of **scripts for the gamut of difficult communication scenarios**. **Able to adjust scripts ad hoc** for specific encounters.
❖ Connects with patients and families in an **authentic manner that fosters a trusting and loyal relationship. Effectively educates** patients, families, and the public as part of all communication. **Intuitively handles the gamut of difficult communication** scenarios with grace and humility.

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2. *Demonstrate the insight and understanding into emotion and human response to emotion that allow one to appropriately develop and manage human interactions*

Primary Author: Bradley Benson, MD

Background

The concept of emotional intelligence (EI) is a useful construct in elucidating the development of insight and understanding into emotion and human response to emotion that allows one to appropriately develop and manage human interactions.[1] EI is a set of four separate but related abilities: perceiving emotions, using emotions, understanding emotions, and managing emotions.[2] **Table 1** below provides a description of each with an example from graduate medical education.

Table 1. Description and examples of the abilities of emotional intelligence

Ability	Narrative Description	Example
Perceiving emotions	Accurate identification of emotions in oneself and others	A senior resident reads fear and anxiety in a mother's face and body language during a discussion of routine vaccinations.
Using emotions	Knowledge of and experience with emotions informs and changes behavior	The above resident acts upon the discovery of the mother's emotional nonverbal cues and queries for further information about her experiences and fears related to vaccination.
Understanding emotions	Ability to analyze emotions in oneself and others and describe the connections between those feelings and the resultant behavior	The above resident learns that the mother's nephew has been diagnosed with autism and makes the connection between the mother's anxiety and her fear of the MMR vaccine causing autism in her child.

Managing emotions	Ability to consciously regulate emotions in oneself and others	The above resident is able to manage her own strong feelings about the value of vaccinations and counsel the parent in a caring and empathetic manner, allaying her fear.

This model assumes that these four abilities encompass skills that are distinct from personality traits and environmental factors and may be de veloped and improved through practice.[3] This is supported by observational reports across multiple learner levels and training programs.[4,5]

In addition to EI, the Dreyfus and D reyfus model, describing the developmental skill progression from novice to master as it applies to medical education, greatly informed the ontogeny of the milestones below.[6]

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Developmental Milestones

❖ **Does not accurately anticipate or read others' emotions** in verbal and nonverbal communication. Is **unaware of one's own emotional and behavioral cues** and **may transmit emotions in communication** (e.g., anxiety, exuberance, and anger) that can **precipitate unintended emotional responses** in others. **Does not effectively manage strong emotions** in oneself or others.
❖ Begins to **use past experiences to anticipate and read** (in real time) the **emotional responses** in herself and others across a **limited range of medical communication scenarios,** but **does not yet have the ability or insight to moderate her behavior to effectively manage the emotions**. **Strong emotions in oneself and others may still become overwhelming**.
❖ **Anticipates, reads, and reacts to emotions in real time** with appropriate and **professional behavior in nearly all typical medical communication scenarios**, including those evoking very **strong emotions**. Uses these abilities to **gain and maintain therapeutic alliances** with others.
❖ **Perceives, understands, uses, and manages emotions** in a **broad range of medical communication scenarios** and **learns from new or unexpected emotional experiences**. Effectively **manages her own emotions** appropriately in **all situations**. Effectively and consistently **uses emotions to gain and maintain therapeutic alliances** with others. Is perceived as a **humanistic provider**.
❖ **Intuitively perceives, understands, uses, and manages emotions** to improve the health and well-being of others and to **foster therapeutic relationships** in any and **all situations**. Is seen as an **authentic role model of humanism** in medicine.

3. *Communicate effectively with physicians, other health professionals, and health-related agencies*

Primary Author: Bradley Benson, MD

Background

Competence in interprofessional communication is a critical skill that underlies effectiveness across the scope of medical practice and is integrally linked with the issues of patient safety and medical error.[1] Research into how this competency develops, however, is scarce and l imited by the complexity of medical communication across different specialties, settings, and contexts.

Communicative Competence

A useful construct in understanding the developmental progression of skills in interprofessional communication is that of communicative competence.[2] This model was originally described by Dell Hymes[3] and has been built upon by a legion of subsequent scholars studying how learners acquire a second language. C anale and S wain[4] described the three components of communicative competence Listed in **Table 1**:

Table 1. Description and examples of the components of communicative competence

Communicative Competence Component	Narrative Description	Example in Medical Interprofessional Communication
Grammatical Competence	Concerned with mastery of the language code itself (i.e., the words and the rules)	Medical terminology and jargon, order of presentation (i.e., chief complaint *before* the history of present illness and the physical examination *before* the labs)
Sociolinguistic Competence	Concerned with appropriateness of the chosen grammar and syntax for the particular situation or context	Use of jargon may be inappropriate for discussion with nonphysician care team members
Strategy Competence	Concerned with adoption of the appropriate communication strategy for the situation or context	Appropriate choice of communication type (e.g., alpha text page versus e-mail versus telephone versus face-to-face) or the strategy within a given type (e.g., 30-second synopsis versus 5-minute full presentation)

Each of these may be a pplied to communication in medicine, as noted in the third column of **Table 1** above.

Medicine as a Second Language

The literature supports the comparison of learning "medicalese" and oral presentation skills to the acquisition of a new language.[5,6] In fact, the observational study by Haber and Lingard[5] using rhetorical analysis to study oral presentation skill development provides great insight into the early milestones.

Competent medical communication requires fluency in the complex language of health care and in the ability to adapt the communication of a message to the context in which it is delivered. T his context consists of the audience (e.g., supervising resident, consult attending, pharmacist, nurse), the purpose (i.e., to tell a s tory or make a c ase), and the occasion (e.g., bedside rounds, phone consult request, transfer of care).

<u>Early Development in Interprofessional Communication</u>
Using the observations of Haber and Lingard,[5] in the early stages learners describe and conduct presentations as a "rigid, rules based, data storage activity governed by order and structure." Data are presented in the same order in which the questions were asked and often directly from a written note. The presentation does not change based on context, and the same summary is given to the resident, the attending, and the consultant. The presenter is often not aware of the social purpose of the presentation (e.g., to obtain permission from the infectious diseases specialist for use of a restricted antibiotic), but is more focused on clearly stating all of the facts.

<u>Intermediate Development in Interprofessional Communication</u>
As learners progress, they begin to understand the different audiences and occasions and can tailor their language and corresponding message accordingly. T hey also begin to see the purpose of the presentation and are able to either "tell the story" or "make the case" appropriately. While in some situations, they may still err on the side of inclusion of excess details out of fear of causing harm; they begin to shorten presentations to include just the pertinent information. The intermediate developmental stage here also includes the emerging focus on and understanding of communication strategies to adapt to the context of the communication (e.g., the use of an e-mail for a quick informational exchange, with face-to-face time reserved for crucial conversations or critical feedback).

<u>Advanced Development in Interprofessional Communication</u>
As interprofessional communication skills become advanced, the learner naturally tailors the message and communication strategy to the context to maximize effectiveness and ef ficiency. The concept of "improvisation" is helpful in understanding the nature and development of these skills. In the words of Haidet,[7] "Improvisation guides a physician's process of making moment-to-moment communicative decisions (e.g., what to say next, how to structure particular questions, which threads to follow, when to interrupt and when to let the patient keep going)." With regular exposure to new communication scenarios and ongoing reflection, improvisation skills continue to evolve and are a hallmark of the expert communicator.

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Developmental Milestones

❖ **Rigid rules-based** recitation of facts. Often communicates from a **template** or prompt. Communication does not change based on context, audience, or situation. **Not aware of the social purpose of the communication.**
❖ Begins to **understand the purpose of the communication** and at times adjusts length to context, as appropriate. However, will often still **err on the side of inclusion of excess details**.
❖ Successfully **tailors communication strategy** and message to the audience, purpose, and context in most situations. **Fully aware of the purpose of the communication**; can efficiently tell a story

and effectively make an argument. **Beginning to improvise** in unfamiliar situations.
❖ Uses the **appropriate strategy for communication**. Distills complex cases into succinct summaries tailored to audience, purpose, and context. **Can improvise** and has expanded strategies for dealing with difficult communication scenarios (e.g., an interprofessional conflict).
❖ **Master of improvisation** in any new or difficult communication scenario. Recognized as a highly **effective public speaker**. Intuitively develops strategies for **tailoring message** to context to gain maximum effect. Is sought out as a **role model** for difficult conversations and mediator of disagreement.

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4. *Work effectively as a member or leader of a health care team or other professional group*

Primary Author: Bradley Benson, MD

Background

The importance of teamwork in medicine is clear from a growing body of literature linking these skills to patient safety, satisfaction, and improved clinical outcomes.[1-3] The relationship between teamwork and patient safety and outcomes was highlighted in the landmark Institute of Medicine (IOM) publications, *To Err Is Human*[4] and *Crossing the Quality Chasm*,[5] with specific recommendations for teaching and assessing these knowledge, skills, and attitudes (KSA) across the continuum of medical education and continuing professional development with the goal of ingraining this into the culture of our medical institutions. In these publications, however, it is clear that a comprehensive theoretical model of team performance in medical settings is not yet fully developed and validated adding to the challenges in assessment, as eloquently stated below by Baker et al.[6]

> For teamwork skills to be assessed and have credibility, team performance measures must be grounded in team theory, account for individual and team-level performance, capture team process and outcomes, adhere to standards for reliability and validity, and address real or perceived barriers to measurement.

The focus here will be on the individual competencies that a provider brings to a team in order to contribute to effective team function. However, it is important to consider that the development of these competencies is influenced by the individual competencies of other team members, competencies of the team as a unit, and competencies of the organization as a whole.[7]

Before detailing the proposed milestones for the sub-competency of interprofessional teamwork, we must begin with an accepted definition of a "team" and a description of the specific KSA that comprise teamwork. For the purposes of this work, a team will be considered to be a group of two or more people with the following characteristics: specific roles, interdependent tasks, adaptability, and a shared common goal.

Teamwork-Related Knowledge
Cannon-Bowers and colleagues[7] describe multiple knowledge areas related to effective team performance. Simply stated, to function effectively in a team, a team member must know what team skills are required, what team behaviors are appropriate, and how to perform these skills and behaviors in a team setting. Team members must also know the team's mission and goals as well as each other's roles and responsibilities in achieving them. This knowledge is then used to determine the best strategies for interaction and coordination among teammates to best achieve the mission.

Teamwork-Related Skills
The literature in this area is extensive and context-specific, leading to a myriad of skill labels and definitions. A review of the teamwork literature in 1995 identified over 130 terms to describe the various teamwork skills.[8] Much work has been done to distill these into generic skill sets required for effective performance on any team, independent of the context.[10] The four key skills identified by Alonso and

colleagues[9] are leadership, mutual support, situation monitoring, and communication.[11] These form the basis of the Agency for Healthcare Research and Quality supported team training program, TeamSTEPPS[TM], which was released to the public domain in 2006 and has been implemented at healthcare institutions across the nation and abroad.[10] The outcomes of this program strengthen the argument that these core skills are teachable and that improved individual performance positively impacts team outcomes. They are clearly inter-related and improvements in one area may lead to observable improvements in the others. The ontogeny of the four team skills described below is based on developmental models used throughout the milestones work and includes the work of Dreyfus and Dreyfus,[11] Monrouxe,[12] and Pangaro.[13] The developmental progression of these skills is an area ripe for research.

Team Communication
For the purposes of this milestone, it is defined as the initiation of a message by the sender, the verification of receipt and acknowledgement of the message by the receiver, and the verification of the initial message by the sender. The developmental progression for this skill goes from unidirectional communication (i.e., with a focus on sending or receiving a message only) to bidirectional information exchange with verification of understanding by both team members and commitment to the greater purpose of the communication. This skill is integral to effective patient hand-offs and discussed in detail in related milestones. Using this example the early learner would focus on the specific task of providing or receiving the sign-out document. The advanced learner would augment the written sign-out with a succinct verbal summary, verify that the covering provider understands the key clinical issues and the tasks that need to be followed up, and that they commit to providing the needed care.

Mutual Support
A working definition of mutual support focuses on providing coaching and support to improve performance or when a lapse is detected, assisting teammates in performing a task or completing a task for the team member when an overload is detected. The proposed developmental progression for this skill moves from a "self" centered view of one's work to one that includes the other individual team members and "their work" to a team-focused view of "our work." Early learners perform their "own work" but may not seek help when beyond their capabilities or overloaded. With progression, intermediate learners will ask for help with their work as needed and will provide support when other team members ask for it, or passively offer support if it is clear that team members are overwhelmed or unable to complete "their work". Finally, the advanced learner makes certain they get any needed help when overloaded and automatically steps in or arranges for assistance when "our work" is uneven or not adequately completed for any reason. This later stage includes initiation of active assistance as opposed to the passive offering of assistance.

Situation Monitoring
It is defined here as tracking fellow team members' performance to ensure that the work is running as expected and that proper procedures are followed. In the early stages, the proposed developmental progression for this skill begins with the self-awareness of one's needs, abilities, and contributions, and progresses to include awareness of the needs, abilities and contributions of the other team members. The more advanced stages are characterized by a global view of team performance as it relates to achieving team goals.

Team Leadership
For our purposes this skill is defined as the ability to direct/coordinate team members, assess team performance, allocate tasks, motivate subordinates, plan/organize, and maintain a positive team environment. When translated into behaviors, these may be observed and assessed in any member of a healthcare team, not just the designated leader. The proposed developmental progression for this skill involves moving from behaving as a passive bystander on the team, to taking an active ownership role, to ensuring that the overall team goals are met.

Teamwork-Related Attitudes

Teamwork-related attitudes are internal states that affect a team member's choices and behavior. Examples include shared vision, mutual trust, collective orientation, and a belief in the importance of teamwork as the best approach to achieve a goal. Studies demonstrating better performance of individuals who view success as more a function of cooperation than competition as compared to those with the opposite view suggest the importance of attitudes in team outcomes.[14]

It is upon this foundation of team theory that developmental milestones in this sub-competency are proposed. As with other milestones, there is significant overlap, particularly with Systems-Based Practice and Professionalism. The development of a team-based systems approach to health care provision is well described in the Systems-Based Practice milestones, and similar overlap is noted in the discussion of leadership related to Personal and Professional Development.

While these teamwork-related KSA domains could be parsed out as sub-sub-competencies with individual milestones in the professional development of each, we will not attempt that here. We propose to unify these domains into developmental stages informed by the work of Dreyfus and Dreyfus,[15] Zabarenko and Zabarenko,[16] and Brent.[17]

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Developmental Milestones

❖ Limited participation in team discussion; **passively follows** the lead of others on t he team. Little **initiative** to interact with team members. More **self-centered** in approach to work with a focus on one's own performance. Little awareness of one's own needs and abilities. Limited acknowledgment of the contributions of others.
❖ Demonstrates an understanding of the roles of various team members by interacting with appropriate team members to accomplish assignments. **Actively works** to integrate herself into team function and meet or exceed the expectations of her given role. In general, works towards achieving team goals, but may put **personal goals related to professional identity development (e.g., recognition) above pursuit of team goals.**
❖ Identifies herself and is seen by others as **an integral part of the team**. **Seeks to learn the individual capabilities** of each fellow team member and will offer coaching and performance improvement as needed. Will **adapt and shift roles and responsibilities as needed to adjust to changes to achieve team goals**. **Communication is bi-directional** with **verification of understanding** of the message sent and the message received in all cases.
❖ **Initiates problem-solving**, **frequently provides feedback** to other team members, and **takes personal responsibility** for the outcomes of the team's work. **Actively seeks feedback** and **initiates adaptations** to help the team function more effectively in changing environments. Engages in **closed loop communication** in all cases to ensure that the correct message is understood by all. **Seeks out and takes on leadership roles** in areas of expertise and makes sure the job gets done.
❖ Goals of the team supersede any personal goals, resulting in the ability to seamlessly assume the role of leader or follower, as needed. **Creates a high-functioning team de novo or joins a poorly functioning team and facilitates improvement,** such that team goals are met.

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5. *Act in a consultative role to other physicians and health professionals*

Primary Author: Bradley Benson, MD

Background

The medical consultation is not a straightforward procedure, and the effectiveness of such consultations is not easily studied in a randomized controlled trial.[1] It is, however, a common intervention in patient care, and nearly all medical professionals request or provide consultative services as part of their clinical work. As with many other competencies and s ub-competencies, there is significant overlap in the skill sets that are required. For consultation skills, in particular, specific expertise is required in the domains of medical knowledge and patient care. Certain specific aspects of professionalism are also critical and have been the subject of much ethical and medico-legal debate as they relate to consultation.[2] The American Medical Association[3] noted nine ethical principles directly pertaining to physician consultation, three of which apply to the referring physician and the remaining six focus on the consultant. These serve to clarify the responsibilities and role of the consultant and are summarized briefly as follows: 1) *one physician* should direct the patient's care and t reatment and the consultant *should not* take on primary management without the consent of that primary provider; 2) the consultation should be done in a timely manner and the results should be communicated directly to the referring provider and should be shared with the patient only by prior consent of that provider; and finally, 3) differences of opinion need to be resolved with a second consultation or withdrawal of the consultation, although the consultant has the right to discuss their opinion with the patient in the presence of the referring physician.

At the heart of effective consultation is the communication with the referring provider. There is a body of literature on factors that improve compliance with consultant recommendations, and these findings support the importance of advanced communication skills for an effective consultant. This literature has formed the basis of most subsequent writing on the knowledge, skills, and attitudes required for effective consultation. The cardinal article by Goldman,[4] "The Ten Commandments For Effective Consultations," pragmatically summarizes this work. This work has been updated to reflect current practice, but the key principles remain the same.[5] Review of Goldman's ten key skills is provided in **Table 1**; however, the developmental process of becoming an expert consultant is much more complex and involves not only the acquisition of specific knowledge and skills but also attitudes and behaviors related to professional identity, which are addressed in other milestones.

Table 1. Key skills for effective communication based on the work of Goldman[5]

Skill	Narrative	Novice-Expert Anchors
Clarify the question	Communicate with the referring provider to determine whether a specific question is to be answered, a procedure requested, or if co-management is the goal.	Novice: Does not attempt to clarify clinical questions where needed Expert: Negotiates (and if needed renegotiates) most appropriate role and question based on needs of provider and patient
Determine the urgency	Understanding the question and the patient's situation allows determination of how quickly an opinion needs to be given to provide optimal patient care.	Novice: Not able to determine urgency; own time constraints trump patient/provider needs Expert: Determines urgency and conveys this to the requestor of the consultation, mobilizing the team as needed in acute situations
Independently assess the patient	Independent assessment of the patient is necessary.	Novice: Relies primarily on others' assessments in the medical record Expert: Approaches each patient independently and verifies all important data while seeking out missing information to obtain a complete and accurate clinical picture
Be as brief as appropriate	Succinct medical documentation and communication improve compliance.	Novice: Lengthy documentation often includes unnecessary detail and irrelevant information Expert: Brief documentation synthesizes clinical picture with just the right amount of detail
Be specific	Treatment recommendations should be as specific as possible (e.g., medication doses, routes of administration, duration of therapy).	Novice: Makes vague general recommendations Expert: Makes specific recommendations that could be transcribed as orders
Provide contingency plans	Communication of the anticipated clinical course with clear recommendations to help manage potential complications that may arise is ideal.	Novice: Does not anticipate clinical course or provide contingency plans Expert: Clearly communicates predictable complications and clinical course and plans for monitoring, prevention, and treatment, as appropriate

Skill	Narrative	Novice-Expert Anchors
Stay within your expected/negotiated role	Writing orders on patients may be inappropriate; in other cases, co-management is what the referring provider wants. This must be tactfully negotiated up front.	Novice: Does not determine what role is expected/desired by the requesting physician Expert: Tactfully negotiates the most appropriate role up front with the requesting physician
Carry out teaching role	Discipline-specific teaching is an important role of the consultant and must be tailored to the individual needs/expectations of the requesting physician. A pejorative style must be avoided.	Novice: Does not teach or is condescending in communicating recommendations Expert: Effectively tailors education to meet the needs and expectations of the requesting physician in a respectful manner
Make direct contact with referring provider	Direct communication allows questioning, specific teaching, and feedback regarding satisfaction with the consultation.	Novice: Does not directly communicate with the referring provider; may simply use the medical record Expert: Determines and practices the preferred mode of communication with each requesting physician and makes sure that two-way communication is clear and effective
Provide adequate follow-up	Appropriate interval and level of follow-up required to assess outcomes and patient and referring provider needs and to adjust recommendations accordingly.	Novice: Timing and level of follow-up not appropriate to the clinical picture Expert: Timing and level of follow-up optimally tailored to the patient's and the requesting physician's needs and expectations; makes conscientious use of resources

The skills noted above are relatively straightforward and amenable to assessment by chart audits and multisource assessments. Mor e difficult to conceptualize and assess is the development of the professional identity of a consultant.[6] Much has been written about the development of professional expertise. Refer to Bereiter and Scardemalia,[7] Eraut,[8] and Dreyfus and Dreyfus[9] for a d eeper understanding of the foundation on which this framework is developed.

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Developmental Milestones

❖ Actively participates as a member of the consultation team and **can accurately gather and present the patients' history and physical findings, scribe recommendations, and document them in the medical record**. Lack of discipline-specific knowledge **limits ability to focus the data gathering and presentation** to those details relevant to the question asked.
❖ **Identifies self as a member of the consultation team**. Can accurately gather and present the patient's history and physical findings with a **focus on those details pertinent to the question asked**. Increased discipline-specific knowledge and ability to filter and prioritize information lead to a **more focused (although not comprehensive), differential, realistic working diagnosis; more specific recommendations; and more succinct documentation**. Takes more **"ownership" of the patients' outcomes** during follow-up of initial recommendations.
❖ Identifies self as an **integral member** of the consultation team based on **advanced knowledge and skills in specific areas** tempered by **recognition of limitations** in others, leading to pursuit of new knowledge. **Independently assesses and confirms data**. Combination of past experience and ability to use information technology to seek new knowledge allows for **recommendations that are consistent with best practice**. Develops **good relationships** with referring providers, but may not encourage the bidirectional feedback that makes the relationship truly collaborative.
❖ Identifies self as an **expert** in her discipline based on advanced knowledge and **vast experience** that manifest as **intuitive clinical reasoning that is succinctly communicated to answer the specific questions asked**. This **drives life-long learning behavior** and clear communication of the strength of the evidence on which recommendations are based. Develops and maintains a **collaborative relationship with the referring providers** that **maximizes adherence to recommendations** and supports continuous bidirectional feedback.
❖ Identified by self and others as a **master clinician** who effectively and efficiently lends a **practical wisdom** to consultation. Answers to all but the most difficult diagnostic dilemmas are **intuitive,** leaving most mental energy available for reinvestment in ongoing clinical, educational, and/or research **contributions to the field**.

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6. *Maintain comprehensive, timely, and legible medical records, if applicable*

Primary Author: Bradley Benson, MD

Background

Medical documentation serves many purposes in our healthcare system,[1] including:

- Communication and clinical care planning among caregivers
- Providing a basis for assessing quality of care[2]
- Legal recording for protection of patients, providers, and facilities
- Providing a clinical database for research and education[3,4]
- Documentation for billing of the services provided

The quality and accuracy of medical documentation are closely linked with competence in all of the other domains, with special emphasis on medical knowledge and patient care. F or this discussion of the development of competence in the specific area of medical documentation, however, we will focus on those aspects that are relatively independent of the specific medical content of the documentation. For example, an expert history and physical for a patient with developmental delay might include a thorough

developmental assessment and discussion of how the findings suggest a unifying genetic diagnosis with a detailed plan for testing and follow-up. This, however, requires advanced medical knowledge and patient care skills that are evidenced in the content of the documentation, which reflects clinical assessment and decision-making abilities. This sub-competency, while inextricably linked to the other competencies that target content, will focus primarily on the structure and timing of the medical documentation, as these aspects are also independently linked to the quality of patient care. The widespread adoption of electronic health records (EHRs) has dramatically changed documentation practices and has eliminated some problems (legibility), but has created others.[5,6] For example, the practice of cutting and pasting, or "copying forward," parts of a medical record from one encounter to another may contribute significantly to medical error.[7]

To adequately address this sub-competency, we must define the key terms, specifically "comprehensive," "timely," and "legible." In the assessment of comprehensiveness we ask two key questions: 1) Is the record complete (i.e., does it contain all of the appropriate information)?; and 2) Is the record accurate (i.e., does it reflect what was actually said and done)? The concepts of "complete" and "accurate" documentation also refer not only to the records for an individual patient encounter (i.e., an admission history and physical examination), but to a patient's medical record as a whole. For the individual physician-patient encounter, the documentation standards are setting and context specific. For example, a complete interval note for a continuity panel patient seen for follow-up of eczema would differ considerably from that of a new patient seen in consultation for developmental delay. Chart audit and video review of encounters are most often used to assess the completeness and accuracy of documentation and interventions; use of these methods has been demonstrated to improve physician compliance with set standards.[8,9] There are also generally accepted standards for comprehensive medical records as a whole.[10,11] The specific requirements vary with the patient setting (e.g., inpatient versus ambulatory) and the specific disease state (e.g., diabetes versus cystic fibrosis), but there are similarities to all. As an example, the Joint Commission for Accreditation of Healthcare Organizations (JC) requires accredited hospitals to perform chart audits for nineteen data items (e.g., identification data, medical history, physical examinations, progress notes, consultation reports, reports of diagnostic and therapeutic procedures) and to document their presence, timeliness, legibility, and authentication to ensure that the medical records are comprehensive.

The definition of "timely" is more straightforward. In this context, timely documentation refers to availability of the written communication regarding a medical encounter within an accepted time frame that allows others involved in the care of the patient to use it in understanding the course of medical events that have occurred during a hospitalization, a clinical encounter (e.g., an outpatient visit), or an interval between visits. The most common example would be the availability of a discharge summary for the primary pediatrician to review prior to the scheduled follow-up visit with the child.

Lastly, the definition of "legible" is similarly straightforward. Handwritten documentation or an order is either easily readable or not. This aspect of medical communication is critical, and a learner who persists in illegible documentation would not ever be judged competent. As we shift to universal use of EHRs, however, we must move beyond the concept of legibility and focus on the comprehensibility of medical documentation. This construct addresses grammar and syntax, culturally competent communication, use of jargon, and other critical issues, such as flow and cohesiveness. In other words, does it tell the patient's "story" in a way that the reader can easily follow and understand?

Little literature exists on the development of this specific competency, but the following progression is proposed based on work focusing on the development of expertise.[12-15]

Early Development in Medical Documentation
Early learners focus on the individual encounter and, with progression of competence, gain the larger view of the importance of the comprehensive medical record. In their documentation of the individual encounter, early learners lack the ability to filter and prioritize and therefore commit both errors of omission (leaving out important information) and commission (including unimportant information). With progression, the errors of omission decrease and errors of commission increase, as evidenced by more lengthy documentation with more extraneous information.

<u>Intermediate Development in Medical Documentation</u>
As the learner progresses to competence and beyond, the documentation becomes succinct, containing just the right amount of information. At this level, care must be taken to balance the brevity with the need for thoroughness and to accurately document the key aspects of what was said and done during a specific encounter.

<u>Advanced Development in Medical Documentation</u>

As further development occurs, more focus is placed on management of the medical record as a whole. Maintaining a problem list, medication list, immunization status (including those administered elsewhere), growth curves, and communicating with specialists are examples of items the advanced learner focuses on.

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Developmental Milestones

❖ Documentation has **both errors of omission and errors of commission**. In the former case, documentation is often **incomplete**; critical data sections (e.g., past medical history [PMH]) and critical data (e.g., specific diagnoses in the PMH) may be missing and **may not document what was actually said and done**. In the latter case, documentation is subject to **errors of inclusion of unnecessary information or detail**. Documentation is often **not available** for other providers to review in time for their use in the patient's care. Handwritten documentation may be **illegible,**

abbreviations are often used, and date/time/signature may be omitted.
❖ Documentation often contains **all appropriate data sections**; though some information may be **missing** from some sections or presented in a **sequence that confuses the reader** (evolution of symptoms is not documented chronologically). Documentation may be **overly lengthy** and detailed. It may contain **erroneous information** carried forward from review of the past medical record. However, the practitioner at this stage begins to go beyond documentation of specific encounters and **may update the patient-specific databases** (e.g., problem list and diabetes care flowsheet) where applicable. Documentation is often in the medical record in a **timely manner,** but may need subsequent amendment to be considered complete. Handwritten documentation is usually legible, timed, dated, and signed.
❖ Documentation is **comprehensive** and **accurately captures the patient's story** using key aspects of the physician-patient interaction and the service provided, yet is not overly long and detailed. Will sometimes **tailor** the documentation to the **specific situation**. All important data are **verified** or the source is stated. Identified errors in the medical record are **reported** and appropriate measures initiated to **correct** them. Key patient-specific databases are **maintained and updated** where applicable. Documentation is **completed and available** for others to review **within an appropriate time frame** for it to aid in their care of the patient. Handwritten documentation **is always legible, prohibited abbreviations are avoided, and all documentation has a time, date, and signature.**
❖ In addition to the capabilities noted above, most often **tailors** documentation to the specific care situation **without loss of comprehensiveness**. **Synthesizes** key information in a **succinct** manner. Begins to develop **standard templates** or tools for ensuring that documentation **includes all appropriate quality markers, supports accurate billing and coding, meets legal and community care standards, enables identification of patients for disease registries, and supports chart audits**. Regularly **participates in chart audits** for quality of documentations and **acts on the results for self-improvement**.
❖ In addition to the capabilities noted above, **uses her expertise to improve documentation systems to drive better patient care outcomes and works to disseminate best practices**.

E. COMPETENCY: PROFESSIONALISM

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Background

"Professionalism" is a multi-dimensional term that encompasses many sub elements. The framework for professionalism formulated by Stern and Papadakis[1] includes the pillars of excellence, humanism, accountability and altruism resting on a base of ethical and legal understanding, communication skills and clinical competence.

An analysis of the literature indicates that professionalism appears to have at least four sub-components: 1) **professionalization**[2, 3] or the development of a professional identity ("Now I am no longer a student I am becoming a doctor"; 2) **professional conduct**[4] in interactions with patients, families, peers and colleagues ("Now I must act in a way that reflects the responsibilities that my patients and society expect of m e"); 3) **humanism**,[5, 6] or the ability to maintain human values that permeate altruistic patient interactions ("Although I have special skills as a medical doctor, I am still just one member of the human family"); and 4) **cultural competence**[7] ("I am aware of the views that derive from my cultural background and am aware of the unique cultural backgrounds of my patients").

Although there are many sub-components to the professionalism competency, they can all be related to the four sub-components described above. Of note, there are aspects of professionalism that permeate and integrate with many of the other milestones such as self-improvement, life-long learning, empathy and transference, teamwork, advocacy, self-awareness, work-life balance, trustworthiness, confidentiality

and integrity. There are no well-structured published sequences for the professional development of physicians; however, Hilton and Slotnick[8] have proposed the term proto-professionalism which describes how professionalism develops across the continuum. There are three important questions that impact the development sequence: 1) How do nature and nurture interact to produce development? 2) Is the learner a passive recipient of environmental influence or is there an active shaping of development? and 3) Does development happen continuously or in stages?[9]

Typically elements of professionalism are taught and learned early in child development (e.g., honesty, respect) but need to be explicitly reinforced during medical education and training. In cases where these elements were not learned it is incumbent upon the faculty to teach, assess and r ole model them. Additional elements that may not have been learned in childhood (e.g., cultural competence), likewise need to be taught, assessed and role modeled. Some trainees, through prior experience and personality characteristics, may enter residency training at an advanced level of development of the listed milestone anchors presented later in this chapter. Other physicians may need to be guided through the series of developmental steps also represented by the anchors. Professionalism assessments may be influenced by certain contexts or situations, cultures, or even factors inherent to the assessor. S o there always needs to be due caution and a search for patterns of behavior rather than a single event. Using the four professionalism subcomponents and the related milestones will help the program director or mentor locate the level of a trainee and add direction for further instruction and improvement.[10-14]

As far as **professionalization,** Forsythe[2] has written about identity development in professional education using the insights of Robert Kegan's constructive developmental theory.[15] Kegan is interested in how people construct or organize their understanding of themselves and t heir interpersonal world. Although Kegan proposes six stages, three (Stages 2, 3 and 4) are relevant to professional identity. In Stage 2, individuals organize events into concrete categories and are able to see the perspective of others but only in relation to how it affects them personally. In Stage 3, individuals are able to organize experiences and events into abstract events and t o view multiple perspectives. In Stage 4, external expectations and identifications are restructured in terms of self-authored principles and standards. With stage 4 the physician understands the role and what is expected is internalized and not dependent on someone requiring them to act in a professional way. These stages are relevant to the progression we see in physician development from medical student to mature senior professional.

The following are some sample observations that might be used to document this aspect of professionalism:

- Appears to be passive and unengaged with patients in therapeutic relationships.
- In delivering patient care does what he is told to do when he is aware that his actions will result in negative consequences or praise.
- Introduces him/herself by first name, not as Dr. ___.
- Fulfills patient care role, but is not proactive in that role; always defers to the attending physician and takes little to no initiative.
- Colleagues identify this person as demonstrating a professional demeanor even under stressful circumstances, which is an important component for being a c andidate for a chief resident position.
- A trainee who embraces responsibility for the broad issues of pediatric health and advocates for children, their hospital or their profession outside the standard work role.

Professional Conduct that is constant and not situational or time independent is something to strive for but sometimes there are slips and failure. One cannot be professional in all situations. One is challenged each and every day by issues of professionalism and each of us experiences lapses from time to time. One expects development of integrity, duty, ethics, appropriate boundaries,[16] and accountability.[17] Emanuel and Emanuel have defined accountability in terms of the loci of accountability, the domains of accountability, and the procedures of accountability. T here may also be at least three models of accountability: the professional model, the economic model, and the political model. In this milestone the focus is on t he professional model. Given fatigue, stress, excessive workload, and nonwork-related

factors, there may be varying degrees of professional conduct lapses. Thus, we are looking to assess not an absolute standard but a pattern of usual behaviors.

Some sample observations that might be used to document this aspect of professionalism:

- Frequently provoking reports from colleagues, nursing staff, program coordinator about unprofessional conduct.
- Appears to be nonchalant about issues of confidentially, HIPPA requirements or ethical conflicts.
- When post call or stressed may say and do things that are not appropriate to the professional role.
- Does not keep up with evaluations and chart completions.
- Understands his own lapses in professional conduct and works on ways to anticipate and control these situations. For example, when provoked by an angry parent knows how to remain above the fray.
- Appears to be well respected and gets along with every team member while delivering good care.

Humanism is that quality that leads the doctor to see himself as a member of the family of all people thus ensuring compassion, altruism, empathy, privacy, and understanding of and respect for diverse populations. Jordan Cohen[5] states that "humanism is the passion that animates professionalism."

Some sample observations that might be used to document this aspect of professionalism:

- Sees patients as a burden – refers to admissions as "hits".
- Offers concern and support in unusual or isolated circumstances but not for the routine patient.
- On rounds indicates insight into the needs of the patient and family – has heard the family's expression of need.
- Seems to intuitively provide for all patients' needs - for example will tell the parent of a child with a headache that they need not worry about a brain tumor.
- Demonstrates work outside the required work role to make things better for a group of children, for example, volunteers in a homeless shelter.

Cultural Competence is defined by the Association of American Medical Colleges[18] (AAMC) as follows:

Cultural competence is a set of congruent behaviors, knowledge, attitudes and policies that come together in a system, organization, or among professionals that enables effective work in crossing cultural situations. Culture refers to integrated patterns of human behavior that include language, thoughts, action, customs and beliefs, and institutions of racial, social, ethnic, or religious groups. Competence implies having the capacity to function effectively as an individual or an organization within the context of cultural beliefs, practices and needs presented by the patients and their communities.

The AAMC has developed a cultural competence initiative and a tool for curriculum assessment.

The following are some sample observations that might be used to document this aspect of professionalism:

- Generalizes about a group of patients for example, "Those __ they always want tokens for their ride home from the ED."
- Knows that certain individuals have beliefs or customs that relate to health care, but does not incorporate this knowledge into care plans.
- Does not use translation services.
- Trainee demonstrates interest in cultural understanding; asks families about their preferences and needs, and reports on these issues regularly on rounds.
- Develops systems and programs to understand and educate others about cultural issues. Is an advocate for cross-cultural understanding.

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Developmental Milestones

Professionalization

❖ Appears to be interested in learning pediatrics but **not fully engaged and involved** as a professional, which results in an observational or passive role.
❖ Although he appreciates the role in providing care and being a professional, at times has **difficulty in seeing self as a professional,** which may result in not taking appropriate primary responsibility.
❖ **Demonstrates understanding and appreciation of the professional role** and the gravity of being the "doctor" by becoming fully engaged in patient care activities. Has a sense of duty. Rare lapses

into behaviors that do not reflect a professional self-view.
❖ Has **internalized and accepts full responsibility** of the professional role and develops fluency with patient care and professional relationships in caring for a broad range of patients and team members.
❖ **Extends professional role** beyond the care of patients and sees self as a professional who is contributing to something larger (e.g., a community, a specialty, or the medical profession.

Professional Conduct

❖ There are **repeated lapses** in professional conduct wherein responsibility to patients, peers and/or the program are not met. These lapses may be due to an apparent lack of insight about the professional role and expected behaviors or other conditions or causes (e.g., depression, substance use, poor health).
❖ Under conditions of **stress or fatigue, there are documented lapses** in professional conduct that lead others to remind, enforce, and resolve conflicts.   There may be some insight into behavior but there is an inability to modify behavior when placed in stressful situations.
❖ In nearly all circumstances, **conducts interactions with a professional mindset,** sense of duty and accountability. Has insight into his/her own behavior as well as likely triggers for professionalism lapses and is able to use this information to remain professional.
❖ Demonstrates an in-depth understanding of professionalism that allows him to **help other team members and colleagues with issues of professionalism.** Able to identify potential triggers and uses this information to prevent lapses in conduct as part of his duty to help others.
❖ Others look to this person as a **model of professional conduct**. Smooth interactions with patients, families, and peers. Maintains high ethical standards across settings and circumstances. Excellent emotional intelligence about human behavior and insight into self and uses this information to promote and engage in professional behavior as well as to prevent lapses in others and self.

Humanism

❖ Sees the patients in a "we versus they" framework and is **detached** and not sensitive to the human needs of the patient and family.
❖ Demonstrates **compassion for patients in selected situations** (e.g., tragic circumstances such as unexpected death) but has a pattern of conduct that demonstrates a lack of sensitivity to many of the needs of others.
❖ Demonstrates consistent understanding of patient and family expressed needs and a desire to meet those needs on a regular basis. Is **responsive** in demonstrating kindness and compassion.
❖ Is altruistic and goes beyond responding to expressed needs of patients and families; **anticipates the human needs** of patients and families and works to meet those needs as part of his skills in daily practice.
❖ Is a **proactive advocate** on behalf of individual patients, families and groups of children in need.

Cultural Competence

❖ Sees the world through the eyes of his own background, is **ethnocentric,** has trouble understanding and accepting the cultures of others. Generalizes based on the patients' racial, ethnic, religious, or cultural backgrounds.
❖ Acknowledges that there are other backgrounds and views, but **at times seems insensitive** to these issues. Needs help in broadening perspectives.
❖ **Acknowledges the range of backgrounds** and cultures and includes these concepts in care plans for patients and families. Families recognize this sensitivity. Demonstrates cultural humility.
❖ **Celebrates issues of patient diversity** and uses this awareness; incorporates the understanding of many different backgrounds and how cultural competence is important to the physician's professionalism and the health care system's effectiveness.

F. COMPETENCY: SYSTEMS-BASED PRACTICE

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

Primary Author: 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.[1]

Definitions
- **System:** A system is defined as "a collection of interdependent elements that interact to achieve a common purpose."[1]
- **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.[2]
- **Work-Around:** A plan or method to circumvent a problem without eliminating it.

Perhaps the keys to competence in systems-based practice (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 sub-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 sub-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. In his paper "Understanding Medical Systems," Nolan[1] identifies 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 sub-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[3,4] as well as their ability to develop system improvements.[5]

This sub-competency is intricately linked to several other sub-competencies. For example, the ability to deal with uncertainty will inform success in this sub-competency, given the inherent uncertainty of complex systems. Plsek and Greenhalgh[6] 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[7] 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 sub-competency); 2) optimize interprofessional collaboration (see systems-based practice sub-competency); and 3) be a r eflective practitioner (see practice-based learning and improvement sub-competency).

Developmental Progression

After considering the two premises discussed above (that the context in which one practices may affect the ability to progress through this sub-competency and that this sub-competency is highly interconnected with other key sub-competencies), one can still outline a developmental progression for the ability to work effectively in various settings and systems. G iven the complexity of health care systems and t heir inherent uncertainty, the work of Plsek and Greenhalgh[6] and Fraser and G reenhalgh[8] are particularly informative for this sub-competency. T hey outline a dev elopmental progression from competence to capability as defined below:

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 sub-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 towards improvement.

Attaining competence for this milestone is probably at least a two-stage process. First, one must simply acquire knowledge about systems and s ystems 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 k nowledge 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 sub-competency *is the ability to adapt to new settings and systems.* T his 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.

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Developmental Milestones

❖ **With limited knowledge of systems, focuses on the "pieces"** of a process rather than the whole. Frequently frustrated by the system's suboptimal processes, but lacks the ability to identify the root cause and thus to effect change.
❖ **Has developed knowledge of systems** and therefore **understands when others describe** how the pieces relate to the whole. Not yet able to articulate 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; therefore, has competence in systems thinking and **can 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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2. *Coordinate patient care within the health system relevant to their clinical specialty*

Primary Author: Susan Guralnick, MD

Background

The American Academy of Pediatrics[1] 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.[2] 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 acknowledgement, 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.[3]

That care coordination must take place in all care settings is now recognized by many organizations. The Society of Hospital Medicine[4] has included care coordination among the core competencies of hospitalist care, while the National Quality Forum[5] 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 coordinator 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 finds themselves. That being said, there are specific knowledge, skills and attitudes required for care coordination. This milestone was 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 non-accredited settings.

The role of the physician care coordinator has four 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/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 (e.g., 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 (**Figure 1**).

Figure 1. Each competency level contains several components. Each of these components may develop at a different rate, as is demonstrated in the diagram below.

Care Coordination Components
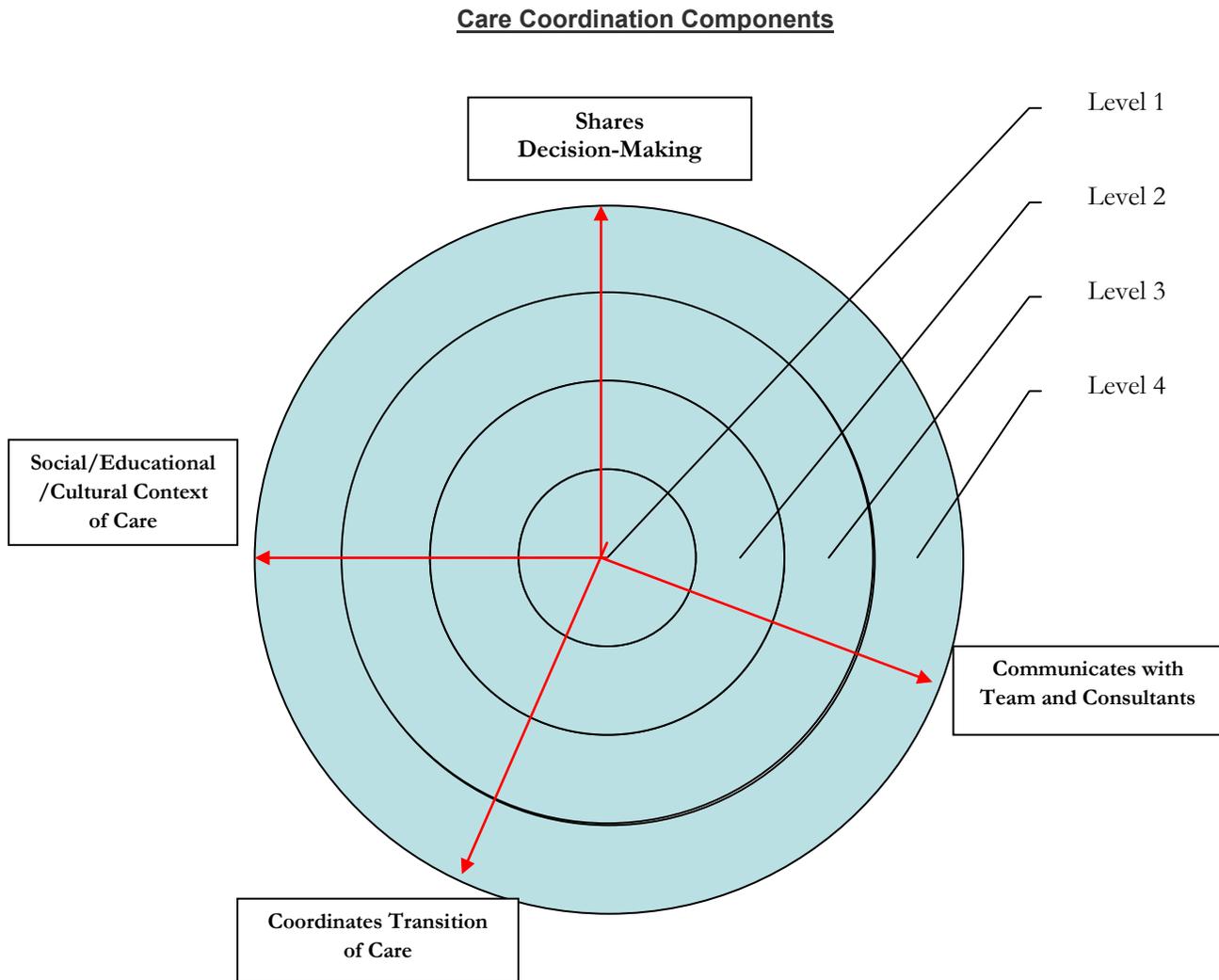
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Developmental Milestones

- ❖ Performs the role of medical decision-maker, **developing care plans and setting goals of care independently**. The patient/family is informed of the plan. **No written care plan** is provided. Makes referrals, requests consultations and testing with **little or no communication with team members or consultants. Not involved in the transition of care** between settings (e.g., outpatient and inpatient, pediatric and adult); **little or no recognition of social/educational/cultural issues** affecting the patient/family.

- ❖ **Begins to involve the patient/family** 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. May **inconsistently be involved in the transition of care** between settings (e.g., 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 healthcare system.** The **patient/family is frequently involved 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 omits few 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 (e.g., outpatient and inpatient, pediatric and adult). **Social, educational and cultural issues are considered** in most care interactions.

- ❖ **Actively assists families in navigating the complex healthcare 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, helping the family to interpret and act on results/recommendations. **Coordinates seamless transitions of care** between settings (e.g., 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.**

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

Primary Author: Robert Englander, MD, MPH

Background

The sub-competency of cost awareness and risk-benefit analysis is linked with sub-competencies in medical knowledge and patient care, as well as with other systems-based practice sub-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 is underscored in a Canadian study.[1] 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.[2,3]

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.[4,5] However, the importance of the interplay of clinical knowledge and judgment with cost awareness is underscored in a study by Rudy et al.[6] 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,[7,8] and many physicians, despite years of practice, would likely be relatively novice if plotted on the developmental milestone scale below. Many physicians do not see their role in cost containment, and 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.[9] 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.[10] 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, Atul Gawande[11] 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 towards risks and benefits among doctors who become patients, Klitzman[12] 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-benefit, and 4) imposing value on statistics (e.g., a "good chance" or a "bad chance"). His work helps provide a framework for understanding the developmental progression along this sub-competency.

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Developmental Milestones

❖ **Unaware 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** (e.g., 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 **inappropriate cost-containment activities and/or risk-benefit counseling.**
❖ **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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4. *Advocate for quality patient care and optimal patient care systems*

Primary Author: 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.[1,2] 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, for ultimately the advocate must be able to understand systems and how to change them.[3]

In their paper entitled "Teaching Quality Improvement: The Devil is in the Details," Batalden and Davidoff[4] wrote, "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*[5] in 2000 and *Crossing the Quality Chasm*[6] 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 milestone ties in with the professionalism milestone. Besides the improvement 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.[7,8] The American Medical Association[9] 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 in this domain may further spur their incorporation and accomplishment in our medical education programs.

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Developmental Milestones

❖ Attends to medical needs of individual patient(s). Wants to take good care of patients and **takes action for the individual patient's** health care needs.
For 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.
For example, a physician notes on rounds, "We have sent home four to five firearm-injury patients and one 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. May enlists colleagues to help with this problem.
For 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-initiated quality improvement and safety actions. Demonstrates a desire to have an **impact beyond the hospital walls**.

> *For 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-teachers association.*

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

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

Primary Author: Robert Englander, MD, MPH

Background

As with most systems-based practice sub-competencies, the ability of an individual to develop competence is dependent both on the macro-system and micro-system 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 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.[1,2]

The literature suggests that interprofessional teams working together provide safer and more effective care with better health outcomes.[3-6] Less clear is the optimal way to provide interprofessional education (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[7] identified six 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 [sic] inferences about the effects."[7] The reader interested in understanding some of the precepts of IPE programs is referred to Hammick et al.[8]

The current disconnect between how we educate and how we function optimally notwithstanding, Phillip Clark[9] provides an excellent framework for understanding development in this sub-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 sub-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).[9] 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[9] cites work by Perry in setting out four stages of development in the understanding of knowledge and values:

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 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.

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Developmental Milestones

- ❖ Seeks answers and **responds to authority from only <u>intra</u>professional colleagues**. **Does not recognize other members of the interdisciplinary team** as being important or making significant contributions to the team. Tends to **dismiss input from other professionals** aside from other physicians.

- ❖ **Beginning** to have an **understanding of the other professionals on the team**, **especially their unique knowledge base**, and is open to their input. However, **still acquiesces to physician authorities to resolve conflict** and provide answers in the face of ambiguity. This individual is **not dismissive** of other health care professionals, **but** she is **unlikely to seek out those individuals** when confronted with ambiguous situations.

- ❖ **Aware of the unique contributions** (knowledge, skills, and attitudes) **of other health care professionals**. **Seeks their input** for appropriate issues. As a result, is an **excellent team player.**

- ❖ In addition to the above features, individuals at this stage **understand the broader connectivity of the professions and their complementary nature**. Recognizes that quality patient care only occurs in the context of the interprofessional team. Serves as a **role model for others in interdisciplinary work** and is thus an **excellent team leader.**

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

Primary Author: Susan Guralnick, MD

Background

> The enormous complexity of modern medical care has made error detection and management extremely difficult. Traditional deterministic methods of solving the ''error issue'' cannot cope with the huge number of potential errors that are possible. Systems thinking and a pproach to error reduction provides a different avenue for tackling this challenging dilemma.[1]

In his work about human error, Reason[2] defines three categories of error: knowledge-based, skill-based, and rule-based. 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 and, in other words, rule based errors.[1]

Errors may also be classified as active or latent. Active errors are those that can be attributed to a person, while 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."[3] "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."[4] 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.[4] There is always a risk of error. Leape encourages "robust, high reliability individuals, teams, systems, and organizations that are able to recognize trouble before negative consequences occur."[5] Systems can be created that will reduce the probability that these mistakes will occur, thus preventing harm to patients.[4] 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.

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Developmental Milestones

❖ **Defensive or blaming** when encountering medical error. **No perception of personal responsibility** for individual or systems error correction. **Not open to discussion of error or identification of the type of error**. Approaches error prevention from an **individual case perspective only**.
❖ **Occasionally open to discussion** of error **without a defensive or blaming approach**. **Some awareness of personal responsibility** for individual or systems error correction. **Identifies medical error events**, but **cannot identify the type** (active versus latent) of error**. Begins to perceive that error may be more than the mistake of an individual**.
❖ **Usually open to a discussion** of error. **Actively identifies medical error events** and **seeks to determine the type of error**. Occasionally identifies the element of **personal responsibility** for individual or systems error correction. **Sees examination and analysis of error as an important part** of the preventive process.
❖ **Usually encourages open and safe discussion of error**. **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**.
❖ **Consistently encourages open and safe discussion of error**. **Characteristically identifies and analyzes error events**, habitually 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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7. *Know how to advocate for the promotion of health and the prevention of disease and injury in populations*

Primary Author: Susan Guralnick, MD

Background

The pediatrician's role as advocate for children's health from a population perspective has been recognized for centuries.[1] 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 population of patients."[2] 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 s afety.[1] 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.[1] Bicycle helmet and b ooster 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 i ndividual patient. Physicians also advocate through mandated reporting responsibilities, such as reporting adverse drug events to the FDA or reporting notifiable diseases to the state or local health department.[3] 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.[4] To be ef fective, the physician must have an understanding of the health literacy of the population served, so that the patients understand and act on t he health care information provided.[5] 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.[2,6] 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 m oves 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.

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Developmental Milestones

❖ **Does not consider population health to be** the **role of** a practitioner and therefore has **not become informed about the needs and assets of his community**. **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 does not consider whether this is a problem prevalent in the community.*

❖ **Occasionally recognizes that population health issues impact the health of individual patients** and therefore **seeks 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.*
❖ **Believes 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 (e.g., 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 to advocate for population health issues (e.g., disease and injury prevention). **Appropriately 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 in 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.*

G. COMPETENCY AREA: PERSONAL AND PROFESSIONAL DEVELOPMENT

1. *Develop the ability to use self-awareness of knowledge, skills and emotional limitations to engage in appropriate help-seeking behaviors*

Primary Author: Carol Carraccio, MD, MA

Background

Help-seeking behaviors stem from uncertainty. An individual's ability to deal with uncertainty is shaped by his identity development, the culture and context in which he finds himself, and the socialization process within that culture.[1,2] Identity development plays a critical role in the professional formation of physicians. In the early stages, one relies almost exclusively on external prompts and judgments to guide behavior. This translates into doing something because we are told to do it and either want the praise or want to avoid the consequences.[2] As one matures there is a shift to more intrinsic motivation and values. One begins to look at the identity of the profession and emulate behaviors that are perceived as important in belonging to the physician community.[2] The perceived values of the profession are incorporated as one's own value system. It is only with greater maturity that one is able to integrate one's own personal and professional value systems in a way that minimizes conflict that may arise between the two.[2]

When applying what is known about identity development to the construct of help-seeking, we know that learners early in their development may recognize deficiencies but may not ask for help because they fear it will negatively affect their evaluation or they want to avoid being made to feel inadequate. Since they are driven by external influences, a supervisor can step in and direct them to resources or prompt help seeking behaviors; role modeling being an excellent venue for accomplishing the latter. The exceptions to desired behaviors in response to prompts are individuals who may not recognize their

shortcomings even when pointed out by those who supervise them. For this small group of learners, ongoing feedback and concrete examples of deficiencies are most helpful.

As the learner begins to mature he will try on the perceived values of the profession by emulating witnessed behaviors of other physicians. This is where the perception of autonomy as a valued behavior competes with the recognition of limitations and becomes a bar rier to asking for help. Faculty development is critical in educating the physician community about the great influence of the "hidden curriculum" on learners.[3]

It is only with the later stages of identity development that one i s able to engage in help-seeking behaviors despite concerns about the perceptions of others, because one's personal value system for patient safety supersedes any perceived values of professional autonomy. At this stage the outcome for the patient is more important than the evaluation or personal consequences. The learner is secure enough in his own identity as a physician that he can be true to his own values.

Socialization within the culture and context of the medical community greatly influences personal and professional identity development, one element of which is appropriate help-seeking behaviors. The socialization process in medicine has not traditionally embraced acknowledgement of one's uncertainty; rather, it has placed a premium on t he attributes of autonomy and independence. A recent study of learners in the emergency department and general internal medicine inpatient units underscored the pressure learners experience to act independently. This pressure was based on their perception that independence in thought and action was an identifying characteristic of a doctor, the community to which they aspired to belong, as well as organizational issues such as heavy workload and also the impact on their constant process of evaluation.[1]

The work of Lingard et al[4] also describes the professional socialization process through the learning and language of students' verbal case presentations in the context of rounds on a pediatric inpatient unit. In this qualitative study, which illustrates the development of identity described above, the authors were able to elucidate themes such as "thinking like a s tudent" and "thinking like a doctor." The student presentations typically focused not only on seeking guidance for the sake of patient care but for their own agenda of proving competence and deflecting criticism, demonstrating that uncertainty is an uncomfortable realm for students. Faculty attendings, however, modeled a m ore comfortable realm for uncertainty through professional rhetoric that placed uncertainty in the context of not only personal limits in knowledge but also limits in: evidence, information from primary historians, professional agreement, and scientific knowledge as well as a contrary concept of limitless possibilities. The authors were also able to show that students had t he capacity to progress from student thinking toward doctor thinking during the study period.

Noteworthy is that the traditional hierarchical and autonomous social context and culture of medicine facilitates keeping the novice at the novice stage by placing true or perceived value on certainty, autonomy and independence. To move learners from novice, or student, thinking to doctor thinking, faculty have to mitigate the value placed on these traditional beliefs and role model the value of uncertainty, explicitly stating that not only is it acceptable to acknowledge uncertainty but that it is a critical ingredient in improvement. While faculty behaviors will not alter the developmental stages of help-seeking behaviors per se, they can slow or hasten a l earner's progression through them. This has important implications for faculty development and emphasizes the need for faculty to embrace and r eward the acknowledgment of uncertainty by learners.

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Developmental Milestones

❖ The lack of insight into limitations results in **the need for help going unrecognized, sometimes resulting in unintended consequences.**
❖ Concern that limitations may be seen as weaknesses that will negatively impact evaluations results in **help-seeking behaviors typically only in response to external prompts** rather than internal drive.
❖ **Recognizes limitations,** but perception that autonomy is a key element of one's identity as a physician and the need to emulate this behavior to belong to the profession **may interfere with internal drive to engage in appropriate help-seeking behavior.**
❖ **Recognizes limitations** and has matured to the stage where a personal value system of help-seeking for the sake of the patient supersedes any perceived value of physician autonomy, resulting in **appropriate requests for help when needed.**
❖ Beyond recognizing limitations, the personal drive to learn and improve results in the **habit of engaging in help-seeking behaviors** and **explicitly role modeling** and encouraging these behaviors in trainees.

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2. *Use healthy coping mechanisms to respond to stress*

Primary Author: Daniel Schumacher, MD

Background

Physicians face stress from a number of sources each day. Most physician stress can be categorized as arising from their professional responsibilities, their work environment and situations, or their personal lives.[1] As stress is often multi-factorial, there can be significant overlap between these categories.

Sources of professional stress include patient care responsibilities, supervisory duties, patients with complex medical problems, difficult patients and families, working with terminally ill and dying children, and information overload. For learners with limited clinical experience, professional stress can also arise from their high levels of uncertainty and low tolerance for ambiguity,[2] which is discussed in other sub-competencies. Performance anxiety may also be a contributor for these learners.

Sources of work environment and s ituational stress include sleep deprivation, fatigue, excessive workload, and lack of control over work and c all schedules. F or learners, especially those with limited clinical experience, situational stress can also include having too many patients, having complex patients with difficult management issues, or working in a learning environment that is ineffective or lacks appropriate support.

Sources of personal stress include family problems, financial concerns, lack of free time, and psychosocial struggles. For trainees, personal stress can also include feelings of isolation when moving to a new city to begin training and difficulty with choosing a career focus or securing their first job after training. As learners first encounter the time and work demands of the medical profession and have not yet developed a mature professional identity, conflict between personal and professional obligations can also be a s ource of stress. F urthermore, immature coping skills in response to this stress may only exacerbate it.

In addressing the development of healthy responses to stressors, it is important to note that this development is multi-factorial, with clinical experience possibly having less of an impact on t he rate of progression than other factors such as previous life experiences, personality type, communication style,

and conflict resolution mode. Thus, an early clinical learner could be someone with advanced development in healthy responses to stressors.

<u>Early and Intermediate Development: The Presence of Unhealthy Responses to Stressors</u>
The least healthy responses to stressors mimic those maladaptive signs that are seen in individuals with burnout. C hristina Maslach and c olleagues[3] describe the three dimensions of burnout as emotional exhaustion, depersonalization and cynicism, and f eelings of inefficacy and perceived lack of personal accomplishment. E ven without suffering from burnout, a learner early in the development of healthy responses to stressors can struggle when confronted with stressful situations and respond with these manifestations. Without appropriate coping mechanisms, even minor stressors for these individuals can lead to emotional outbursts and b laming others. T hese learners may also demonstrate performance impairment with inability to fulfill basic professional or personal responsibilities. Indeed, previous study[4] has shown that residents who self-report feelings of depersonalization are significantly more likely to also report suboptimal patient care practices, perhaps the most concerning manifestation of an unhealthy response to stress.

Professional identity plays a s ignificant role in how one responds to stressors. E arly in professional identity development, learners' thoughts, words, and actions are greatly influenced by what they perceive will please others; therefore, they are unable to truly embrace the professional identity of a physician.[5] Rather, they shroud themselves in what they see as that identity in others to receive the praise of acting the part and avoid the consequences of not acting the part. While this has the potential to help them project healthy responses to stressors, their lack of true identification with their professional role places them at risk. A s they are merely playing the part, there is potential for them to mimic the unhealthy responses to stressors that they learn from the "hidden curriculum" of those who work around them. While previous development in self-regulation and self-monitoring may temporize their responses to stress in more public situations, these skills may fail them in more private settings away from supervisors or when confronted with more significant stressors.

<u>Advancing Development: Developing Consistently Healthy Responses to Stressors</u>
With advancing professional identity formation, learners internalize what it means to be a physician.[5] The external expectations that were previously important in driving thought, word, and action are broken down and reformed into internal expectations for themselves. By internalizing the values and expectations of the profession and making them their own, learner responses to stressors tend to become healthier, as that is how more mature physicians should behave.

This development of healthier responses to stressors through advancing professional identity formation is associated with development in other areas. T hese include personal awareness, described as "insight into how one's life experiences and emotional make-up affect one's interactions with patients, families, and other professionals,"[6] and reflective practice. However, it is important to note that personal awareness and reflective practice are necessary but not sufficient to exhibit healthy responses to stressors. Advanced development in skills such as self-regulation and self-monitoring in the moment are also necessary. T ogether, personal awareness, reflective practice, self-regulation, and self-monitoring are all important in the development of emotional intelligence[7] and mindfulness[8-9] which are central to developing healthy responses to stressors. Epstein describes mindful practice as:

> being attentive, on purpose, to one's own thoughts and feelings during everyday activities (in this case, clinical practice) to be able to practice with greater clarity, insight, and compassion. Mindfulness implies a non judgmental stance in which the practitioner can observe not only the patient situation but also his or her own reactions to it before taking action. A mindful practitioner can see a situation from several angles at the same time. Mindful practice implies curiosity rather than premature closure and presence rather than detachment. Mindfulness is especially helpful when dealing with difficult relationships with patients and f amilies, challenging clinical situations, and in recognizing the need for self-care.[9]

Exhibiting a healthy response to stress is context-specific, as even individuals at the most advanced levels of development may show instances of regression when encountering major personal,

professional, or situational stressors. However, these individuals would be anticipated to demonstrate advanced coping skills and healthy responses in almost all circumstances.

Overview of Strategies to Model, Promote, and Develop Healthy Responses to Stressors
As we look to develop and model healthy responses to professional stressors, there are several useful personal and occupational strategies, which can also have positive impacts on the larger health care system.[10] These are shown in **Table 1.** Additionally, emotional intelligence and mindfulness can be cultivated and developed through several venues, including individual and group reflection, narrative medicine, appreciative inquiry, and other techniques.[8]
A more thorough discussion of modeling, promoting, and developing healthy responses to stressors is beyond the scope here. However, developing and modeling healthy responses is vitally important, and we hope this introduction will serve as a starting point for exploring this in the referenced works and beyond.

Table 1: Personal strategies that demonstrate healthy responses to stressors include: [10]

- Pursuing personal awareness and participating in reflective practice
- Prioritizing values
- Maintaining "connectedness" with family, friends, hobbies, and interests outside of work
- Maintaining good physical health through physical activity and nutrition
- Accepting limitations
- Using high level defense mechanisms, such as appropriate humor
- Setting and pursuing goals[11]
- Possessing positive self-regard[11]

Occupational strategies that demonstrate healthy responses to stressors include: [10]
- Setting limits
- Trying to improve the doctor-patient relationship
- Using a team approach, including mutual support for all members
- Valuing and promoting collegiality
- Seeking further education to prepare oneself for professional duties

When individuals are facing minimal or controllable stress, they are more able to explore these strategies on their own and find ways to integrate them into their personal and professional lives. However, as stress increases, individuals become less able to explore these strategies on their own. Therefore, the role of colleagues, residency program leadership, and other professionals in the immediate environment become vitally important. These individuals, especially those in leadership positions, must implement meaningful and deliberate techniques to alleviate the stress of residents and faculty and to promote the adoption and integration of strategies that demonstrate healthy responses to stress.

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Developmental Milestones (adapted from Epstein[8])

❖ Without appropriate coping mechanisms, stressors lead to **significant impairment in performance** and ability to fulfill basic professional or personal responsibilities.
❖ Able to perform professional duties, but with **limited coping mechanisms**, stressors lead to depersonalization with colleagues, patients, and/or families; cynicism; feelings of inefficacy; and/or emotional exhaustion. Even **minor stressors may lead to emotional outbursts and blaming others.**
❖ With advancing coping mechanisms, **behavior in public settings usually conforms to social norms** when responding to minor stressors. However, in more private settings or when encountering more **significant stressors, behavior may be compromised** (by demonstrating behaviors such as depersonalization, cynicism, emotional outbursts or blaming others) or be impacted by feelings of inefficacy or emotional exhaustion.
❖ Development of a mature, internalized professional identity leads to advanced coping mechanisms and healthy responses to stressors, including **mindfulness and reflection** on what has gone well in stressful situations and how to apply lessons learned in the future; **develops personal and occupational strategies to respond to stressors** in a healthy way
❖ Healthy response to stressors leads to **proactive planning** of how to personally respond **before anticipated stressors fully present themselves**; **helps anticipate and alleviate the stress felt by patients, families, and colleagues**; projects success and satisfaction in being a physician that mitigates the negative impact of stressors.

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3. *Manage conflict between personal and professional responsibilities*

Primary Author: Carol Carraccio, MD, MA

Background

Conflict between responsibilities and the ability to resolve the conflict are important elements of professionalism.[1] Conflicting values may be between two professional values or between a personal and a professional value. The most appropriate action that occurs in response to these competing values is context and situation dependent. For example, in most situations keeping one's promise of confidentially to patients is a primary value. However, this may conflict with, and be superseded by, a value that upholds the supremacy of patient safety above all other values (e.g., breaching confidentiality to protect a depressed adolescent with suicidal ideations). In isolation, it is difficult to predict the supremacy of one professional value over another. For this reason, it is critical to understand the context, thought process, and rationale that go into decision-making about how to resolve conflict and the subsequent actions that are taken.

Professional identity formation is central to managing conflict between one's personal and professional responsibilities. "The process of [professional identity] formation includes experience and reflection, service, growth in knowledge of self, and of the field, and constant attention to the inner life as well as the life of action."[2] Stern[3] makes the case for a developmental model of professional identity formation and also cites the work of Forsythe[4] to enhance the developmental framework. The earliest stage is awareness that guiding principles of professional behavior exist. The application of these principles in a clinical setting requires learning to prioritize these principles. The process of prioritization is predicated on a process of critical reasoning to develop a rationale for why one value supersedes another.[3] Early in the process of identity development, one recognizes that there are guiding principles for professional behavior, but these tenets are typically viewed as rules to be followed for the purposes of either gaining personal recognition or avoiding negative consequences. As one begins to mature, these principles become viewed as values of the profession that must be reflected in personal behaviors to be considered a member of the profession. Initially, the values of the profession can lead to conflict between personal and professional values, since the latter have not been internalized and reconciled with one's personal values. It is only when one is able to see himself as a professional, and not just a member of the profession, that he is able to internalize professional values and reconcile them with personal values. This process of reconciliation helps to prevent significant future conflict between personal and professional values and provides experience with anticipating conflict and resolving it.

When assessing this sub-competency, Ginsburg et al[1] remind us that we must include conflict, context, and resolution as we develop evaluation methods. Avowed, unavowed, and disavowed principles may be a helpful classification system for understanding a person's decision-making about the prioritization of personal and professional values and the resolution of conflict.[5] Avowed principles are those embodied by the profession, such as putting patient interests before self-interests. Unavowed principles are those that likely go unexpressed and are typically representative of the hidden curriculum, such as protecting a colleague so they do not look bad. Disavowed principles are often thought of as breaches or lapses of professionalism, such as placing self-interests before patient interests.

In evaluating behavior, it is critical to consider the developmental level of the individual, realizing that time and experience are important in learning and acting on professional values. Context is also important, as early medical students are not in a position to have significant impact on patient care, limiting assessment of professionalism to their ability to identify values and prioritize competing values based on an appropriate rationale, often of hypothetical situations. The latter should take into account both the avowed and disavowed principles. The more experienced students and residents will be expected to act on their prioritized principles in a clinical context, making witnessed behaviors an important part of the assessment process. Even at later developmental stages, however, it is critical to return to an individual's rationale for choosing an action to better understand why a lapse may have occurred and to use the process of assessment as the teachable moment for future conflict resolution.

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Developmental Milestones

❖ **Unable to identify conflicting personal and professional values,** even in hypothetical situations.

- ❖ Identifies conflicting personal and professional principles and can **justify the importance of the competing principles in the context of a given hypothetical situation.** (One is not called upon to act on these professional principles at this early stage in professional development.)

- ❖ **Identifies competing principles and prioritizes them based on personal implications**; actions reflect an early stage of identity development in which the **focus is on recognition for doing the right thing and/or avoiding negative consequences. This rationalization may result in the unintended consequence of a lapse in professional behavior.**

- ❖ **Prioritizes principles based on the perception of values espoused by the profession**; these values are not yet incorporated into one's personal value system**, which can lead to **inner conflict and subsequent rare outward lapses in professional behavior.**

- ❖ **Personal values are reconciled with those of the profession**; a **proactive approach to conflict prevention and resolution** is used in anticipation of internal conflicts that may arise.

4. *Practice flexibility and maturity in adjusting to change with the capacity to alter behavior*

Primary Author: Ann Burke, MD

Background

When considering the developmental progression of flexibility and maturity in adjusting to change with the capacity to alter one's own behaviors, it is helpful to consider a f ew theories from the psychology literature. T hese theories frame the concepts of flexibility and maturity, as well as bring to light other attributes or personality characteristics, such as resilience. This framework is multifactorial and complex. For example, how does a resident deal with news that another resident is ill and he must take call for that colleague? Does the resident constantly complain about difficult patients? How do faculty members deal with the new electronic medical record system? How does a resident who has just had a new baby cope with balancing life and learning? Are they able to balance personal and professional responsibilities and "keep it together?" All of these examples are nuanced on m ultiple psychological and contextual levels. Each individual functions with a complex set of factors, making it difficult to define the weight of various experiences, values, motivations, personality factors, and s tressors for each individual. H owever, in examining some psychological factors we may gain some understanding into our learners' development.

There is healthy debate and discussion about some of the major psychological theories regarding personality. These theories include trait perspective, type p erspective, psychodynamic/psychoanalytic, behavioral, social cognitive, humanistic, and bio-psychological.[1] Additionally, emotional intelligence[2,3] (EI), which will be described later in this milestone, informs the understanding of the developmental progression of this sub-competency. The context in which this competency is placed, whether personal or professional, also impacts one's flexibility and maturity in adjusting to change and one's ability to alter behaviors. Maturity, flexibility, and the ability to adapt and s how resilience play out and are readily assessed in the professional setting.

Flexibility and Maturity

Psychological flexibility includes a wide range of human abilities, including recognizing and adapting to various situational demands; shifting mindsets and beha vioral repertoires when these strategies compromise personal or social functioning; maintaining balance among important life domains; and being aware of and open and committed to behaviors that are congruent with deeply held values.[4]

In cognitive psychology, flexibility can be defined as "the ability to switch cognitive mindsets to adapt to changing environmental stimuli."[5] Aspects of flexibility, as defined by psychologists on validated instruments, include three distinct domains: 1) the tendency to perceive difficult situations as controllable, 2) the ability to perceive multiple alternative explanations for life occurrences and human behavior, and 3) the ability to generate multiple alternative solutions to difficult situations.[5,6] Further, other psychologists and researchers have commented on t he dynamic processes of human psychological flexibility as a

"slippery construct"[4] that is somewhat hard to define. Other terms utilized in the literature to describe the same abstract collection of behaviors include ego-resiliency, self-regulation, and response modulation.[5,7]

Flexibility correlates positively with many aspects of health and well-being.[4,7,8] Further, the construct of flexibility and ego-resiliency has been associated with greater progression through the stages of identity development and maturity. The spectrum of identity development involves moving from being impulsive and relatively less insightful to learning social rules and conforming to the most advanced stage of being wise and self-determined.[4,9] Additionally, studies in the field of psychology demonstrate that adults at increasingly mature stages of identity development had greater flexibility, and this difference could not be explained by general intelligence based on IQ testing.[10] In addition to wisdom and maturity, other features in flexible teens and adults include descriptors such as self-reliant, resilient, confident, creative, curious, quick to recover from stressful events, adaptable, and able to effectively master challenges.[9-11] A number of tools exist that can be used to assess the construct of flexibility, including the Cognitive Flexibility Inventory (CFI)[5] and Schaie's Test of Behavioral Rigidity (TBR).[12,13] As described above, there is evidence in the psychology literature that the concepts/constructs of maturity and flexibility tend to be correlated.

While there are multiple streams of psychological theories and frameworks for personality, we will focus on the Five Factor Personality Traits theory.[14,15] This theory is advanced by the trait perspective theorists and consists of the following trait descriptors[16,17]:

- **Openness:** Inventive and curious versus cautious and conservative. Appreciation for art, emotion, adventure, unusual ideas, and variety of experience.
- **Extraversion:** Outgoing and energetic versus shy and withdrawn. Seeks stimulation in the company of others; has energy, positive emotions, enthusiasm, and warmth towards others.
- **Conscientiousness:** Efficient and organized versus careless and overly easy-going. A tendency to show self-discipline, act dutifully, and aim for achievement. Comforted by planned rather than spontaneous behavior.
- **Neuroticism:** Sensitive and nervous versus secure and confident. Tends to easily experience unpleasant emotions (anger, vulnerability, anxiety, and depression).
- **Agreeableness:** Friendly and compassionate versus competitive and outspoken. Tends to be compassionate and cooperative rather than suspicious and antagonistic towards others.

Many of the personality traits described in this construct overlap with and influence individual flexibility.[4] Specifically, one who scores highly on the neuroticism scale would tend to be less likely to change their behavior after feedback is given by another person.[16,18] Positive emotions that come from the other end of the neuroticism spectrum can induce increased attention span, greater working memory, and openness to new information.[19] A study of physician functioning revealed that doctors experiencing positive emotions (the antithesis of neuroticism) actually consider a greater number of alternative hypotheses prior to committing to the initial diagnostic consideration.[20] Overall, personality traits impact how residents function in this sub-competency within the context of the working environment. It is helpful to know that there are instruments[21-23] that assign numeric scores to these traits to help assess learners and, via the results, assist them in their journey to develop insight into their own functioning. There are also commonly known and validated instruments that characterize other personality theories but align with the Five Factor Model, such as the Minnesota Multiphasic Personality Inventory (MMPI).[23]

<u>The Capacity to Alter One's Own Behaviors and Emotional Intelligence</u>

When considering the capacity to alter one's own behaviors, the role of EI cannot be underscored enough. EI was initially defined as an individual's ability to monitor his/her own and other's emotions, to discriminate between the positive and negative effects of emotions, and to use emotional information to guide his/her thoughts.[3,24] This has been discussed in other milestones. Mayer and colleagues[3] further divide the concepts into the current form with four branches:

- Having the ability to perceive emotions in oneself and others;

- Facilitating thought, or the ability to generate, use, and feel emotion to communicate feelings or employ them in other cognitive processes;
- Understanding emotions, or the ability to understand information and how emotions combine and to progress through relationship transitions and appreciate such emotional meanings; and
- Managing emotions, or the ability to be open to feelings and to modulate them in oneself and others so as to promote personal understanding and growth.

Another informative way to consider EI was put forward by Goleman,[25] who describes five elements of EI: self-awareness, self-regulation, motivation, empathy, and adeptness in relationships.

EI is a broad, complex concept that has gained much interest over the past two decades. Literature on mindful practice and physician self-awareness expresses EI without actually naming the construct as such.[26,27] The concepts of self-awareness, compassion based on insight into one's own values, modifying conclusions to fit the situation, and self-actualization, as discussed in the literature on mindful practice, are actually subscales on the most widely used scale for EI, the Emotional Quotient Inventory.[28]

Some of the concepts in EI, personality traits, and flexibility overlap significantly. In constructing a framework for this milestone, the developmental progressions of these themes move and mature together. Similar to other milestones, such as professionalism, this milestone (adaptive flexibility) can be fluid in regard to observable behaviors, depending on the situational context and stressors. However, an individual would not likely mature and/or regress more than one level as context varies. Further, these personality traits, skills, and psychological constructs, while sometimes interpreted as static and innate (e.g., "I am an extrovert.") are demonstrated time and again in the literature to be modifiable.[1-3,14,25-27] Stated differently, a person would be able to mature and progress in this adaptive flexibility milestone through practice, guided reflection, role modeling, and knowledge of concepts. As Goleman[25] states:

> …our level of emotional intelligence is not fixed genetically, nor does it only develop in early childhood. Unlike IQ, which changes little after our teen years, emotional intelligence seems to be largely learned, and it continues to develop as we go through life and learn from our experiences-our competence in it can keep growing. …people get better and better in these capabilities as they grow more adept at handling their own emotions and impulses, at motivating themselves, and at honing their empathy and social adroitness. There is an old-fashioned word for this growth in emotional intelligence: *maturity.*

Table 1. Progression of development for characteristics of flexibility and maturity

Rigid: worries about change, does not take calculated risks, does not deal with uncertainty well	**Flexible:** resilient, confident, self-efficacious, and adaptable
Personality: Cautious, shy, withdrawn, careless, nervous, overly competitive, insecure, immature	**Personality**: Inventive, energetic, organized, confident, and friendly. Moves towards stable, mature way of dealing with events, and life stressors. Can go against personal tendencies (negativity, rigidity) due to insight.
Emotional Intelligence - Low: Lacks self-awareness and self-confidence, poor self-control, inadaptable, pessimistic, unable to be empathetic.	**Emotional Intelligence - High:** Self-aware and self-confident. Understands and controls internal states and impulses. Aware of other's needs, concerns. Easily handles relationships. Ability to modulate own behaviors to assist others. Understands emotions and cues from others.

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Developmental Milestones

❖ **Rigid behavior is most comfortable**. Has a difficult time making decisions when faced with challenging situations. Fears loss of **control** when moving outside of the usual realm of cognitive concepts/thinking. Emotionally reactive and **vulnerable to stress**. Uses **immature coping mechanisms**. Does not modify behavior, seeing no reason to do so. **Low level of EI** with inability to be self-aware or effectively self-regulate, poor commitment and little optimism. Poor social skills**.**
Example: *A physician becomes irritated with a nurse who pages her that the new admission—a patient with a fever and rash—is on the floor. She complains to her medical student that she should not even have to be on call today because she has one more call this month than the other senior resident. Later she feels badly that she complained, but just feels so out of control sometimes. The nurse calls again to let her know that the family is Spanish speaking, so she will need to arrange an interpreter. This sends the resident into a "tailspin" of moodiness, frustration, worry, and inability to gather herself to take care of the patient. She again feels disturbed by her inability to cope. The idea of apologizing to the student and nurse does not even cross her "radar."*

❖ **Less rigid, possesses some flexible behaviors**. May realize that there is more than one solution to some problems. **Uncomfortable with loss of control, but** able to recognize that feeling and start to adjust and modify. When not stressed, can demonstrate self-awareness with reflection. **Tough situations may cause reversion to immature or primitive (e.g., fight or flight, blaming, fussy) behaviors and unhealthy coping mechanisms. Intermediate level of EI,** with some ability to self-regulate. Has some self-awareness and insight, some optimism, and aware of need for social skills.
Example: *Life has been running smoothly for one of the residents in the PICU, who had some minor difficulty in the past. To his colleagues, he seems to have "figured it out." He seems to care more about them, is more self-confident, and some interns have actually requested to be on call with him because he is good at solving problems. His wife pages him during rounds one day to tell him that she had a car accident. She has a shoulder injury and her car is totaled, but she is otherwise OK. He takes off a few days to make arrangements for the car and to take her to the doctor. He feels out of control internally due to worry and is moody to others. He does not feel "back to normal" for 2 months. He recognizes and apologizes to his colleagues for his moodiness.*

❖ **Flexibility is consciously chosen and practiced.** Easily shifts mindsets and behaviors when emotional and social functioning is compromised. Mature and healthy[4] mechanisms are utilized to cope. **Self-resilience and confidence** seem to carry through both daily behaviors and stressful times. Tends to have a positive attitude. **Upper-middle** to **high EI,** with high level of self-awareness, self-regulation, motivation, empathy, and social skills**.**
Example: *A seemingly happy resident who is well liked by students and peers has just had premature twins (25 weeks) who are in the NICU. He does not complain about it at work and actually has the outlook (coping mechanism) that he is so glad they are both alive and his wife is fine. He continues to take call, despite offers of help from colleagues. He seems to take care of his wife, patients, and peers with his usual enthusiasm, friendliness, and openness to life experience.*

❖ This is someone who appears to be and is **flexible, resilient, confident,** and has high EI **by habit**. These capabilities have progressed and are now innate behaviors. Maturity and self-awareness lead her to anticipate stressors and invoke coping mechanisms that work well, so that she is **always in control. Adapts easily** to almost any situation and **embraces change** as a positive experience. **High level of EI** allows her to "**read" others and anticipate their needs, proactively helping them** to cope with stress and change.
Example: *The senior resident on your team is doing an amazing job on the ward. It is time for midrotation feedback and you try to tease out what makes her performance so outstanding. You have worked with other knowledgeable and skilled residents, but as you think about this you realize that it is not the knowledge and skill that sets her apart but her attitude. She is perceptive and anticipates the needs of everyone on the team, carefully monitoring workloads and providing the right amount of help. In the middle of what can be total chaos she is in control and is able to easily adapt to the ever-*

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5. ***Demonstrate trustworthiness that makes colleagues feel secure when one is responsible for the care of patients***

Primary Author: Patricia Hicks, MD

Background

Trustworthiness can be defined as the combination of clinical knowledge/skill, discernment, conscientiousness and truthfulness that allows supervisors and care team members to be more certain that the individual is responsible and capable of providing competent patient care without direct supervision. At first blush, the term "trustworthiness" is a seemingly value-laden, subjective term that would render assessment difficult. However, the construct of trustworthiness of Kennedy *et al'* allows us to objectify the term and determine the level of supervision needed for that individual. In their construct, the term "trustworthiness" is not being used in the general sense of "trusted," a judgment of the nature of one's character or intent. Rather the term is used to describe a collection of outcome data that may provide inference for the ability to count on an individual to carry out a given task, decision-making process or other aspect of clinical care within a specified context with minimal or no supervision.

Graded, progressive responsibility is thought to be critical to the development of a competent physician.[2] A careful balance between the appropriate level of supervision of learners (students, residents, fellows and practitioners) and their development, which takes place through progressively more independent opportunities and deliberate practice, is critical. Supervision may take many forms, as described by Kennedy *et al* [1]: 1) direct, hands-on care and demonstration with immediate course correction; 2) routine oversight (e.g., rounds or case presentations); 3) responsive oversight where the patient, learner or other prompt raises a patient care issue requiring escalation of care or involvement of supervisors; and 4) back-stage oversight practiced by the seasoned supervisor who has confidence that the learner is trustworthy.

With the goal of examining trustworthiness in the context of its implications for supervision, Kennedy et al[1,3] define a multidimensional construct with four domains: 1) ability or level of knowledge, skills, and attitudes (KSA); 2) discernment or level of awareness of one's limits in KSA; 3) conscientiousness (degree of thoroughness in data gathering and dependability in following through with assigned tasks); and 4) truthfulness (absence of deception in trainee's interactions with the supervisor)[3].

One's ability or level of KSA is a necessary, but not sufficient element of the overall trustworthiness of an individual. Unlike other aspects of development, KSA are particularly sensitive to the educational and experiential history of the individual. Each new clinical task or situation requires that an individual address his development of KSA as it relates to that clinical context. This often means that an older or more experienced individual in one context may find himself at a very early stage of development within a new clinical context where different KSA are required.

Discernment in this construct of trustworthiness refers to acknowledgement of uncertainty and the willingness to be transparent in communicating that uncertainty to a supervisor who can help close the gaps. Discernment is predicated on the practitioner's awareness of his limits and the consequences of these limits in a given clinical context. As an example, a practitioner would be characterized as discerning if he expressed both concern for a patient's condition given a change in status and acknowledged his uncertainly about how to best respond to that change. True discernment implies the ability to assess one's level of KSA at the point of care, know when one is in over one's head, and seek help.

Conscientiousness, as described by Kennedy et al [1] refers to the combination of comprehensive data gathering and the reliability or dependability in completion or follow-through of assigned or necessary

tasks. The first of this two-part element depends heavily on knowledge or understanding of what constitutes the expected comprehensive data collection; the second part depends on agreement of what tasks are assigned (completion or follow-through can therefore be determined by a specified task-list either explicitly stated/written or widely accepted as standard of care). As such, the assessment or determination of level of learner performance for this element would be a combination of these two elements. For the dependability in completion or follow-through of assigned tasks, the starting point would ideally begin with the supervisor review of a to-do list constructed by the learner, by protocol, or by another source and confirmed by the supervisor. The expectation for a conscientious practitioner is comprehensive completion of all assignments in a timely manner without prompting, and with practitioner initiated help seeking if barriers develop.

Truthfulness or absence of deception in a practioner's interactions with the supervisor can be determined most easily when it is absent and/or inconsistencies are revealed. One mechanism for determining such inconsistencies is through "back-stage supervision" such as cross-checking data reported verbally with data offered in written communication. A supervisor should also be alerted when there is a lack of transparency about uncertainty in that it is recognized but not communicated. Learner awareness is implicit in all aspects of truthfulness. A culture in which both awareness and communication of uncertainty is embraced is key to professional formation. Supervisor prompting to encourage the expression of uncertainty (not just giving permission but encouraging open expression of uncertainty) rather than making assumptions can reduce this perception that the learner is deceptive or untruthful. Since early learners often feel pressure to not ask questions, to be autonomous or not bother a supervisor, explicit supervisor request for learner inquiry regarding uncertainty is critical.

Ethnographic studies of trustworthiness, as defined by the author's construct, reported that supervisors used a combination of two strategies to try to ascertain truthfulness: 1) "double-checks, where a team member would check or verify a report or finding presented" (e.g., reviewing vitals, labs, and nursing notes before a learner presents a patient) and 2) "language cues, including the structure and delivery of anticipated information" (e.g., when a learner, prompted on rounds to report results of a blood test, states that all lab tests were normal when the phlebotomist was unable to obtain enough blood to run that particular test)[1]. Language cues may be difficult to use for such an assessment, for the same reason that oral examinations, which are not standardized, pose potential threats to validity[4]. These threats include content under-representation[5] (under sampling), anecdotal performance that is generalized to other settings[6], and bias associated with unstated supervisor expectations[7] (including the read my mind phenomenon). Comfort with uncertainty and transparency in communication/sharing of dilemmas is consistently displayed in those most trusted.[8, 9]

Teachers should prompt learners to establish a personal goal of heightened awareness regarding gaps in KSA and to embrace the uncertainty present at every level of development. The learner adaptation and internalization of this metacognitive process then allows for the self-initiated processes of inquiry and resource seeking necessary to address identified gaps.

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Table 1. Developmental Progression of Milestone Elements for the Trustworthiness Sub-competency

Abbreviation for Element	Description of Element	Milestone 1	Milestone 2	Milestone 3	Milestone 4
KSA	Ability or level of knowledge, skills and attitudes (KSA)	Lacks knowledge and/or skills necessary for the assigned task	Demonstrates emerging KSA for clinical task through participation as a passive but engaged learner (asks some questions, attempts to build on level of KSA)	Sufficient, but incomplete knowledge and/or skills to function at the level assigned, but may have some necessary KSA to participate with supplementary oversight	Has the ability/level of KSA to achieve expected performance in the context of practice without direct supervision
D	Discernment or level of awareness of one's limits in KSA as it relates to a clinical context	Is unaware of and unaffected by limitations or gaps in KSA within the assigned context	With prompting, becomes aware of gap(s) in KSA but is not able to express perceived consequences or impact of the gap(s) on the relevant clinical situation	Aware of gap(s) in KSA and expresses without prompting but does not recognize/express perceived consequences or impact of the gap(s) on the relevant clinical situation	Aware of gap(s) in KSA and expresses, without prompting; also recognizes and expresses known or potentially uncertain consequences of the gap(s) on the relevant clinical situation
C	Conscientiousness (degree of thoroughness in data gathering and dependability in following through with assigned tasks)	Incomplete data gathering and/or inconsistent follow-through with assigned tasks, despite prompting	Partially complete data gathering; requires prompting to generate task list and prompting to carry out completion of task list	Data gathering is complete for some contexts; incomplete for other contexts; generates initial or first level task list and spontaneously completes most items, but lacks generation of and follow-through for secondary level tasks (tasks that are indicated based on results from primary tasks)	Data gathering is consistently performed in thorough and complete fashion; follow-through on assigned and self-initiated tasks is consistent without external prompts. Spontaneously checks in to report status of data gathering and task completion, initiating questions regarding indications for secondary tasks
T	Truthfulness (absence of deception in trainee's interactions with the supervisor)	Incomplete truth, transparency or openness to uncertainty present in context where deception and its consequences may not be appreciated	Pauses, omits or falls short of a full explanation of directly requested or expected content, relevant to the context assessed	In response to query is transparent, accurate and comprehensive in information sharing, including qualification of uncertainty when applicable	Initiates contact with others to communicate information and associated uncertainty, missing data or other gaps in KSA relevant to the clinical context

*Elements are assessed by context; elements may or may not develop together. Some elements may *functionally* serve to be compensatory in a given context. A truly advanced physician who is said to be trustworthy in a context without direct supervision has "Milestone 4" status in all elements

In **Table 1** each row represents the developmental progression of one of the four elements of trustworthiness (knowledge, discernment, conscientiousness, and truthfulness), while each column represents a single stage of development (milestone) for all four elements. In attempting to apply the table to the individual learner, the evaluator should note two issues for caution: 1) The four elements may not develop at the same rate; for example, a learner may be at the first milestone for knowledge but the second or third for discernment; and 2) Individual observations or encounters with students may not be conducive to assessing all four of the elements of trustworthiness. The behaviors noted in the "truthfulness" row, in particular, can be difficult to observe. Kennedy[3] describes *double checks* (e.g., when a supervisor checks labs prior to the presentation of those labs on rounds) and *language cues* (e.g., the qualifications or the uncertainty expressed within the structure and delivery of a patient on rounds) as possible ways of assessing truthfulness. Unfortunately, truthfulness may be most accurately assessed when there is clear evidence of non-truthfulness.

Below, we have presented some examples that represent various combinations of cells from the above table of the four elements of trustworthiness to emphasize both the potential for differing rates of developmental growth for each of these elements and the likelihood that only some of the four elements can be observed in any given encounter. It is anticipated that the scoring of clinical observations that demonstrate multiple elements of trustworthiness will likely require consideration of the variable rates of their development, and multiple observations will be required to insure proper sampling across all the elements. The clinical scenarios described below use the following abbreviations to identify the elements observed: KSA = Knowledge, skills and attitudes; D = discernment; C = conscientiousness; T = truthfulness. The milestone (level of performance) is indicated by the number from 1-4. Thus the scoring would be a combination of the observed element and their milestone – example KSA-1 would be knowledge, skills and attitudes as described in Milestone 1 in **Table 1.**

<u>Examples of observable scenarios that represent clusters of behaviors at different levels of development for the elements of trustworthiness</u>

❖ Has significant knowledge gaps or is unaware of knowledge gaps and demonstrates lapses in data-gathering or in follow-through of assigned tasks. May misrepresent data (for a number of reasons) or omit important data, leaving others uncertain as to the nature of the individual's truthfulness or awareness of the importance of attention to detail and accuracy. (overt lack of truth-telling is assessed in a professionalism competency)
Example: *An individual calls her supervisor at home to present a patient that she admitted. Key laboratory results are missing in the presentation and the supervisor requests that she seek this critical information and report back. Several hours later on rounds, the individual is again questioned about the laboratory values and reports that the results are normal but she is unable to locate those results in her paperwork.*
D-2, C-1, T-2

❖ Has a solid foundation in knowledge and skill but is not always aware of or seeks help when confronted with limitations. Demonstrates lapses in follow-up or follow-through with tasks, despite awareness of the importance of these tasks. Follow-through can be partial, but limited due to inconsistency or yielding to barriers. When such barriers are experienced, no escalation occurs (such as notifying others or pursuing alternative solutions).
Example: *On hand-over of patients from the day team to the night team, several tasks are identified as needing follow-up or completion during the next shift. The following day, when the service is handed back over to the original individual, several of these tasks were either incomplete or not completed as specified in the signed-out. When questioned about these tasks, the night-float individual indicated that things were busy, she forgot, or she gives another excuse indicating that she was aware of the expectation but failed to complete the tasks.* KSA-3, D-2, C-3

❖ Solid foundation in knowledge and skill with realistic insight into limits with responsive help seeking. Data-gathering is complete with consideration of anticipated patient care needs, careful consideration of high risk conditions first and foremost. Little prompting is required for follow-up.
Example: *Presentation of a patient consultation is done in a comprehensive manner, without the need for prompting. Questions posed by the individual allow the consultant to appreciate the individual's understanding of the disease process and the individual's awareness of gaps in her knowledge. Careful*

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attention to detail and accuracy are evident in the history and physical examination that is presented. The next day, the service is busy and the individual needs reminding to re-check the send-out labs. KSA-3, D-3, C-3
❖ Has a broad scope of knowledge and skill and assumes full responsibility for all aspects of patient care, anticipating problems and demonstrating vigilance in all aspects of management. Pursues answers to questions and communications include open, transparent expression of uncertainty and limits of knowledge. **Example:** *An individual possesses the KSA to lead the team on rounds, asking for pertinent data not presented by other team members (assertive inquiry). Constant review and vigilance of patient status uncovers unexplained findings on laboratory or physical examination. Findings are reported to supervisors as change with un-identified meaning (and potential concern).*   KSA-4, D-4, T-4
❖ As above, but any uncertainty brings about rigorous search for answers and conscientious and ongoing review of information to address the evolution of change. May seek the help of a master in addition to primary source literature. **Example:** *This is the practitioner who leaves no stone unturned. Colleagues are confident when handing-off a patient that he will receive exemplary care. In fact, when there is a complex patient colleagues are relieved when this practitioner is on call because she typically invests much time and energy in searching for needed answers and meticulously reports back on all important developments.* KSA-4, D-4, C-4, T-4

6. ***Provide leadership skills that enhance team functioning, the learning environment, and/or the health care delivery system/environment with the ultimate intent of improving care of patients***

Primary Author: Susan Guralnick, MD

Background

As physicians move from medical school to residency, fellowship, and on to practice, there are many situations where the physician is in a leadership position. However, leadership training has not been a significant focus during the continuum of medical education. The organizational structure of most residency training programs places senior residents in the position of leading a team of junior trainees (medical students and junior residents) that may also include nurse practitioners, nurses, physician assistants, and others, under the supervision of faculty. There are an infinite number of situations in which a physician may function in a leadership role and at varying levels of responsibility. The skills necessary to be an effective leader clearly include those of team management.[1] Leadership may take the form of leading a code, running an ambulatory office, or heading a patient safety program. Some residency programs are beginning to incorporate leadership training into their educational curricula.[2] Several residency programs have published articles describing educational retreats, with a focus on developing leadership skills in their trainees.[3,4] While team leadership is an essential skill, there are broader aspects of leadership that deserve consideration. Physicians take on a variety of roles, such as educational leadership, program or organizational leadership, community leadership, and being a change agent. They must lead not just through power and authority (direct management), but also through influence. They need to function within various organizational structures, often with groups who do not share a vision and goals. Leadership roles may involve small, homogeneous groups or larger, more heterogeneous groups. Bolman and Deal[5] have proposed four successful frameworks for leadership: 1) *structural*, in which the leader acts as analyst and architect, leading through analysis and design; 2) *human resources*, in which the leader acts as catalyst and servant, leading through support, advocacy, and empowerment; 3) *political*, in which the leader acts as advocate and negotiator, leading through coalition building and persuasion; and 4) *symbolic*, in which the leader acts as prophet and poet, leading through inspiration. Much has been written about effective leadership in the business community and at an organizational level, such as *The Leadership Challenge* by Kouzes and Posnes.[6] However, there is little literature defining the leadership skills required of a resident specifically or a physician in general. Orlander et al[1] developed a validated seven-item Resident Leadership Scale to help define and assess these skills. Based on lessons learned from the literature, several key themes emerge. Competent leaders provide

definition and clarification of rules and expectations for team members. They possess both good organizational skills and strong interpersonal/communication skills. They empower their team members to perform, encouraging them to take ownership and participate actively in decisions, thereby having an impact on outcomes.[7] Leaders are consensus builders, and great leaders inspire others to perform.

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❖ **Does not define/clarify roles and expectations** for team members. Team management is **disorganized and inefficient**. Interacts with supervisor(s) in an **unfocused and indecisive manner**. **Open communication is not encouraged** within the team. **Team members are not given ownership or engaged in decision-making**. **Manages by mandate. Unable to advocate effectively for the team** with faculty, staff, families, patients, and others.
❖ Interactions suggest that **there are roles and expectations for team members, but these are not explicitly defined.** Manages the team in a **somewhat organized** manner. Interacts with supervisor(s) in a **somewhat focused but poorly decisive manner**. **Begins to encourage open communication** within the team. **Sometimes engages team members in decision-making** processes. **Manages most often through direction,** with some effort towards consensus building. **Attempts to advocate for the team** with faculty, staff, families, patients, and others.
❖ Provides **some explicit definition to roles and expectations for team members**. Manages the team in an **organized** manner. Interactions with supervisor(s) **are focused and decisive in most cases. Open communication within the team is routinely encouraged**. **Team members are routinely engaged in decision-making and are given some ownership** in care. Usually **manages through consensus-building** and **empowerment** of others, but sometimes reverts to being directive. **Advocates somewhat effectively for the team** with faculty, staff, families, patients, and others.
❖ **Routinely clarifies roles and expectations** for team members. Manages the team in an **organized and fairly efficient** manner. Interactions with supervisor(s) are **focused and decisive**. **Creates a foundation of open communication within the team**. **Team members are expected to engage in decision-making and are encouraged to take ownership** in care. **Utilizes a consensus-building** process and **empowerment** of others, only in rare instances becoming directive. **Advocates effectively for the team** with faculty, staff, families, patients, and others.
❖ **Routinely clarifies roles and expectations for team members**. Team management is **organized and efficient**. Interacts with supervisor(s) in a **focused and decisive** manner. **Creates a strong sense of open communication within the team**. **Team members routinely engage in decision-making and are expected to take ownership** in care. **Consensus-building and empowerment** are the norm. **Proactively and effectively advocates for the team** with faculty, staff, families, patients, and others. **Inspires** others to perform.

7. *Demonstrate self-confidence that puts patients, families, and members of the health care team at ease*

Primary Author: Ann Burke, MD

Background

Erik Erikson,[1] the famous psychiatrist, has described each patient as "a universe of one," and an eminent physician has claimed that "85% of the problems a doctor sees in his office are not in the book."[2] As a result of the knowledge explosion, the uncertainty of medicine has increased, as has the complexity of the profession. How does one feel comfortable dealing with uncertainty? There is possibly a mixture and varying degrees of overlap between self-confidence, emotional intelligence (EI), and metacognition at play in this very complex construct. The individual learner must have a moderate level of metacognition, insight, and self-efficacy to be able to put families and teams at ease. Metacognition refers to one's awareness of one's own cognitive processes. It is an assessment of one's own ability, knowledge, and understanding of task-relevant factors.[3]

EI has been divided into four branches[4-6]:

- The ability to perceive emotions in oneself and others
- Facilitating thought, or the ability to generate, use, and feel emotion, to communicate feelings, or employ them in other cognitive processes
- Understanding emotions, or the ability to understand emotional information, how emotions combine, and progress through relationship transitions, and to appreciate such emotional meanings
- Managing emotions, or the ability to be open to feelings and to modulate them in oneself and others so as to promote personal understanding and growth

The dynamic overlap of self-confidence and EI integrated into reflective practice allows us to think of this sub-competency in a complex framework involving a number of maturational skills and/or characteristics and attributes. One such attribute is trustworthiness. Defined as a combination of clinical knowledge/skill, discernment, conscientiousness, and truthfulness, trustworthiness is implicitly related to the complex abilities required in this sub-competency.

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❖ **Unaware of how to solve a problem**/question. **Expected to have little self-confidence** given limited experience, and appropriately identifies the need to ask for help.

- ❖ Speaks in a **confident manner, but still unsure of when and how to clearly articulate his limitations to the family.** Exhibits behaviors that reflect some comfort and confidence with his role as a physician, but families would not necessarily feel at ease without reassurance from a more senior colleague or supervisor.
- ❖ Starts to self-reflect and navigate the interplay of the complexity of explaining uncertainty to patients and families, while remaining confident with information he knows and understands clinically. **Has some insight into when to be confident and when to express uncertainty** with situations and diagnoses. Emerging alignment between knowledge/skill and degree of certainty allows families to assess him as effective in placing them at ease in many situations.
- ❖ Gaining experience and comfort with uncertainty. Is appropriately **self-confident** and considered to be trustworthy (skilled, truthful, discerning, and conscientious). The balance between confidence and uncertainty allows families and patients to assess him as quite effective in placing them at ease.
- ❖ Master of explaining uncertainty and what is known. Does so with a **mature/comforting self-confidence** that is easily identified by all, **modified to the emotional needs of the family/patient**. Families and patients identify him as excellent at placing them at ease, even in the face of difficult situations.

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8. *Recognize that ambiguity is part of clinical medicine and respond by utilizing appropriate resources in dealing with uncertainty*

Primary Author: Patricia Hicks, MD

Background

The practice of medicine is fraught with uncertainty. Uncertainty arises in 1) the world, 2) our knowledge of the world, 3) the structure of the decisions we face, and 4) the preferences and values that are brought to bear in making those decisions.[1]

Ambiguity is defined as the timely absence of information needed to understand a situation or identify its possible future states. As such, ambiguity is a state of uncertainty about the world (construct 1 above), either knowing that we do not know or not being certain that we do know.

In clinical decision-making, physicians assist patients in achieving their goals, usually relating to preventing illness, sustaining health status, or achieving a better state of health.[1] An individual's management of uncertainty can influence their approach to clinical decision-making for both the physician and the patient.

Uncertainty as Risk
Uncertainty can be processed as risk. When considering the approach to clinical medicine, individuals can be categorized as risk tolerant or risk averse, and these behaviors affect both the approach to clinical decision-making and how uncertainty is considered in that decision-making. *Objective risk* is that component of risk that can be calculated by an epidemiologic or pathophysiologic data set. *Subjective risk* is the perception of risk, which may or may not match the objective risk due t o the overlay of bias regarding the weight of factors both related and unrelated to the data. As an example, the *objective risk* of placing a g-tube and performing a Nissen fundoplication in a patient with dysfunctional swallowing and associated aspiration is known and would generally favor action (surgery) to prevent aspiration and its complications. However, the family's perception of risk for that procedure may be much higher due to factors associated with the loss of "normal" body image (visible g-tube) and the loss of the satisfaction that comes with the mother's ability to feed her child "naturally." For the physician, objective risk may be altered by previous experiences with poor outcomes, such as post-Nissen fundoplication retching, biasing the physician against the procedure and potentially favoring the risk of aspiration.

While the risk of uncertainty can bring a n egative connotation when it relates to optimal health care outcome, it can also bring about hope.   Physicians and patients who embrace or accept the objective risk

or potential for suffering, morbidity, or death may have the option to reframe the uncertain outcome as hope of overcoming the odds, often accompanied by a increased focus or appreciation of remaining life or quality of life. Several scales to measure risk aversion or risk-taking behavior have been studied [2]; among the most useful of these is the Domain-Specific Risk-Taking Scale (DOSPERT).[3]

Perception of risk or quantifying uncertainty requires numeracy, which is the facility for reading and understanding numbers and their representation (including statistics). Numeracy is literacy for numerical health care outcome data. It is an important skill for both the practitioner and patient in understanding risk. A high level of numeracy is rare in the general population. A patient's numeracy can allow for true understanding of the odds for good health care outcomes and thus lead to a celebration of life and current functioning as well as contribute to compliance and maintenance of the goal to adhere to a difficult medical regimen or quality of life.[4,5] Physician skill in expressing outcomes through both the differentiation between the biological or clinical significance and the statistical significance is variable. Patients may request interpretation or explanation of the meaning of outcome data stated in statistical fashion, sometimes resorting to the request, "What would you do if this was your child?" R esponding to a patient/family request to manage uncertainty by offering one's personal approach can be quite supportive when the patient/family cues indicate that such input may be appropriate.

Physician Reactions to Uncertainty
Reactions to uncertainty coupled with the desire for a clearer understanding of the situation can lead to stress, avoidance, delay, suppression, or denial.[6] For most individuals, the response to uncertainty is aversion; however, some people are attracted to the mystery or cognitive challenge that comes from incomplete information, especially when there is no perceived threat. Uncertainty may also be attractive when there is a possibility that the situation may produce a negative outcome[7] and when the uncertainty enables some hope of avoiding that outcome.

Physician responses to uncertainty often differ from the patient's response to the same uncertainty. It is important for the physician to recognize these differences and how clinical decisions and patient adherence to therapy can be affected by a patient's attitudes regarding certainty. Physician awareness of effective psychological responses to uncertainty associated with illness can enable the physician to assist their patients and families with such adjustment.[8] In this way, this milestone has connections to milestones in patient care and i nterpersonal and communication skills. Physicians can manage uncertainty and assist their patients and families with uncertainty through information-seeking efforts. For example, physicians can individualize the discussion of treatment options by considering whether discussing treatment uncertainties immediately after revealing a devastating diagnosis could alter a patient's management of uncertainty, particularly if that person were fearful or angry (see patient reactions below). Physicians can also assist patients and families with coping or adjusting to the realization of uncertainty.[9,10] Physician awareness of effective psychological responses to uncertainty associated with illness can enable the physician to assist patients and families with such adjustment.[17]

Patient Reactions to Uncertainty and Risk Perception
The patient's attitude toward risk is also an important component of the physician's management of risk. Fearful people tend to be risk averse and pessimistic about uncertainty. Fearful individuals are also less likely to be unrealistically optimistic about their future health when presented with both positive and negative potential outcomes.[11] Individuals with low self-esteem may have a higher intolerance of uncertainty and may be more risk averse.[12] Angry individuals are likely to be unrealistically optimistic about their future health when presented with both positive and negative outcomes.[11] Furthermore, individual risk perceptions and r isk attitudes may continue once a par ticular experience has ended (appraisal-tendency theory), complicating the role that risk can play in future situations.[11] Additionally, patients manage uncertainty within a frame of overall health status, individual values, and outcomes. An individual who has the choice of undergoing a prolonged therapy associated with pain and suffering may choose to do so at a young age or if death is highly probable without the therapy. The same diagnosis and treatment options in an older patient may not lead to a choice to treat, given the overall length of life and suffering involved in the therapy.

Table 1. Elements and Anchors for the Developmental Extremes of the Components

Domain	Early	Mature
Physician management style in response to uncertainty	Authoritarian *Physician response to uncertainty is to confidently cite data, recommend a course of treatment without consideration or inclusion of patient perspective, values, uncertainty.*	Informer-advisor/educator/collaborator *In the face of uncertainty, physician discusses choices with the patient/family with open communication that expresses desire to inform, seek additional resources and collaborate with the patient/family on a plan. All acknowledge the current state of limited knowledge regarding outcome and agree to proceed with uncertainty, but revisit the decision as needed.*
Physician risk position	Risk behavior (averse or prone) related to position held by self without consideration of patient position *Physician's tendency to choose risk when outcome is uncertain OR to choose to not take risk when outcome is uncertain is based on physician beliefs and dominates management and decision-making approach; patient perspective is not considered.*	Balanced risk-aversion with risk-taking *Physician's approach to uncertainty and risk associated with that uncertainty is balanced, rendering the physician more able to listen and respond to patient concerns regarding uncertain outcomes, diagnoses, processes and management.*
Physician alignment with patient goals	Physician does not consider patient goals and values in weighing risk *Physician does not explore the patient's personal goals for health, individual circumstances and perceptions regarding health, quality of life and management of uncertainty.*	Physician able to adjust treatment plan (given patient mental health status is maximally adjusted) to patient goals *After consideration of the patient's and family's mental health status (depression and other conditions rendering patient/family incompetent to participate in decision-making fully) the physician is able to navigate conversations regarding treatment plans, outcomes and alternative therapies in a flexible fashion, adjusting communications and decision-making process to align with overall patient goals.*
Physician understanding and management of numeracy	Talks "over patient" or presents information in restricted formats *Physician uses medical terminology and statistics without regard for patient/family level of understanding. Does not use alternative language, visuals or analogies to communicate complex statistical data.*	Able to adjust expression of numeracy so that patient is able to understand; seeks patient feedback as evidence of understanding likelihood of various outcomes/choices. *Uses language and graphics appropriate to perceived level of understanding and requests patient/family teach back for complex scenarios involving treatment choices and risk/morbidity.*

Table 1. Elements and Anchors for the Developmental Extremes of the Components *(cont.)*

Domain	Early	Mature
Physician response to ambiguity(condition where an outcome cannot be known)	Denial, avoidance, unengaged *Physician avoids engaging family/patient in complex conversations, unresponsive to family/patient needs or request for clarification.*	Seeks information to improve knowledge of world (of patient problem) *When faced with complex patient care problem for which there is no known therapy, diagnosis, and/or outcomes, the physician seeks multiple outside resources for answers to best practice/treatment approach. Ultimate is to pursue research or to offer patient the opportunity to seek expertise elsewhere (if/when disease process is rare).*
Physician emotional response to uncertainty (where data regarding outcomes is known, but *known* to be variable or poor prognosis)	Physician discomfort with uncertainty results in physician pushing patient to "get it" at the most pessimistic perception of uncertainty (Physician desires sharing of burden of uncertainty). *Physician pushes patient/parent to understand and accept the worst case scenario; physician is motivated by anxiety associated with variation in outcome or lack of guaranteed outcome and selfish desire to avoid experiencing sense of helplessness when patient/family experiences loss/despair associated with minimal chance of good outcome.*	Balance of information seeking with acceptance or peace with self about what cannot be changed. *Physician is able to accept his limited capacity to affect the desirable therapeutic outcome. Is able to express loss, disappointment and simultaneous engagement with patient/family to continue to hope and look for additional possibilities/resources.*
Physician support of patient's adjustment and hope	No or low recognition of patient despair; when recognized, experiences and responds with frustration to the burden of patient response to uncertainty (e.g., fear, anger). *Physician dismissive to patient expression of anticipated loss and/or responds by distancing self, or avoidance of conversation.*	Physician anticipates support of patient adjustment; arranges timing of therapeutic plans and other clinical decisions according to patient readiness. *Physician paces information delivery to individual patient/family capacity to cope/manage/adjust to difficult or uncertain diagnosis or treatment plans.*

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❖ Feels **overwhelmed** and **inadequat**e when **faced with uncertainty** or ambiguity. **Communications** with patients/families and development of therapeutic plan are **rigid and authoritarian**, with assumption that the patient can manage information and participate in decision-making; **patient/family numeracy presumed**. Seeks only self or self-available resources to manage response to this uncertainty, resulting in a **response characterized by their (individual) preexisting state of risk aversion or risk taking**. Does not regard patient need for hope; feels compelled to make sure that patients understand full potential for negative outcome (defensive/protective of physician).
❖ Recognizes uncertainty and feels tension/pressure from not knowing or knowing with limited control of outcomes. **Explains** situation **to the patient in framework most familiar to the physician,** rather than framing it with terms, graphics, or analogies familiar to the patient. Seeks rules and statistics and feels **compelled to transfer all information to the patient immediately**, **regardless of** patient readiness, patient goals, and **patient ability to manage information**.
❖ **Anticipates** and focuses on **uncertainty**, looking for resolution by **seeking additional information**. Aims to inform the patient of the more optimal outcome(s), framed by physician goals. Does not manage overall balance of patient/family uncertainty with quality of life, need for hope, and ability to adhere to therapeutic plan. **Focuses on own risk management position for a given problem** and does not suggest that more or less risk taking (different from physician's position) could be chosen. Still seeks patient/parent recitation of uncertainty/morbidity as proof that patient/family understands the uncertainty. **Unresolved balance of expectations with physician expectations taking precedence**.
❖ Anticipates that uncertainty at the time of diagnostic deliberation will be likely. Uses such uncertainty or larger ambiguity as a prompt/motivation to seek information or understanding of unknown (to self or world). **Balances delivery of diagnosis with hope, information, and exploration of individual patient goals**. Concepts of risk versus hope are worked through **using conceptual framework** that **includes cost** (e.g., suffering, lifestyle changes, financial) **versus benefit; framed by patient health care goals**. Expresses openness to patient position and patient uncertainty about his/her position and response.

❖ Is **aware of and keeps own risk aversion** or risk-taking position in check. Seeks to **understand patient/family goals for health** and their capacity to achieve those goals, given the uncertain treatment options. Engages in discussion with **high sensitivity towards numeracy**, emphasizing patient/family control of choices with initial plan development and ongoing information sharing through changes as knowledge and patient health status evolve. Remains flexible and committed to engagement with the patient/family throughout the patient's illness, serving as a **resource to gather information so that degree of uncertainty is minimized.** Openly and comfortably discusses strategies and outcomes anticipated with the patient/family, emphasizing that all plans are subject to the imperfect knowledge and state of uncertainty. **Constant revisiting of knowledge, uncertainty, and developed plans is balanced with acceptance of what is unknown**; transparent communication of limits of treatment plan outcomes.