Guralnick S, Fondahn E, Amin A, Bittner EA. Systems-based practice: time to finally adopt the orphan competency. *J Grad Med Educ.* 2021;13(suppl 2):96-101.

## Comparison of Specialty-Specific Systems-Based Practice (SBP) Milestones

| Specialty | Domain | Current SBP | Domain | Future SBP - Milestones 2.0 |
|---|---|---|---|---|
| Allergy/ Immunology | Resource use<br>QI<br>PS | **Utilizes/accesses outside resources. Demonstrates awareness of and accommodation to circumstances affecting patient care, including the patient's financial resources and other factors that can affect health care delivery and quality. Understands the basics of patient safety and clinical risk management, with emphasis on avoidance of medical errors. Uses technology and external resources to accomplish safe and effective health care delivery. — Systems-based Practice**<br>Level 1: • Infrequently (<25% of the time) demonstrates proficiency for all aspects expected of a graduating resident, fellow, or junior independent practitioner<br>Level 2: • Inconsistently (25-75% of the time) demonstrates proficiency for all aspects expected of a graduating resident, fellow, or junior independent practitioner<br>Level 3: • Usually (75-90% of the time) demonstrates proficiency for all aspects expected of a graduating resident, fellow, or junior independent practitioner<br>Level 4: • Constantly (>90% of the time) demonstrates proficiency for all aspects expected for a graduating resident, fellow, or junior independent practitioner<br>Level 5: • Demonstrates consistency and proficiency beyond expectations for a graduating resident, fellow, or junior independent practitioner | PS<br>QI | **Systems-Based Practice 1: Patient Safety and Quality Improvement**<br>Level 1: Demonstrates knowledge of common patient safety events<br>Demonstrates knowledge of how to report patient safety events<br>Demonstrates knowledge of basic quality improvement methodologies and metrics<br>Level 2: Identifies system factors that lead to patient safety events<br>Reports patient safety events through institutional reporting systems (simulated or actual)<br>Demonstrates knowledge of and participates in local quality improvement initiatives<br>Level 3: Participates in analysis of patient safety events (simulated or actual)<br>Participates in disclosure of patient safety events to patients and families (simulated or actual)<br>Demonstrates the ability to identify and develop a quality improvement project or advance an existing project<br>Level 4: Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)<br>Discloses patient safety events to patients and families (simulated or actual)<br>Demonstrates the ability to implement or assess quality improvement initiatives<br>Level 5: Actively engages teams and processes to modify systems to prevent patient safety events<br>Role models or mentors others in the disclosure of patient safety events<br>Independently creates, implements, and assesses quality improvement initiatives |
| Allergy/ Immunology | | | CC | **Systems-Based Practice 2: System Navigation for Patient-Centered Care**<br>Level 1: Demonstrates knowledge of care coordination<br>Level 2: Coordinates care of patients in routine clinical situations effectively using the roles of interprofessional teams<br>Identifies key elements for safe and effective transitions of care and hand-offs<br>Level 3: Coordinates care of patients in complex clinical situations effectively using the roles of interprofessional teams<br>Performs safe and effective transitions of care/hand-offs in routine clinical situations<br>Level 4: Role models effective coordination of patient-centered care among different disciplines and specialties<br>Performs safe and effective transitions of care/hand-offs in complex clinical situations<br>Level 5: Analyzes the process of care coordination and leads in the design and implementation of improvements<br>Role models or improves safe and effective transitions of care/hand-offs within and across health care delivery systems |
| Allergy/ Immunology | | | HC Systems | **Systems-Based Practice 3: Physician Role in Health Care Systems**<br>Level 1: Describes basic health payment systems and practice models<br>Level 2: Identifies and describes how components of a complex health care system are interrelated, and how this impacts patient care<br>Delivers care with consideration of each patient's payment model<br>Level 3: Discusses how individual practice affects the broader system<br>Engages with patients in shared decision making informed by each patient's payment models<br>Level 4: Uses various components of the complex health care system to provide efficient and effective patient care and transition of care<br>Advocates for patient care needs with consideration of the limitations of the patient's payment model<br>Level 5: Advocates for or leads systems change that enhances high-value, efficient, and effective patient care and transition of care<br>Participates in health policy advocacy activities |
| Allergy/ Immunology | | | Population Health | **Systems-Based Practice 4: Community and Population Health**<br>Level 1: Demonstrates knowledge of population or community health needs and disparities<br>Level 2: Identifies specific population or community health needs and inequities for the local population<br>Level 3: Accesses local resources to meet the needs of a specific patient population or community<br>Level 4: Participates in changing and adapting practice to provide for the needs of specific populations or communities<br>Level 5: Leads innovations to advocate for specific populations or communities with health care inequities |

**Anesthesiology** — CC

**Systems-based Practice 1: Coordination of patient care within the health care system**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Identifies the roles of patients, families, health care providers, and systems in health care delivery and outcome<br><br>Identifies priorities when caring for multiple patients<br><br>Coordinates the care of an individual patient within the health care system effectively and safely | Prioritizes multiple patient care activities with indirect supervision for routine procedures<br><br>Uses system resources to facilitate cost-effective and safe non-subspecialty anesthesia care | Prioritizes multiple patient care activities with indirect supervision for patients undergoing common subspecialty procedures<br><br>Uses system resources to facilitate cost-effective and safe subspecialty anesthesia care | Manages multiple patient care activities with conditional independence<br><br>Uses system resources to facilitate and optimize cost-effective and safe longitudinal peri-operative care | Effectively coordinates the management of multiple patient c activities |

**Anesthesiology** — QI, PS

**Systems-based Practice 2: Patient Safety and Quality Improvement**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Describes common causes of errors<br><br>Describes team-based actions and techniques designed to enhance patient safety<br><br>Participates in established institutional safety initiatives<br><br>Follows institutional safety policies, including reporting of problematic behaviors or processes, errors, near misses, and complications<br><br>Incorporates national standards and guidelines into patient care | Uses the safety features of medical devices<br><br>Participates in team-based actions designed to enhance patient safety, (e.g., briefings, closed-loop communication)<br><br>Identifies problems in the quality of health care delivery within one's institution and brings this to the attention of supervisors<br><br>Incorporates anesthesiology-specific national standards and guidelines into patient care | Describes and participates in systems and procedures that promote patient safety<br><br>Identifies departmental and or institutional opportunities to improve quality of care<br><br>Participates in quality improvement activities as a member of an inter-professional team to improve patient outcomes<br><br>Takes patient preferences into consideration while promoting cost-effective patient care that improves outcomes | Applies advanced team techniques designed to enhance patient safety (e.g., 'assertiveness')<br><br>Participates in formal analysis (e.g., root cause analysis, failure mode effects analysis) of medical error and sentinel events with direct supervision<br><br>Identifies opportunities in the continuum of care to improve patient outcome and reduce costs | Leads multidisciplinary teams (e.g., human factors engineers, social scientists) to address patient safety issues<br><br>Provides consultation to organizations to improve personal and patient safety<br><br>Proactively participates in educational sessions prior to using new advanced medical devices for patient care<br><br>Defines and constructs process and outcome measures, and leads quality improvement projects<br><br>Effectively addresses areas in anesthesiology practice that pose potential dangers to patients |

**Colon and Rectal Surgery** — Resources, PS, Techno-logy

**Systems-based Practice —**

- **Utilizes/accesses outside resources**
- **Demonstrates awareness of and accommodation to circumstances affecting patient care, including the patient's financial resources and other factors tha can affect health care delivery and quality**
- **Understands the basics of patient safety and clinical risk management, with emphasis on avoidance of medical errors**
- **Uses technology and external resources to accomplish safe and effective health care delivery**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Rarely demonstrates proficiency in systems-based practice | • Occasionally demonstrates proficiency in systems-based practice | • Consistently demonstrates proficiency in systems-based practice in common clinical situations | • Consistently demonstrates proficiency in systems-based practice in most clinical situations | • Is a leader in the area of systems-based practice; advice is frequently sought relating to difficult situation |

**Dermatology** — HC Systems

**SBP1. Adapts easily and works effectively in various health care delivery settings and systems**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Completes all required tasks for residency and first rotation site orientation<br><br>Articulates health care missions at participating sites | Uses electronic health record (EHR) efficiently and independently<br><br>Adapts to clinical work in different sites and health care systems (e.g., VA, university medical center)<br><br>Maintains access to all needed systems<br><br>Identifies target patient populations, and the differences in demographics and needs of these populations at each participating site<br><br>Accesses support services appropriately at different practice sites | Effectively navigates systems to overcome obstacles to optimal patient care (e.g., facilitating access to care)<br><br>Identifies target patient populations, differences in demographics, and can use the appropriate agencies/resources to address specific needs of these populations | Recognizes the differences between a system change and a work-around (a bypass of a recognized system fault that attempts to improve efficiency)<br><br>Identifies at least one work-around, explores opportunities for change, and when possible, takes steps to improve the system fault that incited it | Adapts learning from one system or setting to another, and in this way, can effect or stimulate improvements in a system, and does so when the need arises |

PS, QI

**Systems-Based Practice 1: Patient Safety and Quality Improvement**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of common safety events | Identifies system factors that lead to safety events | Participates in analysis of safety events (simulated or actual) | Conducts analysis of safety events and offers error prevention strategies (simulated or actual) | Actively engages teams and processes to modify systems to prevent safety events |
| Demonstrates knowledge of how to report patient safety events | Reports patient safety events through institutional reporting systems | Participates in disclosure of patient safety events to patients and families (simulated or actual) | Discloses patient safety events to patients and families (simulated or actual) | Mentors others in the disclosure of patient safety events |
| Demonstrates knowledge of basic quality improvement methodologies and metrics | Describes local quality improvement initiatives (e.g., handwashing, needle stick prevention, wrong site surgery prevention) | Participates in local quality improvement initiatives | Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project | Creates, implements, and assesses quality improvement initiatives at the institutional or community level |

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**Dermatology**

Teams

CC

PS

**SBP2. Works effectively within an interprofessional team**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Identifies members of the team who coordinate patient care<br><br>Describes own role as member of the health care team | Uses and consults with other health care providers in coordination of patient care<br><br>Appropriately communicates and coordinates care with the primary care and/or referral provider(s)<br><br>Describes unique contributions (knowledge, skills, and attitudes) of other health care professionals, and seeks their input for appropriate issues<br><br>Describes the use of checklists and briefings to prevent adverse events in health care; recognizes the roles of team members and participates in briefings | Delegates tasks appropriately to members of the health care team<br><br>Attends and contributes to academic department/division retreats (or similar organizational venue), as well as to clinic team/staff meetings at participating sites<br><br>Facilitates checklist-guided briefings (e.g., pre-procedure timeouts) in health care activities | Demonstrates how to manage, use, and coordinate the inter-professional team<br><br>Participates in an interdisciplinary team meeting for clinic or program improvement | Leads an interdisciplinary team |

CC

**Systems-Based Practice 2: System Navigation for Patient-Centered Care**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of care coordination | Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams | Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams | Leads effective coordination of patient-centered care among different disciplines and specialties | Analyzes the process of care coordination and leads in the design and implementation of improvements |
| Identifies key elements for safe and effective transitions of care and hand-offs | Performs safe and effective transitions of care/hand-offs in routine clinical situations | Performs safe and effective transitions of care/hand-offs in complex clinical situations | Advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems including outpatient settings | Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes |
| Demonstrates knowledge of population and community health needs and disparities | Identifies specific population and community health needs and inequities for their local population | Uses local resources effectively to meet the needs of a patient population and community | Participates in changing and adapting practice to provide for the needs of specific populations | Leads innovations and advocates for populations and communities with health care inequities |

**Dermatology**

PS

**SBP3. Improves health care delivery by identifying system errors and implementing potential systems solutions Advocates for quality patient care and optimal patient care systems**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Articulates understanding of the limitations of the health care system and potential for systems errors | Participates in discussion during conferences that highlight systems errors<br><br>Articulates understanding of institutional risk-management resources available<br><br>Begins to identify the social/governmental services necessary for vulnerable populations, including determination of eligibility for services and delivery of some aspects of care<br><br>Begins to advocate for optimal patient care in the setting of interdisciplinary interactions (e.g., discussions with insurance companies or care providers in other specialties) | Leads discussion during conferences that highlight systems errors<br><br>Articulates understanding of the intersection of the legal system and health care system in the context of medical errors<br><br>**Consistently** identifies the social/governmental services necessary for vulnerable populations, including determination of eligibility for services and delivery of some aspects of care<br><br>**Consistently** advocates for optimal patient care in the setting of interdisciplinary interactions | **Consistently** encourages open and safe discussion of error, and begins to identify and analyze error events | **Consistently** encourages open and safe discussion of errors, and characteristically identifies and analyzes error events, habitually approaching medical errors with a system solution methodology<br><br>Actively and routinely engages with teams and processes through which systems are modified to prevent medical errors<br><br>Advocates to improve patient care provided by health care, social, community, and governmental systems, including for vulnerable populations |

HC Systems

**Systems-Based Practice 3: Physician Role in Health Care Systems**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Identifies key components of the complex health care system | Describes how components of a complex health care system are interrelated, and how this impacts patient care | Discusses how individual practice affects the broader system | Manages various components of the complex health care system to provide efficient and effective patient care | Advocates for or leads systems change that enhances high-value, efficient, and effective patient care |
| Describes basic health payment systems and practice models | Delivers care with consideration of each patient's payment model | Engages with patients in shared-decision making, informed by each patient's payment models | Advocates for patient care needs with consideration of the limitations of each patient's payment model | Participates in health policy advocacy activities |
| Identifies basic practice management knowledge domains for effective transition to practice | Describes core administrative knowledge needed for transition to practice | Demonstrates use of information technology required for medical practice | Analyzes individual practice patterns and professional requirements in preparation for practice | Educates others to prepare them for transition to practice |

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**Dermatology** — HC Costs

Version 6/2014

**SBP4. Practices cost-conscious care (for patients and populations)**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Articulates awareness of health care costs | Demonstrates knowledge of how a patient's health care is paid for, and how this affects the patient's care<br><br>Articulates awareness of costs for common diagnostic or therapeutic tests, including the cost of performing and interpreting skin biopsies<br><br>Considers cost of medical and surgical therapies, and incorporates this into therapy decisions and discussions with the patient<br><br>**Demonstrates awareness of** minimizing unnecessary care, including tests, procedures, therapies, and ambulatory or hospital encounters<br><br>**Usually** applies principles of coding (ICD-9/10) and reimbursement (E&M levels/procedures) appropriate to medical record documentation | Articulates awareness of common socio-economic barriers that impact patient care<br><br>Articulates understanding of how cost-benefit analysis is applied to patient care (i.e., via principles of screening tests and the development of clinical guidelines)<br><br>Identifies the role of various health care stakeholders, including providers, commercial and government payers, and pharmaceutical industry and medical device companies, and their varied impact on the cost of and access to health care<br><br>**Consistently** applies principles of coding (ICD-9/10) and reimbursement (E&M levels/procedures) appropriate to medical record documentation<br><br>**Identifies and minimizes** unnecessary care, including tests, procedures, therapies, and ambulatory or hospital encounters | Articulates an awareness of current debates/issues of health care financing and how it will affect patients, providers, third party payers, and other stakeholders<br><br>Identifies inherent biases of interactions with pharmaceutical and medical device industries<br><br>Demonstrates the incorporation of cost-awareness principles into standard clinical judgments and decision-making | Demonstrates the incorporation of cost-awareness principles into complex clinical scenarios |

**Diagnostic Radiology** — QI

**SBP1: Quality Improvement (QI)**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Describes departmental QI initiatives<br><br>Describes the departmental incident/occurrence reporting system | Incorporates QI into clinical practice<br><br>Participates in the departmental incident/occurrence reporting system | Identifies and begins a systems-based practice project incorporating QI methodology | Completes a systems-based practice project as required by the ACGME Review Committee<br><br>Describes national radiology quality programs (e.g., National Radiology Data Registry, accreditation, peer-review) | Leads a team in the design and implementation of a QI project<br><br>Routinely participates in root cause analysis |

**Diagnostic Radiology** — HC Costs Revenue

**SBP2: Health care economics**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Describes the mechanisms for reimbursement, including types of payors | States relative cost of common procedures | Describes the technical and professional components of imaging costs | Describes measurements of productivity (e.g., RVUs) | Describes the radiology revenue cycle |

**Diagnostic Radiology** — PS

**Systems-Based Practice 1: Patient Safety**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of common patient safety events | Identifies system factors that lead to patient safety events | Participates in analysis of patient safety events (simulated or actual) | Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) | Actively engages teams and processes to modify systems to prevent patient safety events |
| Demonstrates knowledge of how to report patient safety events | Reports patient safety events through institutional reporting systems (simulated or actual) | Participates in disclosure of patient safety events to patients and families (simulated or actual) | Discloses patient safety events to patients and families (simulated or actual) | Role models or mentors others in the disclosure of patient safety events |

**Diagnostic Radiology** — QI

**Systems-Based Practice 2: Quality Improvement**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of basic quality improvement methodologies and metrics | Describes local quality improvement initiatives | Participates in local quality improvement initiatives | Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project | Creates, implements, and assesses quality improvement initiatives at the institutional or community level |

**Diagnostic Radiology** — CC

**Systems-Based Practice 3: System Navigation for Patient-Centered Care**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of care coordination in radiology imaging/procedures | Coordinates care of patients in routine radiology imaging/procedures effectively using the roles of interprofessional teams | Coordinates care of patients in complex radiology imaging/procedures effectively using the roles of interprofessional teams | Role models effective coordination of patient-centered care among different disciplines and specialties | Analyzes the process of care coordination and leads in the design and implementation of improvements |
| Identifies key elements for safe and effective transitions of care and hand-offs | Performs safe and effective transitions of care/hand-offs in routine clinical situations | Performs safe and effective transitions of care/hand-offs in complex clinical situations | Role models safe and effective transitions of care/hand-offs | Improves quality of transitions of care to optimize patient outcomes |
| Demonstrates knowledge of population and community health needs and disparities | Identifies specific population and community health needs and inequities for their local population | Identifies local resources available to meet the needs of a patient population and community | Participates in adapting the practice to provide for the needs of specific populations (actual or simulated) | Leads innovations and advocates for populations and communities with health care inequities |

**Diagnostic Radiology** | | | HC Systems

**Systems-Based Practice 4: Physician Role in Health Care Systems**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Identifies key components of the complex healthcare system (e.g., hospital, finance, personnel, technology)<br><br>Describes the mechanisms for reimbursement, including types of payors | Describes how components of a complex health care system are inter-related, and how this impacts patient care<br><br>States relative cost of common procedures | Discusses how individual practice affects the broader system (e.g., length of stay, readmission rates, clinical efficiency)<br><br>Describes the technical and professional components of imaging costs | Manages various components of the complex health care system to provide efficient and effective patient care and transition of care<br><br>Describes the radiology revenue cycle and measurements of productivity (e.g., relative value units) | Advocates for or leads systems change that enhances high-value, efficient, and effective patient care and transition of care<br><br>Participates in health policy advocacy activities |

**Diagnostic Radiology** | | | PS

**Systems-Based Practice 5: Contrast Agent Safety**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of contrast reactions | Recognizes contrast reactions (simulated or actual) | Manages contrast reactions, with supervision (simulated or actual) | Independently manages contrast reactions (simulated or actual) | Leads educational experience in simulation laboratory for contrast reaction |

**Diagnostic Radiology** | | | PS

**Systems-Based Practice 6: Radiation Safety**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of the mechanisms of radiation injury and the ALARA ("as low as reasonably achievable") concept | Accesses resources to determine exam-specific average radiation dose information | Communicates the relative risk of exam-specific radiation exposure to patients and practitioners | Applies principles of ALARA in daily practice | Creates, implements, and assesses radiation safety initiatives at the institutional level |

**Diagnostic Radiology** | | | PS

**Systems-Based Practice 7: Magnetic Resonance (MR) Safety**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of the risks of magnetic resonance imaging (MRI), including safety zones and pre-MR screening | Accesses resources to determine the safety of implanted devices and retained foreign bodies | Communicates MR safety, including implants and retained foreign bodies, to patients and practitioners | Applies principles of MR safety to daily practice | Creates, implements, and assesses MR safety initiatives at the institutional level |

**Diagnostic Radiology** | | | Informatics

**Systems-Based Practice 8: Informatics**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates familiarity with information systems, including EHR, radiology information system, and picture archiving system | Demonstrates familiarity with information standards in radiology, and describes their roles | Describes approaches to capture and integrate data from radiology examinations into medical decision making | Applies knowledge of information systems, standards, and data to support radiology initiatives, as appropriate | Participates in operational and strategic information systems meetings; applies informatics knowledge to help guide direction and operation of the radiology department |

**Emergency Medicine** | PS

**16. Patient Safety (SBP1) Participates in performance improvement to optimize patient safety.**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Adheres to standards for maintenance of a safe working environment<br><br>Describes medical errors and adverse events | Routinely uses basic patient safety practices, such as time-outs and 'calls for help' | Describes patient safety concepts<br><br>Employs processes (e.g., checklists, SBAR), personnel, and technologies that optimize patient safety (SBAR= Situation – Background – Assessment – Recommendation)<br><br>Appropriately uses system resources to improve both patient care and medical knowledge | Participates in an institutional process improvement plan to optimize ED practice and patient safety<br><br>Leads team reflection such as code debriefings, root cause analysis, or M&M to improve ED performance<br><br>Identifies situations when the breakdown in teamwork or communication may contribute to medical error | Uses analytical tools to assess healthcare quality and safety and reassess quality improvement programs for effectiveness for patients and for populations<br><br>Develops and evaluates measures of professional performance and process improvement and implements them to improve departmental practice |

**Emergency Medicine** — HC Systems

**17. Systems-based Management (SBP2) Participates in strategies to improve healthcare delivery and flow. Demonstrates an awareness of and responsiveness to the larger context and system of health care.**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Describes members of ED team (e.g., nurses, technicians, and security) | Mobilizes institutional resources to assist in patient care<br><br>Participates in patient satisfaction initiatives | Practices cost-effective care<br><br>Demonstrates the ability to call effectively on other resources in the system to provide optimal health care | Participates in processes and logistics to improve patient flow and decrease turnaround times (e.g., rapid triage, bedside registration, Fast Tracks, bedside testing, rapid treatment units, standard protocols, and observation units)<br><br>Recommends strategies by which patients' access to care can be improved<br><br>Coordinates system resources to optimize a patient's care for complicated medical situations | Creates departmental flow metric from benchmarks, best practices, and dash boards<br><br>Develops internal and external departmental solutions to process and operational problems<br><br>Addresses the differing customer needs of patients, hospital medical staff, EMS, and the community |

**Emergency Medicine** — Informatics

**18. Technology (SBP3) Uses technology to accomplish and document safe healthcare delivery.**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Uses the Electronic Health Record (EHR) to order tests, medications and document notes, and respond to alerts<br><br>Reviews medications for patients | Ensures that medical records are complete, with attention to preventing confusion and error<br><br>Effectively and ethically uses technology for patient care, medical communication and learning | Recognizes the risk of computer shortcuts and reliance upon computer information on accurate patient care and documentation | Uses decision support systems in EHR (as applicable in institution) | Recommends systems re-design for improved computerized processes |

**Family Medicine** — HC Costs

**SBP-1 Provides cost-conscious medical care**

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Understands that health care resources and costs impact patients and the health care system | Knows and considers costs and risks/benefits of different treatment options in common situations | Coordinates individual patient care in a way that is sensitive to resource use, efficiency, and effectiveness | Partners with patients to consistently use resources efficiently and cost effectively in even the most complex and challenging cases | Role models and promotes efficient and cost-effective use of resources in the care of patients in all settings |

**Family Medicine** — PS

**SBP-2 Emphasizes patient safety**

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Understands that medical errors affect patient health and safety, and that their occurrence varies across settings and between providers<br><br>Understands that effective team-based care plays a role in patient safety | Recognizes medical errors when they occur, including those that do not have adverse outcomes<br><br>Understands the mechanisms that cause medical errors<br><br>Understands and follows protocols to promote patient safety and prevent medical errors<br><br>Participates in effective and safe hand-offs and transitions of care | Uses current methods of analysis to identify individual and system causes of medical errors common to family medicine<br><br>Develops individual improvement plan and participates in system improvement plans that promote patient safety and prevent medical errors | Consistently engages in self-directed and practice improvement activities that seek to identify and address medical errors and patient safety in daily practice<br><br>Fosters adherence to patient care protocols amongst team members that enhance patient safety and prevent medical errors | Role models self-directed and system improvement activities that seek to continuously anticipate, identify and prevent medical errors to improve patient safety in all practice settings, including the development, use, and promotion of patient care protocols and other tools |

PS

QI

**Systems-Based Practice 1: Patient Safety and Quality Improvement**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of common patient safety events | Identifies system factors that lead to patient safety events | Participates in analysis of patient safety events (simulated or actual) | Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) | Actively engages teams and processes to modify systems to prevent patient safety events |
| Demonstrates knowledge of how to report patient safety events | Reports patient safety events through institutional reporting systems (simulated or actual) | Participates in disclosure of patient safety events to patients and families (simulated or actual) | Discloses patient safety events to patients and families (simulated or actual) | Role models or mentors others in the disclosure of patient safety events |
| Demonstrates knowledge of basic quality improvement methodologies and metrics | Describes local quality improvement initiatives (e.g., community vaccination rate, infection rate, smoking cessation) | Participates in local quality improvement initiatives | Demonstrates skills required to identify, develop, implement, and analyze a quality improvement project | Designs, implements, and assesses quality improvement initiatives at the institutional or community level |

CC

**Systems-Based Practice 2: System Navigation for Patient-Centered Care**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of care coordination | Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional team members | Coordinates care of patients in complex clinical situations effectively using the roles of the interprofessional team member | Role models effective coordination of patient-centered care among different disciplines and specialties | Analyses the process of care coordination and leads in the design and implementation of improvements |
| Identifies key elements for safe and effective transitions of care and hand-offs | Performs safe and effective transitions of care/hand-offs in routine clinical situations | Performs safe and effective transitions of care/hand-offs in complex clinical situations | Role models and advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems including outpatient settings | Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes |
| Demonstrates knowledge of population and community health needs and disparities | Identifies specific population and community health needs and inequities in their local population | Uses local resources effectively to meet the needs of a patient population and community | Participates in changing and adapting practice to provide for the needs of specific populations | Leads innovations and advocates for populations and communities with health care inequities |

Guralnick S, Fondahn E, Amin A, Bittner EA. Systems-based practice: time to finally adopt the orphan competency. *J Grad Med Educ.* 2021;13(suppl 2):96-101.

**Family Medicine** — Advocacy

**SBP-3 Advocates for individual and community health**

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Recognizes social context and environment, and how a community's public policy decisions affect individual and community health | Recognizes that family physicians can impact community health<br><br>Lists ways in which community characteristics and resources affect the health of patients and communities | Identifies specific community characteristics that impact specific patients' health<br><br>Understands the process of conducting a community strengths and needs assessment | Collaborates with other practices, public health, and community-based organizations to educate the public, guide policies, and implement and evaluate community initiatives<br><br>Seeks to improve the health care systems in which he or she practices | Role-models active involvement in community education and policy change to improve the health of patients and communities |

HC Systems

**Systems-Based Practice 3: Physician Role in Health Care Systems**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Identifies key components of the complex health care system (e.g., hospital, skilled nursing facility, finance, personnel, technology) | Describes how components of a complex health care system are interrelated, and how this impacts patient care | Discusses how individual practice affects the broader system (e.g., length of stay, readmission rates, clinical efficiency) | Manages various components of the complex health care system to provide efficient and effective patient care and transition of care | Advocates for or leads systems change that enhances high-value, efficient, and effective patient care and transition of care |
| Describes basic health payment systems, (including government, private, public, uninsured care) and practice models | Delivers care with consideration of each patient's payment model (e.g., insurance type) | Engages with patients in shared decision making, informed by each patient's payment models | Advocates for patient care needs (e.g., community resources, patient assistance resources) | Participates in health policy advocacy activities |
| Identifies basic knowledge domains for effective transition to practice (e.g., information technology, legal, billing and coding, financial, personnel) | Demonstrates use of information technology required for medical practice (e.g., electronic health record, documentation required for billing and coding) | Describes core administrative knowledge needed for transition to practice (e.g., contract negotiations, malpractice insurance, government regulation, compliance) | Analyzes individual practice patterns and prepares for professional requirements to enter practice | |

**Family Medicine** — CC

**SBP-4 Coordinates team-based care**

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Understands that quality patient care requires coordination and teamwork, and participates as a respectful and effective team member | Understands the roles and responsibilities of oneself, patients, families, consultants, and interprofessional team members needed to optimize care, and accepts responsibility for coordination of care | Engages the appropriate care team to provide accountable, team-based, coordinated care centered on individual patient needs<br><br>Assumes responsibility for seamless transitions of care<br><br>Sustains a relationship as a personal physician to his or her own patients | Accepts responsibility for the coordination of care, and directs appropriate teams to optimize the health of patients | Role models leadership, integration, and optimization of care teams to provide quality, individualized patient care |

Advocacy

**Systems-Based Practice 4: Advocacy**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Identifies that advocating for patient populations is a professional responsibility | Identifies that advocating for family medicine is a professional responsibility | Describes how stakeholders influence and are affected by health policy at the local, state, and federal level | Accesses advocacy tools and other resources needed to achieve (or prevent a deleterious) policy change | Develops a relationship with stakeholders that advances or prevents a policy change that improves individual or community health |

**Internal Medicine** — Teams

**8. Works effectively within an interprofessional team (e.g. peers, consultants, nursing, ancillary professionals and other support personnel). (SBP1)**

| Critical Deficiencies | | | Ready for unsupervised practice | Aspirational |
|---|---|---|---|---|
| Refuses to recognize the contributions of other interprofessional team members<br><br>Frustrates team members with inefficiency and errors | Identifies roles of other team members but does not recognize how/when to utilize them as resources<br><br>Frequently requires reminders from team to complete physician responsibilities (e.g. talk to family, enter orders) | Understands the roles and responsibilities of all team members but uses them ineffectively<br><br>Participates in team discussions when required but does not actively seek input from other team members | Understands the roles and responsibilities of and effectively partners with, all members of the team<br><br>Actively engages in team meetings and collaborative decision-making | Integrates all members of the team into the care of patients, such that each is able to maximize their skills in the care of the patient<br><br>Efficiently coordinates activities of other team members to optimize care<br><br>Viewed by other team members as a leader in the delivery of high quality care |

**Internal Medicine** — PS

**9. Recognizes system error and advocates for system improvement. (SBP2)**

| Critical Deficiencies | | | Ready for unsupervised practice | Aspirational |
|---|---|---|---|---|
| Ignores a risk for error within the system that may impact the care of a patient<br><br>Ignores feedback and is unwilling to change behavior in order to reduce the risk for error | Does not recognize the potential for system error<br><br>Makes decisions that could lead to error which are otherwise corrected by the system or supervision<br><br>Resistant to feedback about decisions that may lead to error or otherwise cause harm | Recognizes the potential for error within the system<br><br>Identifies obvious or critical causes of error and notifies supervisor accordingly<br><br>Recognizes the potential risk for error in the immediate system and takes necessary steps to mitigate that risk<br><br>Willing to receive feedback about decisions that may lead to error or otherwise cause harm | Identifies systemic causes of medical error and navigates them to provide safe patient care<br><br>Advocates for safe patient care and optimal patient care systems<br><br>Activates formal system resources to investigate and mitigate real or potential medical error<br><br>Reflects upon and learns from own critical incidents that may lead to medical error | Advocates for system leadership to formally engage in quality assurance and quality improvement activities<br><br>Viewed as a leader in identifying and advocating for the prevention of medical error<br><br>Teaches others regarding the importance of recognizing and mitigating system error |

**Internal Medicine** — HC Costs

**10. Identifies forces that impact the cost of health care, and advocates for, and practices cost-effective care. (SBP3)**

| Critical Deficiencies | | | Ready for unsupervised practice | Aspirational |
|---|---|---|---|---|
| Ignores cost issues in the provision of care<br><br>Demonstrates no effort to overcome barriers to cost-effective care | Lacks awareness of external factors *(e.g. socio-economic, cultural, literacy, insurance status)* that impact the cost of health care and the role that external stakeholders *(e.g. providers, suppliers, financers, purchasers)* have on the cost of care<br><br>Does not consider limited health care resources when ordering diagnostic or therapeutic interventions | Recognizes that external factors influence a patient's utilization of health care and may act as barriers to cost-effective care<br><br>Minimizes unnecessary diagnostic and therapeutic tests<br><br>Possesses an incomplete understanding of cost-awareness principles for a population of patients (e.g. screening tests) | Consistently works to address patient specific barriers to cost-effective care<br><br>Advocates for cost-conscious utilization of resources (i.e. emergency department visits, hospital readmissions)<br><br>Incorporates cost-awareness principles into standard clinical judgments and decision-making, including screening tests | Teaches patients and healthcare team members to recognize and address common barriers to cost-effective care and appropriate utilization of resources<br><br>Actively participates in initiatives and care delivery models designed to overcome or mitigate barriers to cost-effective high quality care |

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**Internal Medicine**

Transition of Care

Communi-cation

**11. Transitions patients effectively within and across health delivery systems. (SBP4)**

| Critical Deficiencies | | | Ready for unsupervised practice | Aspirational |
|---|---|---|---|---|
| Disregards need for communication at time of transition<br><br>Does not respond to requests of caregivers in other delivery systems | Inconsistently utilizes available resources to coordinate and ensure safe and effective patient care within and across delivery systems<br><br>Written and verbal care plans during times of transition are incomplete or absent<br><br>Inefficient transitions of care lead to unnecessary expense or risk to a patient (e.g. duplication of tests readmission) | Recognizes the importance of communication during times of transition<br><br>Communication with future caregivers is present but with lapses in pertinent or timely information | Appropriately utilizes available resources to coordinate care and ensures safe and effective patient care within and across delivery systems<br><br>Proactively communicates with past and future care givers to ensure continuity of care | Coordinates care within and across health delivery systems to optimize patient safety, increase efficiency and ensure high quality patient outcomes<br><br>Anticipates needs of patient, caregivers and future care providers and takes appropriate steps to address those needs<br><br>Role models and teaches effective transitions of care |

**Interventional Radiology (Integrated)**

QI

**SBP1 – Quality Improvement (QI)**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Describes departmental QI initiatives<br><br>Describes the departmental incident/occurrence reporting system | Incorporates QI into clinical practice<br><br>Participates in the departmental incident/occurrence reporting system | Identifies and begins a systems-based practice project incorporating QI methodology | Completes a systems-based practice project as required in the ACGME Program Requirements for Interventional Radiology<br><br>Describes national radiology quality programs (e.g., National Radiology Data Registry, accreditation, peer-review) | Leads a team in the design and implementation of a QI project<br><br>Routinely participates in root cause analysis or other institutional QI committee or initiative |

**Interventional Radiology (Integrated)**

HC Costs and Revenues

**SBP2 – Health Care Economics**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Describes the mechanisms for reimbursement, including types of payors | States relative cost of common procedures | Describes the technical and professional components of imaging costs | Describes measurements of productivity (e.g., Relative Value Units [RVUs]) | Describes the radiology revenue cycle |

**Interventional Radiology (Integrated)**

PS

**Systems-Based Practice 1: Patient Safety**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of common patient safety events<br><br>Demonstrates knowledge of how to report patient safety events | Identifies system factors that lead to patient safety events<br><br>Reports patient safety events through institutional reporting systems (simulated or actual) | Participates in analysis of patient safety events (simulated or actual)<br><br>Participates in disclosure of patient safety events to patients and families (simulated or actual) | Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)<br><br>Discloses patient safety events to patients and families (simulated or actual) | Actively engages teams and processes to modify systems to prevent patient safety events<br><br>Role models or mentors others in the disclosure of patient safety events |

**Interventional Radiology (Integrated)**

QI

**Systems-Based Practice 2: Quality Improvement**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of basic quality improvement methodologies and metrics | Describes local quality improvement initiatives | Participates in local quality improvement initiatives | Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project | Creates, implements, and assesses quality improvement initiatives at the institutional or community level |

**Interventional Radiology (Integrated)**

CC

**Systems-Based Practice 3: System Navigation for Patient-Centered Care**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of care coordination in radiology imaging/procedures<br><br>Performs safe and effective transitions of care/hand-offs in basic clinical situations | Coordinates care of patients in routine radiology imaging/ procedures effectively using the roles of the interprofessional teams<br><br>Performs safe and effective transitions of care/hand-offs in moderately complex clinical situations | Coordinates care of patients in complex radiology imaging/ procedures effectively using the roles of the interprofessional teams<br><br>Performs safe and effective transitions of care/hand-offs in complex clinical situations | Role models effective coordination of patient-centered care among different disciplines and specialties<br><br>Role models safe and effective transitions of care/hand-offs | Analyses the process of care coordination and leads in the design and implementation of improvements<br><br>Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes |

**Interventional Radiology (Integrated)**

Multi-disciplinary Conferences

**Systems-Based Practice 4: Multidisciplinary Conferences**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates basic knowledge of how a multidisciplinary conference operates | Attends multidisciplinary conferences | Contributes meaningfully to the multidisciplinary conference | Initiates and presents their own patients at multidisciplinary conference, and is responsible for comprehensive discussion | Leads a multidisciplinary conferences |

**Interventional Radiology (Integrated)**

Population Health

**Systems-Based Practice 5: Population Health**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of population and community health needs and disparities | Identifies specific population and community health needs and inequities for their local population | Uses local resources effectively to meet the needs of a patient population and community | Participates in changing and adapting practice to provide for the needs of specific populations | Leads innovations and advocates for populations and communities with health care inequities |

<table>
<tr>
<td>Interventional Radiology (Integrated)</td>
<td></td>
<td></td>
<td>HC Systems</td>
<td>
Systems-Based Practice 6: Physician Role in Health Care Systems
<table>
<tr><th>Level 1</th><th>Level 2</th><th>Level 3</th><th>Level 4</th><th>Level 5</th></tr>
<tr><td>Identifies key components of the complex health care system<br><br>Describes the mechanisms for reimbursement, including types of payers</td><td>Describes how components of a complex health care system are interrelated, and how this impacts patient care<br><br>States relative cost of common procedures</td><td>Discusses how individual practice affects the broader system<br><br>Describes the technical and professional components of imaging costs</td><td>Manages various components of the complex health care system to provide efficient and effective patient care<br><br>Describes the radiology revenue cycle and measurements of productivity</td><td>Advocates for or leads systems change that enhances high-value, efficient, and effective patient care<br><br>Participates in health policy advocacy activities</td></tr>
</table>
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</tr>
<tr>
<td>Interventional Radiology (Integrated)</td>
<td></td>
<td></td>
<td>PS</td>
<td>
Systems-Based Practice 7: Radiation Safety
<table>
<tr><th>Level 1</th><th>Level 2</th><th>Level 3</th><th>Level 4</th><th>Level 5</th></tr>
<tr><td>Demonstrates knowledge of the mechanisms of radiation injury and the ALARA (“as low as reasonably achievable”) concept<br><br>Wears lead apron and dosimeter at all times</td><td>Applies principles of ALARA in daily practice<br><br>Uses fluoroscopy techniques that decrease exposure, with guidance<br><br>Uses radiation protection devices, including shielding, as appropriate, with guidance</td><td>Accesses resources to determine exam-specific radiation dose information<br><br>Independently uses radiation protection devices, including shielding, as appropriate</td><td>Communicates the relative risk and benefits of exam-specific radiation exposure to patients and practitioners<br><br>Counsels colleagues and allied health staff regarding radiation exposure</td><td>Creates, implements, and assesses radiation safety initiatives at the institutional level<br><br>Participates in radiation safety education and research</td></tr>
</table>
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</tr>
<tr>
<td>Medical Genetics and Genomics</td>
<td>HC Systems<br><br>HC Costs</td>
<td>
Function effectively within the larger context of health care systems, and practice cost-effective medicine — Systems-based Practice
<table>
<tr><th>Level 1</th><th>Level 2</th><th>Level 3</th><th>Level 4</th><th>Level 5</th></tr>
<tr><td>• Recognizes how health care systems influence individual practice and patient care<br>• Sensitive to cost-effectiveness of care<br>• Recognizes that diagnosis and management have implications for care at home and in the community across the lifespan of the patient</td><td>• Functions effectively within different systems with substantial guidance<br>• Incorporates and advocates for genetics services to enhance cost-effectiveness of care with substantial guidance<br>• Recognizes and manages the variation in access to genetic testing with substantial guidance<br>• Facilitates management and transitions of care teams as the patient ages with substantial guidance<br>• Participates in identifying system errors and implementing potential system solutions with substantial guidance</td><td>• Functions effectively within different systems with minimal guidance<br>• Incorporates and advocates for genetics services to enhance cost-effectiveness of care with minimal guidance<br>• Recognizes and manages the variation in access to genetic testing with minimal guidance<br>• Facilitates management and transitions of care teams as the patient ages with minimal guidance<br>• Participates in identifying system errors and implementing potential system solutions with minimal guidance</td><td>• Independently functions effectively within different systems<br>• Independently incorporates and advocates for genetics services to enhance cost-effectiveness of care<br>• Independently recognizes and manages the variation in access to genetic testing<br>• Independently facilitates management and transitions of care teams as the patient ages<br>• Independently participates in identifying system errors and implementing potential system solutions</td><td>• Leads systems change</td></tr>
</table>
</td>
<td>PS<br><br>QI</td>
<td>
Systems-Based Practice 1: Patient Safety and Quality Improvement
<table>
<tr><th>Level 1</th><th>Level 2</th><th>Level 3</th><th>Level 4</th><th>Level 5</th></tr>
<tr><td>Demonstrates knowledge of common patient safety events<br><br>Demonstrates knowledge of how to report patient safety events<br><br>Demonstrates knowledge of basic quality improvement methodologies and metrics</td><td>Identifies system factors that lead to patient safety events<br><br>Reports patient safety events through institutional reporting systems (simulated or actual)<br><br>Describes local (institutional) quality improvement initiatives</td><td>Participates in analysis of patient safety events (simulated or actual)<br><br>Participates in disclosure of patient safety events to patients and families (simulated or actual)<br><br>Participates in local (institutional) quality improvement initiatives</td><td>Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)<br><br>Discloses patient safety events to patients and families (simulated or actual)<br><br>Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project</td><td>Actively engages teams and processes to modify systems to prevent patient safety events<br><br>Role models or mentors others in the disclosure of patient safety events<br><br>Creates, implements, and assesses quality improvement initiatives at the institutional or community (state/federal) level</td></tr>
</table>
</td>
</tr>
</table>

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**Medical Genetics and Genomics** | Infor-matics | CC

**Use technology to accomplish safe health care delivery — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Utilizes the Electronic Health Record (EHR) and Computerized Physician Order Entry (CPOE) in prevention of medical errors<br>• Recognizes the risk added by copy/paste strategies to create notes | • Documents essential elements of genetics encounters to enhance the transfer of information and patient safety with substantial guidance<br>• Utilizes decision support tools with substantial guidance | • Documents essential elements of genetics encounters to enhance the transfer of information and patient safety with minimal guidance<br>• Utilizes decision support tools with substantial guidance | • Independently documents essential elements of genetics encounters to enhance the transfer of information and patient safety<br>• Independently utilizes decision support tools | • Develops new technologies to improve health care in genetics |

**Systems-Based Practice 2: System Navigation for Patient-Centered Care**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of care coordination | Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams, including non-physician patient caregivers | Coordinates care of patients in complex clinical situations effectively using the roles of the interprofessional teams | Role models effective coordination of patient-centered care among different disciplines and specialties including referrals and testing | Analyzes the process of care coordination and leads in the design and implementation of improvements |
| Identifies key elements for safe and effective transitions of care and hand-offs | Performs safe and effective transitions of care/hand-offs in routine clinical situations | Performs safe and effective transitions of care/hand-offs in complex clinical situations | Role models and advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems including outpatient settings, referrals, and testing | Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes |
| Demonstrates knowledge of population and community health needs and disparities | Identifies specific population and community health needs and inequities for the local population | Uses local resources effectively to meet the needs of a patient population and community | Participates in changing and adapting practice to provide for the needs of specific populations including advocating for a patient's genetic testing coverage | Leads innovations and advocates for populations and communities with health care inequities at the state or federal level |

**Medical Genetics and Genomics** | | HC Systems

**Systems-Based Practice 3: Physician Role in Health Care Systems**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Identifies key components of the complex health care system (e.g., hospital, skilled nursing facility, finance, personnel, technology) | Describes how components of a complex health care system are interrelated, and how this impacts patient care | Discusses how individual practice affects the broader system (e.g., access to genetic testing and treatments, testing advocacy) | Manages various components of the complex health care system to provide efficient and effective patient care and transition of care | Advocates for or leads systems change that enhances high-value, efficient, and effective patient care and transition of care |
| Describes basic health payment systems (e.g., government, private, public, uninsured care) and practice models | Delivers care with consideration of each patient's payment model (e.g., insurance type) and access to genetic testing or formula | Engages with patients in shared decision making, often informed by each patient's payment models | Advocates for patient care needs (e.g., community resources, patient assistance resources) with consideration of the limitations of each patient's payment model, including genetic testing through research | Participates in health policy advocacy activities |
| Identifies basic knowledge for effective transition to practice (e.g., information technology, legal, billing and coding, financial, personnel) | Demonstrates use of information technology required for medical practice (e.g., electronic health record, documentation required for billing and coding) | Describes core administrative knowledge needed for transition to practice (e.g., contract negotiations, malpractice insurance, government regulation, compliance) | Analyzes individual practice patterns and professional requirements in preparation for practice | Educates others to prepare them for transition to practice |

**Neurological Surgery** | PS

**Systems-Based Practice 1: Patient Safety**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Describes principles of patient safety; performs safe and effective hand-offs and transitions of care in routine clinical situations | Recognizes and reports patient safety events; performs safe and effective hand-offs and transitions of care in complex clinical situations | Discloses patient safety events; supervises hand-offs and transitions of care | Analyzes patient safety events and offers error prevention strategies; advocates for safe and effective transitions of care within and across health care systems | Actively engages teams in process and system modification to prevent patient safety events; improves care transition practices within and across health care systems |

**Neurological Surgery** | QI

**Systems-Based Practice 2: Quality Improvement**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Describes basic quality improvement methods and metrics | Participates in local quality improvement initiatives (e.g., surgical site infection (SSI) reduction, care pathway implementation) | Identifies quality improvement opportunities and assists in the development, implementation, and analysis of a quality improvement project | Advances multiple quality improvement initiatives through participation in a quality improvement working group or committee | Creates, implements, and assesses quality improvement initiatives |

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**Neurological Surgery** — HC Systems

**Systems-Based Practice 3: Health Care Systems Awareness**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Describes principles of US health payment systems | Analyzes how personal practice affects the health care system (e.g. test ordering, length of stay, readmissions) | Seeks information about neurosurgical career options and identifies professional mentor(s) | Prepares for transition to practice (e.g. information technology, risk management, billing and coding, financial, personnel) | Collaborates with nursing and administrative teams to promote high value, quality care within a health care system |

**Neurology** — HC Costs and Risk

**Systems thinking, including cost and risk effective practice — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Describes basic cost and risk implications of care | • Describes cost and risk benefit ratios in patient care | • Makes clinical decisions that balance cost and risk benefit ratios | • Incorporates available quality measures in patient care | • Engages in scholarly activity regarding cost- and risk-effective practice |

**Neurology** — Teams

**Work in inter-professional teams to enhance patient safety — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Describes team members' roles in maintaining patient safety | • Identifies and reports errors and near-misses | • Describes potential sources of system failure in clinical care such as minor, major, and sentinel events | • Participates in a team-based approach to medical error analysis | • Engages in scholarly activity regarding error analysis and patient safety |

**Nuclear Medicine** — Infor-matics

**Computer Systems —Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Accesses clinical computer systems; is familiar with word processing and spreadsheet programs | • Retrieves basic patient information from the electronic medical record; is able to use the basic functions of picture archiving and communication system (PACs) and voice recognition systems<br>• Understands Health Insurance Portability and Accountability Act (HIPAA) policies and appropriate use concepts | • Retrieves complex patient information from the electronic medical record; is able to use the advanced functions of PACs and voice recognition systems | • Is familiar with the basic functions of the billing systems | • Recommends changes to computer systems/records to provide additional useful functionality |

**Nuclear Medicine** — Costs and Revenues

**Economics —Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Has a basic understanding of the advantages and disadvantages of different payment systems | • Has a basic understanding of the economics of inpatient vs. outpatient care, and the impact of quality improvement incentives<br>• Develops understanding of relative cost per procedure | • Has a basic practical understanding of the pre-certification process, radiology benefits managers, structured computer-based order entry systems, and Medicare/Medicaid procedure and report requirements | • Has an advanced practical understanding of the pre-certification process, radiology benefits managers, structured computer-based order entry systems, and Medicare/Medicaid procedure and report requirements | • Has a basic understanding of current state and national health care policies and their implications |

**Obstetrics and Gynecology** — PS

**Patient Safety and Systems Approach to Medical Errors: Participate in identifying system errors and implementing potential systems solutions — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Recognizes limitations and failures of a team approach (e.g., hand-offs, miscommunication) in health care as the leading cause of preventable patient harm | Demonstrates knowledge of institutional surveillance systems to monitor for patient safety (e.g., surgical site infection, medical error reporting)<br><br>Participates in "time-out"<br><br>Appropriately utilizes check lists to promote patient safety (e.g., medication reconciliation)<br><br>Demonstrates knowledge of the epidemiology of medical errors and the differences between near misses, medical errors, and sentinel events | Participates in patient safety reporting and analyzing systems<br><br>Participates in team drills<br><br>Demonstrates knowledge of national patient safety standards, as well as their use/application in the institution | Reports errors and near-misses to the institutional surveillance system and superiors<br><br>Recognizes when root cause analysis is necessary, and is capable of participating in root cause analysis<br><br>Actively participates in quality improvement (QI)/patient safety projects | Contributes to peer-reviewed medical literature<br><br>Organizes and leads institutional QI/patient safety projects |

**Obstetrics and Gynecology** — HC Costs<br>Advocacy<br>CC

**Cost-effective Care and Patient Advocacy — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Understands the importance of providing cost-effective care<br><br>Understands the role of physicians in advocating for appropriate women's health care | Is aware of common socioeconomic barriers that impact patient care<br><br>Demonstrates an awareness of the need for coordination of patient care and patient advocacy | Demonstrates the incorporation of cost awareness into clinical judgment and decision making<br><br>Coordinates and advocates for needed resources to facilitate patient care (e.g., effective discharge planning) | Practices cost-effective care (e.g., formulary drugs, generic drugs, tailoring of diagnostic tests)<br><br>Analyzes patient care options from a quality of life (QOL)/cost-of-care perspective, and includes in patient counseling<br><br>Effectively communicates within his or her own hospital/clinic to advocate for patient needs | Participates in advocacy or health care legislation locally, regionally, or nationally<br><br>Effectively communicates within health care systems to advocate for the needs of patient populations<br><br>Demonstrates an understanding of the political economics of health care legislation locally, regionally, and nationally |

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**Ophthalmology**

CC

**SBP-1. Work effectively and coordinate patient care in various health care delivery systems**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Describes basic levels of systems of care (self-management to societal) | Describes systems of care within residency program<br><br>Demonstrates awareness of need for safe transitions of care; lists potential impediments to safe and efficient transitions of care within and between systems | Identifies impediments to safe and efficient transitions of care within and between systems<br><br>Manages routine transitions safely | Proposes solutions to impediments to safe and efficient transitions of care within and between systems<br><br>Manages complex transitions of care within and between systems<br><br>Demonstrates leadership potential for systems changes | Leads systems change at micro and macro levels |

PS

QI

**Systems-Based Practice 1: Patient Safety and Quality Improvement**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of common patient safety events | Identifies system factors that lead to patient safety events | Participates in analysis of patient safety events (simulated or actual) | Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) | Actively engages teams and processes to modify systems to prevent patient safety events |
| Demonstrates knowledge of how to report patient safety events | Reports patient safety events through institutional reporting systems (simulated or actual) | Participates in disclosure of patient safety events to patients and families (simulated or actual) | Discloses patient safety events to patients and families (simulated or actual) | Role models or mentors others in the disclosure of patient safety events |
| Demonstrates knowledge of basic quality improvement methodologies and metrics | Describes local quality improvement initiatives (e.g., eye protection for high risk activities, diabetic eye screening) | Participates in local quality improvement initiatives | Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project | Creates, implements, and assesses quality improvement initiatives at the institutional or community level |

**Ophthalmology**

HC Costs

Infor-matics

**SBP-2. Incorporate cost-effectiveness, risk/benefit analysis, and IT to promote safe and effective patient care**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Describes scenarios in which physician may affect cost-effectiveness in patient care<br><br>Explains the role of the Electronic Health Record (EHR) in prevention of medical errors | Describes scenarios in which ophthalmologist may affect cost-effectiveness in patient care<br><br>Describes specific cost options for most frequently ordered tests and medications<br><br>Utilizes EHR, where available, to order tests and reconcile medications for patients<br><br>Uses information systems for patient care, including literature review | Often practices cost-effective care | Consistently practices cost-effective care<br><br>Applies risk-benefit analyses in ophthalmic care<br><br>Contributes to reduction of risks of automation and computerized systems by reporting system problems | Advocates for cost-effective care and use of risk-benefit analyses within health care system<br><br>Recommends systems re-design for faulty processes |

CC

**Systems-based Practice 2: System Navigation for Patient-Centered Care**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of care coordination | Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams | Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams | Teaches effective coordination of patient-centered care among different disciplines and specialties to junior members of the team | Analyzes the process of care coordination and leads in the design and implementation of improvements |
| Identifies key elements for safe and effective transitions of care and hand-offs | Performs safe and effective transitions of care/hand-offs in routine clinical situations | Performs safe and effective transitions of care/hand-offs in complex clinical situations | Advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems | Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes |
| Demonstrates knowledge of the role of the physician in addressing community health needs and disparities | Demonstrates knowledge of local population and community health needs and disparities | Identifies specific local health needs and disparities related to ophthalmic care | Uses local resources effectively to meet the needs of a patient population and community | Participates in changing and adapting practice to provide for the needs of specific populations |

**Ophthalmology**

Teams

PS

**SBP-3: Work in inter-professional teams to enhance patient safety, identify system errors, and implement solutions**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Describes epidemiology of medical errors and differences between medical errors, near misses, and sentinel events<br><br>Describes role of teamwork and communication failure as a leading cause of preventable patient harm | Reports problematic processes, including errors and near misses to supervisor<br><br>Defines process for safe and efficient patient hand-offs, including basic communication techniques | Analyzes causes of adverse events through root cause analysis (RCA)<br><br>Applies process for safe and efficient patient hand-offs, including basic communication techniques | Develops content for and facilitates patient safety morbidity and mortality (M&M) conference focusing on systems-based errors in patient care<br><br>Supervises communication process for patient hand-offs and on-call responsibilities<br><br>Analyzes shared team experience (e.g., procedure) with debriefing to solve problems | Creates curriculum to teach teamwork and communication skills to health care professionals |

HC Systems

**Systems-Based Practice 3: Physician Role in Health Care Systems**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Describes basic health care systems and access models (e.g., government, private, public, uninsured care) | Describes how different system types require the physician to deliver care effectively with available resources | Optimizes patient care given available resources | Advocates for patient care needs beyond patients' available resources (e.g., community resources, patient assistance resources, telehealth) | Participates in health policy advocacy activities |
| Demonstrates use of electronic medical record | Identifies the documentation required for billing and coding compliance | Describes knowledge domains for effective transition to practice (e.g., information technology, legal, billing and coding) | Demonstrates administrative knowledge needed for transition to practice (e.g., contract negotiations, malpractice insurance, government regulation, compliance) | Analyzes individual practice patterns and professional requirements in preparation for practice |

**Orthopaedic Surgery**

HC Systems

HC Costs

**Systems thinking, including cost-effective practice – Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Describes basic levels of systems of care (e.g., self-management to societal)<br>• Understands the economic challenges of patient care in the health care system | • Gives examples of cost and value implications of care he or she provides (e.g., gives examples of alternate sites of care resulting in different costs for individual patients) | • Orders and schedules tests in appropriate systems for individual patients balancing expenses and quality<br>• Successfully navigates the economic differences of the health care system | • Effectively manages clinic team and schedules for patient and workflow efficiency<br>• Uses evidence-based guidelines for cost-effective care | • Leads systems change at micro and macro level (e.g., manages operating room [OR] team and patient flow in a multi-case OR day) |

Guralnick S, Fondahn E, Amin A, Bittner EA. Systems-based practice: time to finally adopt the orphan competency. *J Grad Med Educ.* 2021;13(suppl 2):96-101.

**Orthopaedic Surgery** — PS, QI

**Resident will work in interprofessional teams to enhance patient safety and quality care – Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Recognizes importance of complete and timely documentation in teamwork and patient safety | • Uses checklists and briefings to prevent adverse events in health care | • Participates in quality improvement or patient safety program and/or project | • Maintains team situational awareness and promote "speaking up" with concerns<br>• Incorporates clinical quality improvement and patient safety into clinical practice | • Develops and publishes quality improvement project results<br>• Leads local or regional quality improvement project |

**Orthopaedic Surgery** — Infor-matics

**Uses technology to accomplish safe health care delivery – Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Explains the role of the Electronic Health Record (EHR) and Computerized Physician Order Entry (CPOE) in prevention of medical errors | • Appropriately and accurately enters patient data in EHR<br>• Effectively uses electronic medical records in patient care | • Reconciles conflicting data in the medical record | • Contributes to reduction of risks of automation and computerized systems by reporting system problems | • Recommends systems re-design for faculty computerized processes |

**Otolaryngology** — PS

**Patient Safety — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Understands the need for formal patient safety measures (e.g., surgical time out) | • Participates in the use of tools to prevent adverse events (e.g., checklists and briefings)<br>• Understands and uses chain of command to develop and implement patient care plans (junior to senior resident to attending) | • Consistently uses tools to prevent adverse events (e.g., checklists and briefings)<br>• Identifies potential patient safety issues (patient positioning in OR, aspiration risk) and means to prevent those problems<br>• Presents at morbidity and mortality (M&M) conference (organizes data and identification of some pertinent patient safety issues) | • Advocates for quality patient care and optimal patient care systems<br>• Analyzes M&M findings and provides feedback to improve patient safety | • Educates other services re patient safety issues in otolaryngology head and neck surgery OHNS |

**Otolaryngology** — Resources, HC Costs

**Resource Utilization — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Uses resources (social work, patient care manager) to coordinate patient care | • Actively functions as part of an inter-disciplinary team to care for patients<br>• Aware of socio-economic issues in patient care and takes those into consideration when developing patient care plans | • Incorporates cost issues into care decisions<br>• Contributes to leadership of the interdisciplinary care team<br>• Uses technology and other hospital/clinic resources in patient care | • Practices cost-effective care (e.g., managing length of stay, operative efficiency)<br>• Leads interdisciplinary team in patient care | • Designs measurement tools to monitor and provide feedback to providers/teams on resource consumption to facilitate improvement |

**Pathology** — PS, QI

**Systems-Based Practice 1: Patient Safety and Quality Improvement (QI) (AP/CP)**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of common patient safety events | Identifies system factors that lead to patient safety events | Participates in analysis of patient safety events (simulated or actual) | Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) | Actively engages teams and processes to modify systems to prevent patient safety events |
| Demonstrates knowledge of how to report patient safety events | Reports patient safety events through institutional reporting systems (simulated or actual) | Participates in disclosure of patient safety events to clinicians and/or patients and families, as appropriate (simulated or actual) | Discloses patient safety events to clinicians and/or patients and families, as appropriate (simulated or actual) | Role models or mentors others in the disclosure of patient safety events |
| Demonstrates knowledge of basic QI methodologies and metrics | Describes departmental and institutional QI initiatives | Participates in departmental and institutional QI initiatives | Demonstrates the skills required to identify, develop, implement, and analyze a QI project | Creates, implements, and assesses QI initiatives at the institutional or community level |

**Pathology** — CC

**Systems-Based Practice 2: Systems Navigation for Patient-Centered Care (AP/CP)**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of case coordination | Coordinates care of patients in routine cases effectively using interprofessional teams | Coordinates care of patients in complex cases effectively using interprofessional teams | Models effective coordination of patient-centered care among different disciplines and specialties | Analyses the process of care coordination and leads in the design and implementation of improvements |
| Identifies key elements for safe and effective transitions of care and hand-offs | Performs safe and effective transitions of care/hand-offs in routine situations | Performs safe and effective transitions of care/hand-offs in complex situations | Models and advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems | Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes |
| Demonstrates knowledge of population and community health needs and disparities | Identifies pathology's role in population and community health needs and inequities for their local population | Identifies opportunities for pathology to participate in community and population health | Recommends and/or participates in changing and adapting practice to provide for the needs of communities and populations | Leads innovations and advocates for populations and communities with health care inequities |

**Pathology** | HC Systems

**Systems-Based Practice 3: Physician Role in Health Care System (AP/CP)**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Identifies key components of the complex health care system (e.g., hospital, skilled nursing facility, finance, personnel, technology) | Describes how components of a complex health care system are inter-related, and how this impacts patient care | Discusses how individual practice affects the broader system (e.g., test utilization, turnaround time) | Manages various components of the complex health care system to provide efficient and effective patient care and transition of care | Advocates for or leads systems change that enhances high-value, efficient, and effective patient care and transition of care |
| Describes basic health payment systems (e.g., government, private, public, uninsured care) and practice models | Documents testing detail and explains the impact of documentation on billing and reimbursement | Engages with clinicians and/or patients in shared-decision making, such as use of preauthorization for complex testing | Practices and advocates for cost effective patient care with consideration of the limitations of each patient's payment model | Participates in health policy advocacy activities |

**Pathology** | Infor-matics-

**Systems-Based Practice 4: Informatics (AP/CP)**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates familiarity with basic technical concepts of hardware, operating systems, databases, and software for general purpose applications | Understands laboratory specific software, key technical concepts and interfaces, workflow, barcode application, automation systems (enterprise systems architecture) | Discusses the role of the pathologist in laboratory initiatives based on integrative pathology informatics and bioinformatics (e.g., laboratory information system implementation and configuration, QI initiatives) | Applies knowledge of informatics skills as needed in laboratory initiatives (e.g., data management and security, computational statistics, information governance) | Participates in operational and strategy meetings, troubleshooting with information technology staff members; able to utilize medical informatics in the direction and operation of the laboratory |

**Pathology** | QI

**Systems-Based Practice 5: Accreditation, Compliance, and Quality (AP/CP)**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge that laboratories must be accredited | Demonstrates knowledge of the components of laboratory accreditation and regulatory compliance (Clinical Laboratory Improvement Amendments and others), either through training or experience | Identifies the differences between accreditation and regulatory compliance; discusses the process for achieving accreditation and maintaining regulatory compliance | Participates in an internal or external laboratory inspection | Serves as a resource for accreditation at the regional or national level |
| Discusses the need for quality control and proficiency testing | Interprets quality data and charts and trends, including proficiency testing results, with assistance | Demonstrates knowledge of the components of a laboratory quality management plan | Reviews the quality management plan to identify areas for improvement | Creates and follows a comprehensive quality management plan |
| | | Discusses implications of proficiency testing failures | Performs analysis and review of proficiency testing failures and recommends a course of action, with oversight | Formulates a response for proficiency testing failures |

**Pediatrics** | CC

**SBP1. Coordinate patient care within the health care system relevant to their clinical specialty**

| Not yet Assessable | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Performs the role of medical decision-maker, developing care plans and setting goals of care independently; informs patient/family of the plan, but no written care plan is provided; makes referrals, and requests consultations and testing with little or no communication with team members or consultants; is not involved in the transition of care between settings (e.g., outpatient and inpatient, pediatric and adult); shows 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; care plan does not address key issues; has variable communication with team members and consultants regarding referrals, consultations, and testing; answers patient/family questions 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 interactions | Recognizes the responsibility to assist families in navigation of the complex health care system; frequently involves patient/family in decisions at all levels of care, setting goals, and defining care plans; frequently makes a written care plan available to the patient/family and to appropriately authorized members of the care team; care plan omits few key issues; has good communication with team members and consultants; consistently discusses results and recommendations with patient/family; is routinely involved in the transition of care between settings (e.g., outpatient and inpatient, pediatric and adult); considers social, educational and cultural issues in most care interactions | Actively assists families in navigating the complex health care system; has open communication, facilitating trust in the patient-physician interaction; develops goals and makes decisions jointly with the patient/family (shared-decision-making); routinely makes a written care plan available to the patient/family and to appropriately authorized members of the care team; makes a thorough care plan, 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 | Current literature does not distinguish between behaviors of proficient and expert practitioners. Expertise is not an expectation of GME training, as it requires deliberate practice over time |
| | | | | support); builds partnerships that foster family-centered, culturally-effective care, ensuring communication and collaboration along the continuum of care | |

Guralnick S, Fondahn E, Amin A, Bittner EA. Systems-based practice: time to finally adopt the orphan competency. *J Grad Med Educ.* 2021;13(suppl 2):96-101.

**Pediatrics** — QI

**SBP2. Advocate for quality patient care and optimal patient care systems**

| Not yet Assessable | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Attends to medical needs of individual patient(s); wants to take good care of patients and takes action for individual patients' health care needs<br><br>*Example:*<br>*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<br><br>*Example:*<br>*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 enlist colleagues to help with this problem<br><br>*Example:*<br>*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<br><br>*Example:*<br>*The physician 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<br><br>*Example:*<br>*Upon completion of quality improvement project, the physician works on new proposed legislation and testifies in City Council.* |

**Pediatrics** — Teams

**SBP3. Work in inter-professional teams to enhance patient safety and improve patient care quality**

| Not yet Assessable | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Seeks answers and responds to authority from only intra-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 | Is 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; is not dismissive of other health care professionals, but 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, and seeks their input for appropriate issues, and as a result, is an excellent team player | Same as Level 3, but an individual at this stage understands the broader connectivity of the professions and their complementary nature; recognizes that quality patient care only occurs in the context of the inter-professional team; serves as a role model for others in interdisciplinary work and is an excellent team leader | Current literature does not distinguish between behaviors of proficient and expert practitioners. Expertise is not an expectation of GME training, as it requires deliberate practice over time |

**Physical Medicine & Rehabilitation** — HC Systems

**SBP 1. Systems thinking: demonstrates awareness of and responsiveness to larger context and system of care, including:**
- **Working effectively in various health care delivery settings and systems relevant to physical medicine and rehabilitation**
- **Coordinating patient care within the health care system**
- **Advocating for quality patient care and optimal patient care systems**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 (Graduation Target) | Level 5 (Aspirational) |
|---|---|---|---|---|---|
| | Acknowledges that health care is delivered in a complex system of care | Describes and differentiates between the various systems of care in which rehabilitation is provided (e.g., acute care; inpatient rehabilitation facility (IRF); skilled nursing facility (SNF), outpatient, home health care, etc.) | Has learned to coordinate care across a variety of settings (e.g., inpatient, outpatient, consultative, etc.)<br><br>Incorporates patient-specific rehabilitation needs, social factors, cost/benefit, and resources into decision-making (e.g., inpatient admission, length of stay, discharge destination, equipment, essential outpatient services, medical management, etc.) | Advocates for and provides high-quality, safe, well-coordinated, patient-centered care across the health care system<br><br>Efficiently manages and coordinates patient transitions between various settings (e.g., acute, IRF, SNF, community, etc.) | Optimally coordinates care and advocates to improve care provided through health care, social/community, and governmental systems<br><br>Successfully organizes appeals for coverage and advocates for patient and family in complex situations<br><br>Maintains regulatory compliance, including accurate coding and billing |

**Physical Medicine & Rehabilitation** — Teams

**SBP 2. Team approach to enhance patient care coordination. Rehabilitation team members may include occupational and physical therapists, speech language pathologists, rehabilitation nurses, nurse practitioners, psychologists, therapeutic recreation specialists, case managers, social workers, and education and vocational specialists.**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 (Graduation Target) | Level 5 (Aspirational) |
|---|---|---|---|---|---|
| | Actively participates in team-based care | Directs questions/comments to appropriate team members demonstrating understanding of their roles in patient care | Collaborates effectively and respectfully with the patient and family, multiple providers, and the interdisciplinary team to develop patient-centered goals | Leads the interdisciplinary team to ensure high quality, safe patient care<br><br>Creates an environment where team members are encouraged to voice concerns and share their expertise | Anticipates team dynamics and effectively manages interactions to optimize group performance |

**Physical Medicine & Rehabilitation** — PS

**SBP 3. Patient safety: Understands ways to improve health care safety through participation in identifying system errors and implementing potential systems solutions**

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 (Graduation Target) | Level 5 (Aspirational) |
|---|---|---|---|---|---|
| | Recognizes the impact of process and systems failures on patient safety | Participates in established safety initiatives (e.g., use of approved abbreviations, isolation precautions, hand washing)<br><br>Applies structured process(es) to foster clear, concise, accurate, and specific communication during patient hand-offs | Identifies health system factors that increase risk for errors, (e.g., errors in the Electronic Medical Record, lack of health information exchange)<br><br>Utilizes existing processes and procedures for reporting problematic events | Partners with others in activities to improve patient safety<br><br>Learns from critical incidents or systems failures that have impacted patient safety | Leads systems-level patient safety interventions<br><br>Proactively identifies system failures and risks for medical errors |

Guralnick S, Fondahn E, Amin A, Bittner EA. Systems-based practice: time to finally adopt the orphan competency. *J Grad Med Educ.* 2021;13(suppl 2):96-101.

| | | | | |
|---|---|---|---|---|
| **Plastic Surgery** | PS | **Patient Safety — Systems-based Practice**<br>**Level 1:** • Understands the differences between medical errors, near misses, and sentinel events • Understands the roles of care team members<br>**Level 2:** • Participates in the use of tools to prevent adverse events (e.g., checklists and briefings) • Describes the common system causes for errors<br>**Level 3:** • Consistently uses tools to prevent adverse events (e.g., checklists and briefings) • Reports problematic behaviors, processes, and devices, including errors and near misses<br>**Level 4:** • Formally analyzes shared team experiences to prevent future errors using proven analysis techniques (e.g., root cause analysis, failure mode effects analysis) • Leads team by promoting situational awareness and input by all team members • Conducts morbidity and mortality conferences to improve patient safety<br>**Level 5:** • Leads curriculum design to teach teamwork and communication skills to health care professionals • Helps lead a multidisciplinary team (e.g., human factors engineers, social scientists) to address patient safety issues | | |
| **Plastic Surgery** | HC Costs<br>Resources | **Resource Allocation — Systems-based Practice**<br>**Level 1:** • Describes practice variations in resource consumption, such as the utilization of diagnostic tests<br>**Level 2:** • Describes the cost implications of using resources and practice variation<br>**Level 3:** • Participates in responsible use of health care resources seeking appropriate assistance<br>**Level 4:** • Practices cost-effective care (e.g., managing length of stay, operative efficiency)<br>**Level 5:** • Designs measurement tools to monitor and provide feedback to providers/teams on resource consumption to facilitate improvement | | |
| **Plastic Surgery** | HC Systems | **Practice Management — Systems-based Practice**<br>**Level 1:** • Understands basic health payment systems, including uninsured care • Understands different practice models<br>**Level 2:** • Understands principles of diagnosis, evaluation and management, and procedure coding • Compares and contrasts different practice models<br>**Level 3:** • Codes routine diagnoses, encounters, and surgical procedures; documents medical necessity • Recognizes basic elements needed to establish practice (e.g., negotiations, malpractice insurance, contracts, staffing, compliance, facility accreditation)<br>**Level 4:** • Codes complex and unusual diagnoses, encounters, and surgical procedures • Establishes timeline and identifies resources for transition to practice (e.g., information technology, legal, financial, personnel)<br>**Level 5:** • Participates in advocacy activities for health policy • Creates curriculum to teach practice management | | |
| **Preventive Medicine** | CC | **Work and coordinate patient care effectively in various health care delivery settings and systems — Systems-based Practice 1**<br>**Level 1:** • Recognizes various individual and population-based health care/services delivery settings and systems<br>**Level 2:** • Works and coordinates individual patient care in various health care delivery settings and systems<br>**Level 3:** • Works and coordinates population-based health services in various health care delivery settings and systems<br>**Level 4:** • Assess organizational performance of health care delivery system<br>**Level 5:** • Interacts with other stakeholders to improve the performance of the system | | |
| **Preventive Medicine** | HC Costs and Risk | **Incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care, as appropriate — Systems-based Practice 2**<br>**Level 1:** • Recognizes the importance of cost awareness and risk-benefit analysis in patient and /or population-based care<br>**Level 2:** • Identifies risks, benefits, and costs for a preventive service in an individual clinical patient<br>**Level 3:** • Demonstrates sound judgment relating to risks, benefits, and costs for a preventive service in an individual clinical patient<br>**Level 4:** • Demonstrates sound judgment relating to risks, benefits, and costs for a preventive service for a population<br>**Level 5:** • Articulates and weighs the costs, benefits, and risks of a proposed population-based service | | |
| **Preventive Medicine** | PS<br>QI | **Work in inter-professional teams to enhance patient safety and improve patient care quality; advocate for quality patient care and optimal patient care systems; participate in identifying system errors and implementing potential systems solutions — Systems-based Practice 3**<br>**Level 1:** • Recognizes the importance of advocating for quality care and optimal patient care systems • Recognizes that medical errors and health care system failures are a significant cause or morbidity<br>**Level 2:** • Understands key concepts related to health care quality improvement • Recognizes and reports errors and near misses<br>**Level 3:** • Advocates for quality care and optimal individual patient care systems • Recognizes potential sources of system failure in healthcare systems, such as minor, major, and sentinel events<br>**Level 4:** • Advocates for quality care and optimal population-based care systems • Participates in a team-based approach to make system changes<br>**Level 5:** • Develops or leads a team to evaluate a system error and improve processes | | |

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**Psychiatry**

PS

**SBP1. Patient Safety and the Health care Team**
**A:** Medical errors and improvement activities
**B:** Communication and patient safety
**C:** Regulatory and educational activities related to patient safety

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | 1.1/A Differentiates among medical errors, near misses, and sentinel events | 2.1/A Describes the common system causes for errors | 3.1/A Describes systems and procedures that promote patient safety | 4.1/A Participates in formal analysis (e.g., root-cause analysis, failure mode effects analysis) of medical errors and sentinel events | 5.1/A Leads multidisciplinary teams (e.g., human factors engineers[1], social scientists) to address patient safety issues |
| | 1.2/B Recognizes failure in teamwork and communication as leading cause of preventable patient harm | 2.2/B Consistently uses structured communication tools to prevent adverse events (e.g., checklists, safe hand-off procedures, briefings) | | | 5.2/A, C Provides consultation to organizations to improve personal and patient safety |
| | 1.3/C Follows institutional safety policies, including reporting of problematic behaviors and processes, errors, and near misses | 2.3/C Actively participates in conferences focusing on systems-based errors in patient care | | 4.2/C Develops content for and facilitates a patient safety presentation or conference focusing on systems-based errors in patient care (i.e., a morbidity and mortality [M&M] conference) | |

PS
QI

**Systems-Based Practice 1: Patient Safety and Quality Improvement**
**A:** Analyzes patient safety events
**B:** Appropriately discloses patient safety events
**C:** Participates in quality improvement

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of common patient safety events | Identifies system factors that lead to patient safety events | Participates in analysis of patient safety events (simulated or actual) | Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) | Actively engages teams and processes to improve systems to prevent patient safety events |
| Demonstrates knowledge of how to report patient safety events | Reports patient safety events through institutional reporting systems (simulated or actual) | Participates in disclosure of patient safety events to patients and families (simulated or actual) | Discloses patient safety events to patients and families (simulated or actual) | Role models or mentors others in the disclosure of patient safety events |
| Demonstrates knowledge of basic quality improvement methodologies and metrics | Describes local quality improvement initiatives (e.g., reduced restraint rates, falls risk, suicide rates) | Participates in local quality improvement initiatives | Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project | Creates, implements, and assesses quality improvement initiatives at the institutional or community level |

**Psychiatry**

HC
Costs

Resources

**SBP2. Resource Management (may include diagnostics, medications, level of care, other treatment providers, access to community assistance)**
**A:** Costs of care and resource management

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | 1.1/A Recognizes need for efficient and equitable use of resources | 2.1/A Recognizes disparities in health care at individual and community levels<br>2.2/A Knows the relative cost of care (e.g., medication costs, diagnostic costs, level of care costs, procedure costs) | 3.2/A Coordinates patient access to community and system resources | 4.1/A Practices cost-effective, high-value clinical care[1], using evidence-based tools and information technologies to support decision making<br>4.2/A Balances the best interests of the patient with the availability of resources | 5.1/A Designs measurement tools to monitor and provide feedback to providers/teams on resource consumption to facilitate improvement<br>5.2/A Advocates for improved access to and additional resources within systems of care |

CC

**Systems-Based Practice 2: System Navigation for Patient-Centered Care**
**A:** Coordinates patient care
**B:** Safely transitions care
**C:** Population and community health needs

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of care coordination | Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams | Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams | Role models effective coordination of patient-centered care among different disciplines and specialties | Analyzes the process of care coordination and leads in the design and implementation of improvements |
| Identifies key elements for safe and effective transitions of care and hand-offs | Performs safe and effective transitions of care/hand-offs in routine clinical situations | Performs safe and effective transitions of care/hand-offs in complex clinical situations | Role models and serves as a patient advocate for safe and effective transitions of care/hand-offs within and across health care delivery systems including outpatient settings | Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes |
| Demonstrates knowledge of population and community health needs and disparities | Identifies specific population and community health needs and inequities for their local population | Uses local resources effectively to meet the needs of a patient population and community | Participates in changing and adapting practice to provide for the needs of specific populations | Leads innovations and advocates for populations and communities with health care inequities |

**Psychiatry**

CC

**SBP3. Community-Based Care**
**A:** Community-based programs
**B:** Self-help groups
**C:** Prevention
**D:** Recovery and rehabilitation

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | 1.1/A Gives examples of community mental health systems of care | 2.1/A Coordinates care with community mental health agencies, including with case managers | | | 5.1/A Participates in the administration of community-based treatment programs<br>5.2/A Participates in creating new community-based programs |
| | 1.2/B Gives examples of self-help groups (Alcoholics Anonymous [AA], Narcotics Anonymous [NA]), other community resources (church, school) and social networks (e.g., family, friends, acquaintances) | 2.2/B Recognizes role and explains importance of self-help groups and community resource groups (e.g., disorder-specific support and advocacy groups) | 3.1/B Incorporates disorder-specific support and advocacy groups in clinical care | 4.1/B Routinely uses self-help groups, community resources, and social networks in treatment[3] | |
| | | 2.3/C Describes individual and population risk factors for mental illness | 3.2/C Describes prevention measures: universal, selective and indicated[1]<br>3.3/D Describes rehabilitation programs (vocational, brain injury, etc.) and the recovery model[2] | 4.2/C Employs prevention and risk reduction strategies in clinical care<br>4.3/D Appropriately refers to rehabilitation and recovery programs<br>4.4/D Uses principles of evidence-based practice and patient centered care in management of chronically ill patients | 5.3/D Practices effectively in a rehabilitation and/or recovery-based program |

HC
Systems

**Systems-Based Practice 3: Physician Role in Health Care Systems**
**A:** Understanding and working within the health care system
**B:** Health care financing and advocacy
**C:** Transition to practice

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Identifies key components of the complex health care system | Describes how components of a complex health care system are interrelated, and how this impacts patient care | Discusses how individual practice affects the broader system | Manages various components of the complex health care system to provide high-value, efficient, and effective patient care and transition of care | Advocates for or leads systems change that enhances high-value, efficient, and effective patient care and transition of care |
| Describes practice models and basic mental health payment systems | Identifies barriers to care in different health care systems | Engages with patients in shared decision making and advocates for appropriate care and parity | Advocates for patient care needs including mobilizing community resources | Participates in advocacy activities for access to care in mental health and reimbursement |
| Identifies basic knowledge domains for effective transition to residency | Demonstrates use of information technology and documentation required for medical practice | Describes core administrative knowledge needed for transition to practice | Analyzes individual practice patterns and professional requirements in preparation for practice | Educates others to prepare them for transition to practice |

**Psychiatry** — Consultant Teams

**SBP4. Consultation to non-psychiatric medical providers and non-medical systems (e.g., military, schools, businesses, forensic )**
**A:** Distinguishes care provider roles related to consultation
**B:** Provides care as a consultant and collaborator
**C:** Specific consultative activities

| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | 1.1/A Describes the difference between consultant and primary treatment provider | 2.1/A Describes differences in providing consultation for the system or team versus the individual patient<br><br>2.2/B Provides consultation to other medical services<br><br>2.3/C Clarifies the consultation question<br><br>2.4/C Conducts and reports a basic decisional capacity evaluation | 3.1/C Assists primary treatment care team in identifying unrecognized clinical care issues<br><br>3.2/C Identifies system issues in clinical care and provides recommendations<br><br>3.3/C Discusses methods for integrating mental health and medical care in treatment planning | 4.1/B Provides integrated care for psychiatric patients through collaboration with other physicians[1]<br><br>4.2/C Manages complicated and challenging consultation requests | 5.1/B Provides psychiatric consultations to larger systems<br><br>5.2/B Leads a consultation team |

**Radiation Oncology** — CC

**Work and coordinate patient care effectively in various health care delivery settings and systems — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Recognizes various health care delivery settings and systems | • Works and coordinates patient care in various health care delivery settings and systems for common clinical situations | • Works and coordinates patient care in various health care delivery settings and systems for most clinical situations | • Works and coordinates patient care in various health care delivery settings and systems for all clinical situations | • Publishes research on coordinating patient care in various health care delivery settings and systems |

**Radiation Oncology** — HC Costs and Risk

**Incorporate considerations of cost awareness and risk-benefit analysis in patient- and/or population-based care, as appropriate — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Recognizes the importance of cost awareness and risk-benefit analysis for patient- and/or population-based care | • Incorporates considerations of cost awareness and risk-benefit analysis for patient- and/or population-based care for common clinical situations | • Incorporates considerations of cost awareness and risk-benefit analysis in patient- and/or population-based care for most clinical situations | • Incorporates considerations of cost awareness and risk-benefit analysis for patient- and/or population-based care for all clinical situations | • Publishes research on cost awareness and risk-benefit analysis for patient- and/or population-based care |

**Radiation Oncology** — Teams, QI, Advocacy, PS

**Work in interprofessional teams to enhance patient safety and improve patient care quality; advocate for quality patient care and optimal patient care systems; participate in identifying system errors and implementing potential system solutions — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Recognizes the importance of working in interprofessional teams to enhance patient safety and improve patient care quality<br>• Recognizes the importance of advocating for quality care and optimal patient care systems<br>• Recognizes the importance of participating in identifying system errors and implementing potential system solutions | • Works in interprofessional teams to enhance patient safety and improve patient care quality in common clinical situations<br>• Advocates for quality care and optimal patient care systems in common clinical situations<br>• Participates in identifying system errors and implementing potential system solutions in common clinical situations | • Works in interprofessional teams to enhance patient safety and improve patient care quality in most clinical situations<br>• Advocates for quality care and optimal patient care systems in most clinical situations<br>• Participates in identifying system errors and implementing potential system solutions in most clinical situations | • Works in interprofessional teams to enhance patient safety and improve patient care quality in all clinical situations<br>• Advocates for quality care and optimal patient care systems in all clinical situations<br>• Participates in identifying system errors and implementing potential system solutions in all clinical situations | • Publishes research on quality patient care or patient safety |

**Surgery** — CC

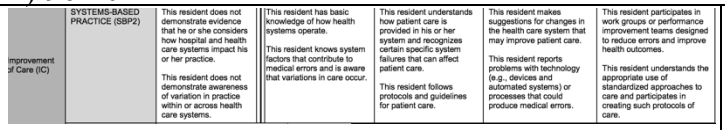
| Practice Domain | Competency | Critical Deficiencies | LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---|---|---|---|---|---|---|
| Coordination of Care (CC) | SYSTEMS-BASED PRACTICE (SBP1) | This resident does not have a basic understanding of the resources available for coordinating patient care, including social workers, visiting nurses, and physical and occupational therapists. | This resident has a basic understanding of the resources available for coordinating patient care, including social workers, visiting nurses, and physical and occupational therapists. | This resident knows the necessary resources to provide optimal coordination of care and how to access them. This resident is aware of specialized services like home total parenteral nutrition (TPN) or home antibiotic infusion. | This resident is able to efficiently arrange disposition planning for his or her patients and takes responsibility for preparing all materials necessary for discharge or transfer of his or her patients. | This resident coordinates the activities of residents, nurses, social workers, and other health care professionals to provide optimal care to the patient at the time of discharge or transfer, and to provide post-discharge ambulatory care that is appropriate for the patient's particular needs. |

PS, QI

**Systems-Based Practice 1: Patient Safety and Quality Improvement**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of common patient safety events | Identifies system factors that lead to patient safety events | Participates in analysis of patient safety events (simulated or actual) | Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) | Actively engages teams and processes to modify systems to prevent patient safety events |
| Demonstrates knowledge of how to report patient safety events | Reports patient safety events through institutional reporting systems (simulated or actual) | Participates in disclosure of patient safety events to patients and families (simulated or actual) | Discloses patient safety events to patients and families (simulated or actual) | Mentors others in the disclosure of patient safety events |
| Demonstrates knowledge of basic quality improvement methodologies and metrics | Describes local quality improvement initiatives (e.g., infection rate, hand hygiene, opioid use) | Participates in local quality improvement initiatives | Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project | Creates, implements, and assesses quality improvement initiatives at the institutional or community level |

Guralnick S, Fondahn E, Amin A, Bittner EA. Systems-based practice: time to finally adopt the orphan competency. *J Grad Med Educ.* 2021;13(suppl 2):96-101.

| | | | | | |
|---|---|---|---|---|---|
| **Surgery** | HC Systems |  | CC | **Systems-Based Practice 2: System Navigation for Patient-Centered Care** | |
| **Surgery** | | | HC Systems | **Systems-Based Practice 3: Physician Role in Health Care Systems** | |
| **Thoracic Surgery** | PS<br>Teams | **Patient Safety — Systems-based Practice** | | | |
| **Thoracic Surgery** | HC Costs and Resources | **Resource Allocation — Systems-based Practice** | | | |
| **Thoracic Surgery** | HC Systems | **Practice Management — Systems-based Practice** | | | |



**Systems-Based Practice 2: System Navigation for Patient-Centered Care**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of care coordination | Coordinates multidisciplinary care of patients in routine clinical situations (e.g., dressing change) | Coordinates and/or leads multidisciplinary care of patients in complex clinical situations (e.g., home parenteral nutrition, postoperative intravenous feeding, intensive care unit) | Coordinates care of patients with barriers to health care access (e.g., trauma patient with no access to care) or other disparities in care | Leads in the design and implementation of improvements to care coordination |
| Performs safe and effective transitions of care/hand-offs in routine clinical situations | Performs safe and effective transitions of care/hand-offs in complex clinical situations | Supervises safe and effective transitions of care/hand-offs of junior residents | Resolves conflicts in transitions of care between teams | Leads in the design and implementation of improvements to transitions of care |

**Systems-Based Practice 3: Physician Role in Health Care Systems**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Describes basic health payment systems, including government, private, public, and uninsured care as well as different practice models | Describes how working within the health care system impacts patient care | Analyzes how personal practice affects the system (e.g., length of stay, readmission rates, clinical efficiency) | Uses shared decision making in patient care, taking into consideration costs to the patient | Advocates or leads change to enhance systems for high-value, efficient, and effective patient care |
| Describes the key components of documentation for billing and coding | Documents the key components required for billing and coding | Describes basic elements needed to transition to practice (e.g., contract negotiations, malpractice insurance, government regulation, compliance, Medicare Access and CHIP Reauthorization Act) | Identifies resources and effectively plans for transition to practice (e.g., information technology, legal, billing and coding, financial, personnel) | Participates in advocacy activities for health policy |

**Patient Safety — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Understands the differences between medical errors, near misses, and sentinel events<br>• Understands the roles of care team members | • Participates in the use of tools to prevent adverse events (e.g., checklists and briefings)<br>• Describes the common system causes for errors | • Consistently uses tools to prevent adverse events (e.g., checklists and briefings)<br>• Reports problematic behaviors, processes, and devices, including errors and near misses<br>• Demonstrates structured communication tool for hand-offs | • Participates in the analysis of shared team experiences to prevent future errors using proven analysis techniques (e.g., root cause analysis, failure mode effects analysis)<br>• Leads team by promoting situational awareness and input by all team members<br>• Conducts morbidity and mortality conferences to improve patient safety | • Leads curriculum design to teach teamwork and communication skills to health care professionals<br>• Leads multidisciplinary teams (e.g., human factors engineers, social scientists) to address patient safety issues |

**Resource Allocation — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Describes practice variations in resource consumption, such as the utilization of diagnostic tests | • Describes the cost implications of using resources and practice variation | • Participates in responsible use of health care resources seeking appropriate assistance | • Practices cost effective care (e.g., managing length of stay, operative efficiency) | • Designs measurement tools to monitor and provide feedback to providers/teams on resource consumption to facilitate improvement |

**Practice Management — Systems-based Practice**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| • Understands basic health payment systems, including uninsured care<br>• Uses EMR appropriately | • Understands the importance of documentation for coding<br>• Able to document inpatient diagnoses<br>• Understands different practice models | • Understands principles of diagnosis, evaluation and management, and procedure coding<br>• Compares and contrasts different practice models | • Codes routine diagnoses, encounters, and surgical procedures; documents medical necessity<br>• Recognizes basic elements needed to establish practice (e.g., negotiations, malpractice insurance, contracts, staffing, compliance, facility accreditation)<br>• Establishes timeline and identifies resources for transition to practice (e.g. information technology, legal, financial, personnel) | • Participates in advocacy activities for health policy<br>• Creates curriculum to teach practice management<br>• Codes complex and unusual diagnoses, encounters and surgical procedures |

Guralnick S, Fondahn E, Amin A, Bittner EA. Systems-based practice: time to finally adopt the orphan competency. *J Grad Med Educ.* 2021;13(suppl 2):96-101.

**Transitional Year**

PS

QI

**Systems-Based Practice 1: Patient Safety and Quality Improvement**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of common patient safety events | Identifies system factors that lead to patient safety events | Participates in analysis of patient safety events (simulated or actual) | Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual) | Actively engages teams and processes to modify systems to prevent patient safety events |
| Demonstrates knowledge of how to report patient safety events | Reports patient safety events through institutional reporting systems (simulated or actual) | Participates in disclosure of patient safety events to the team (simulated or actual) | Participates in disclosure of patient safety events to patients and families (simulated or actual) | Role models or mentors others in the disclosure of patient safety events |
| Demonstrates knowledge of basic quality improvement methodologies and metrics | Describes programmatic or institutional quality improvement initiatives (e.g., handwashing, reducing needle stick injuries) | Participates in programmatic or institutional quality improvement initiatives | Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project | Creates, implements, and assesses quality improvement initiatives at the institutional or community systems level |

**Transitional Year**

CC

**Systems-Based Practice 2: System Navigation for Patient-Centered Care**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of care coordination | Coordinates care of patients in routine clinical situations effectively using the resources of interprofessional teams | Coordinates care of patients in complex clinical situations effectively using the resources of interprofessional teams | Efficiently coordinates patient-centered care using interprofessional teams | Leads and role models effective coordination of patient-centered care among different disciplines and specialties |
| Identifies key elements for safe and effective transitions of care and hand-offs | Performs safe and effective transitions of care/hand-offs in routine clinical situations | Reassesses patient and anticipates patient specific factors that may lead to readmission | Performs safe and effective transitions of care/hand-offs in complex clinical situations and across health care delivery systems | Role models and advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems |
| Demonstrates knowledge of local population and community health needs and disparities | Identifies resources to meet the health needs and disparities of local communities and populations | Uses local resources effectively to meet the needs of a patient population and community | Participates in changing and adapting practice to provide for the needs of specific populations | Leads innovations and advocates across populations and communities towards health/health care equity |

**Transitional Year**

HC Systems

**Systems-Based Practice 3: Physician Role in Health Care Systems**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Identifies components of the complex health care system | Describes the physician's role and how the interrelated components of the complex health care system impact patient care | Analyzes how personal practice affects the system (e.g., length of stay, readmission rates, clinical efficiency) | Adapts personal practice based on practice habits data | Manages the interrelated components of complex health care systems for efficient and effective patient care |
| Describes basic health payment systems (e.g., private, public, government, and uninsured care) and different practice models (e.g., fee for service, capitated fees, accountable care organizations) | Describes the limitations of payment models and uses available patient care resources | Uses shared decision making in delivering care informed by patient-specific payment models | Advocates for patient care incorporating the limitations of their payment model (e.g., community resources, patient assistance resources) | Advocates for health policy to better align payment systems with high-value care |

**Urology**

HC Systems

**SBP1. Works effectively within and across health delivery systems.**

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Describes basic levels of systems of care<br><br>Identifies the types of health care providers within a health care delivery system<br><br>*Example:*<br>*The physician*<br>*1. Identifies patient issues that are beyond his or her personal scope and abilities and may require consultation* | Knows unique roles of and services provided by local health care delivery systems and how to access these resources for patient care<br><br>Knows and appreciates the roles of a variety of health care providers, including consultants, therapists, nurses, home care workers, pharmacists, and social workers<br><br>Advocates for quality patient care<br><br>*Example:*<br>*The physician*<br>*1. Places consults for non-urologic issues affecting individual patients*<br>*2. Reconciles medications at transfer* | Manages and coordinates care and care transitions across multiple delivery systems, including ambulatory, subacute, acute, rehabilitation, and skilled nursing<br><br>Advocates for quality patient care and optimal patient care systems<br><br>*Example:*<br>*The physician*<br>*1. Involves the primary care physician and other consultants appropriately in the care of individual patients*<br>*2. Facilitates performance of the interprofessional care team by (a) timely, clear communication/updating of patient condition and orders; and (b) skillful, respectful interaction (see ICS); complies with communication protocols*<br>*3.Reconciles medications at transfer* | Discusses non-pharmacologic and non-procedural patient resources (such as physical therapy, social work, alternative medicine providers, chaplains, etc.) with patients and families<br><br>Demonstrates how to lead a health care team by utilizing the skills and coordinating the activities of interprofessional team members (physician extenders/mid-levels, nurses, medical students, allied health workers, etc.)<br><br>Negotiates patient-centered care among multiple care providers<br><br>*Example:*<br>*The physician*<br>*1. Coordinates the interprofessional care team by (a) anticipating the need for multi-disciplinary involvement; and (b) skillful, respectful interaction with all team members (see ICS); and complies with communication protocols*<br>*2. Plans for appropriate post-hospitalization care of the patient* | Is adept at systems thinking<br><br>Capably leads the health care team, understanding personal role as leader<br><br>Contributes meaningfully to interprofessional teams<br><br>*Example:*<br>*The physician*<br>*1. Capably leads interprofessional care teams by (a) anticipating the need for multi-disciplinary involvement; and (b) skillful, respectful interaction with all team members (see ICS)*<br>*2. Aligns appropriate post-hospitalization care of the patient* |

PS

QI

**Systems-Based Practice 1: Patient Safety and Quality Improvement**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of common patient safety events and institutional reporting system | Identifies and reports patient safety events | Participates in analysis of patient safety events (simulated or actual) | Offers strategies (simulated or actual) to prevent patient safety events | Actively engages and leads teams and processes to prevent patient safety events |
| Demonstrates knowledge of basic quality improvement methodologies and metrics | Describes local quality improvement initiatives (e.g., multimodal analgesics, antibiotic stewardship, smoking cessation, hospital acquired infection) | Participates in local quality improvement initiatives | Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project | Creates, implements, and assesses quality improvement initiatives at the institutional or community level |

Guralnick S, Fondahn E, Amin A, Bittner EA. Systems-based practice: time to finally adopt the orphan competency. *J Grad Med Educ.* 2021;13(suppl 2):96-101.

**Urology**

HC Costs and Resources

CC

**SBP2. Incorporates cost awareness and risk-benefit analysis into patient care.**

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Recognizes the concept of risk-benefit analysis associated with obtaining and providing health care<br><br>Identifies basic laboratory and radiographic tests that are commonly performed, recognizing that each is associated with specific costs<br><br>*Example:*<br>*The physician*<br>*1. Recognizes the physician's creed to "First, do no harm"*<br>*2. Understands the information conveyed by basic laboratory tests* | Knows common socio-economic barriers that impact patient care<br><br>Describes how cost-benefit analysis is applied to patient care<br><br>Knows relative costs of frequently used diagnostic and therapeutic interventions, such as CT vs. magnetic resonance imaging (MRI) scans, and the extent and ways they contribute to diagnostic accuracy and positive patient outcomes<br><br>*Example:*<br>*The physician*<br>*1. Understands that health care setting, insurance provider, and patient factors may impact an individual's choice between various clinical investigations*<br>*2. Orders appropriate laboratory tests and radiographic studies*<br>*3. Has a beginning appreciation of the cost of OR equipment* | Identifies the role of various health care stakeholders (health care systems, hospitals, insurance carriers, health care providers, etc.) and their varied impact on the cost of and access to health care<br><br>Demonstrates the incorporation of cost awareness and risk-benefit principles into standard clinical judgments and decision-making<br><br>*Example:*<br>*The physician*<br>*1. Selects diagnostic tests and interventions that have a high probability of adding value to patient care in common clinical scenarios*<br>*2. Minimizes unnecessary care, including laboratory tests and radiographic studies, such as by not re-ordering tests performed at other facilities*<br>*3. Has some appreciation of the efficient use of various OR equipment (e.g., doesn't open up more endoscopic instruments than are needed at the beginning of a procedure)* | Demonstrates the incorporation of cost awareness and risk-benefit principles into complex clinical scenarios<br><br>Minimizes unnecessary care by ordering appropriate laboratory tests and radiographic studies<br><br>Uses essential equipment with efficiency in the OR<br><br>*Example:*<br>*The physician*<br>*1. Has knowledge of urology billing codes*<br>*2. Understands reimbursement principles*<br>*3. Efficiently uses laboratory testing, complex studies, and equipment necessary in the care of individual patients* | Consistently incorporates cost awareness and risk-benefit principles into all clinical scenarios<br><br>Masterfully uses common and highly-specialized equipment within the OR<br><br>*Example:*<br>*The physician*<br>*1. Capably applies urology billing codes*<br>*2. Follows situation-specific reimbursement principles*<br>*3. Efficiently uses common and infrequently-used laboratory testing, complex studies, and equipment necessary in the care of individual patients* |

**Systems-Based Practice 2: System Navigation for Patient-Centered Care**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates knowledge of care coordination and community health needs | Coordinates multidisciplinary care of patients in routine clinical situations, considering inequities and disparities for their local population (e.g., cultural barriers) | Coordinates multidisciplinary care of patients in complex clinical situation and incorporates local resources into the plan (e.g., home parenteral nutrition, postoperative intravenous feeding, intensive care unit) | Leads care coordination of patients with barriers or other disparities in care (e.g., trauma patient with no access to care) | Designs innovative care coordination strategies for populations with health care inequities |
| Performs safe and effective transitions of care/hand-offs in routine clinical situations | Performs safe and effective transitions of care/hand-offs in complex clinical situations | Supervises safe and effective transitions of care/hand-offs of junior residents | Resolves conflicts in transitions of care between teams | Leads in the design and implementation of improvements to transitions of care |

**Urology**

Teams

PS

HC Systems

**SBP3. Works in inter-professional teams to enhance patient safety.**

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Recognizes teamwork and communication failure in health care as leading cause of preventable patient harm<br><br>Identifies critical incidents, such as near misses and preventable medical errors<br><br>*Example:*<br>*The physician*<br>*1. Observes quality improvement (Morbidity and Morality [M&M]) conferences (as appropriate and able)*<br>*2. Participates in discussions of medical errors that have occurred* | Identifies, reflects upon, and learns from critical incidents such as near misses and preventable medical errors<br><br>Recognizes health system factors that increase the risk for error, including medical device design, flawed processes, easily confusable medications, barriers to optimal patient care, and competing interests of different stakeholders<br><br>Describes the value and use of techniques and tools for preventing adverse events, including checklists, briefings, and structured communication and teamwork protocols<br><br>*Example:*<br>*The physician*<br>*1. Participates in quality improvement (M&M) conferences*<br>*2. Identifies medical errors that have occurred*<br>*3. Describes key elements of a structured communication technique, such as Situation-Background-Assessment-Recommendation (SBAR)* | Dialogues with care team members to identify risk for and prevention of medical errors<br><br>Understands methods for analysis and correction of systems errors<br><br>Applies structured communication techniques and tools, such as SBAR, during hand-offs and changes in patient condition<br><br>Leads briefings and executes basic teamwork techniques designed to prevent adverse events (such as those in Crew Resource Management [CRM])<br><br>*Example:*<br>*The physician*<br>*1. Communicates systems errors via appropriate channels*<br>*2. Demonstrates the ability to learn from medical errors that occur*<br>*3. Partners and performs system improvement as a team member*<br><br>*4. Performs CRM techniques such as "read back" of a critical laboratory result or a verbal order given to assure accurate communication ("closed loop")* | Leads team analysis of the effectiveness of techniques applied to prevent errors<br><br>Partners with other health care professionals to identify, propose, and implement improvement opportunities within the system<br><br>Uses specialized principles and techniques to study potential sources and causes of errors<br><br>*Example:*<br>*The physician*<br>*1. Provides insight and guidance regarding quality improvement at conferences and in daily clinical work*<br>*2. Suggests and designs a system improvement/solution*<br>*3. Uses root cause analysis (RCA)* | Develops and evaluates communication and teamwork techniques designed to prevent medical errors<br><br>Uses advanced specialized techniques to study potential sources and causes of errors<br><br>Coordinates and/or leads system quality improvement studies and implementation interventions<br><br>*Example:*<br>*The physician;*<br>*1. Uses failure mode effect analysis (FMEA) or human factors engineering principles (HFE)*<br>*2. Consistently leads toward quality improvement at conferences and in daily clinical work*<br>*3. Implements system improvement/solution* |

**Systems-Based Practice 3: Physician Role in Health Care Systems**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Identifies basic needs for effective transition to practice (e.g., information technology, legal, billing and coding, financial, personnel) | Demonstrates use of information technology required for medical practice (e.g., electronic health record, documentation required for billing and coding) | Describes core administrative knowledge needed for transition to independent practice (e.g., contract negotiations, malpractice insurance, government regulation, compliance) | Analyzes individual practice patterns and professional requirements in preparation for practice | Educates others to prepare them for transition to practice |
| Describes basic health payment systems (e.g., government, private, public, uninsured care) and practice models | Describes how components of a complex health care system are interrelated and how this impacts patient care | Discusses how individual practice affects the broader system performance (e.g., length of stay, readmission rates, clinical efficiency) | Manages various components of the complex health care system to provide efficient and effective patient care (e.g., patient payment models, insurance) | Advocates for or leads systems change that enhances high-value, efficient, and effective patient care |

**Urology** | Infor-matics

**SBP4. Uses technology to accomplish safe health care delivery.**

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| | Explains the role of the Electronic Health Record (EHR) and Computerized Physician Order Entry (CPOE) in prevention of medical errors<br><br>*Example:*<br>*The physician*<br>*1. Can use the EHR and CPOE to enter clinical information and basic orders* | As is applicable in the institution, utilizes the EHR to order tests, medications, and document notes, and responds to alerts<br><br>Recognizes the risks and limitations added by EHRs<br><br>*Example:*<br>*The physician*<br>*1. Competently uses the EHR and CPOE on a daily basis for patient care activities*<br>*2. Demonstrates efficiency in accomplishing repeated tasks (such as creating automated rounding lists or order sets)*<br>*3. Understands the risk of using defaults and cut and paste strategies to create notes* | Efficiently uses information systems for patient care, including literature review (see also Practice-based Learning and Improvement [PBLI])<br><br>Demonstrates medication reconciliation for patients using a variety of strategies<br><br>Consistently demonstrates safe practices to minimize risks and limitations added by EHRs<br><br>*Example:*<br>*The physician*<br>*1. Efficiently uses the EHR and CPOE for patient care activities*<br>*2. Performs medication reconciliation with attention to details from the present clinical course that may lead to changes (such as when to resume medications that have been stopped for surgery)*<br>*3. Never uses copy/paste strategies without relevant revision* | Contributes to reduction of risks of automation and computerized systems by reporting system problems<br><br>Uses decision support systems in EHR (as applicable in the institution)<br><br>Critiques decision support systems<br><br>*Example:*<br>*The physician*<br>*1. Capably uses the EHR and CPOE to care for patients and communicate essential information with other members of the health care team*<br>*2. Identifies flaws in decision support systems, automated care pathways, or system alerts* | Judges safety of computer and device interfaces using heuristics<br><br>Recommends systems re-design for faculty computerized processes<br><br>*Example:*<br>*The physician*<br>*1. Demonstrates familiarity with multiple systems, including relative strengths of each*<br>*2. Communicates with information technology personnel to improve systems, such as automated alerts for critical lab values, forwarding communication to PCP* |

**Vascular Surgery** | PS

**SBP1: Radiation Safety**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Describes the mechanisms of and risks for radiation injury<br><br>Describes the ALARA principle<br><br>With supervision, applies basic radiation protection and monitoring concepts | Identifies signs of radiation injury<br><br>Communicates the relative risk of exam-specific radiation exposure to patients<br><br>Requires supervision when employing ALARA principles to minimize radiation exposure to the patient, self, and staff while optimizing image quality | With limited supervision, consistently employs ALARA principles to minimize radiation exposure to the patient, self, and staff while optimizing image quality | Consistently and independently employs ALARA principles to minimize radiation exposure to the patient, self, and staff while optimizing image quality | Performs root-cause analysis for recordable or reportable events<br><br>Develops methodologies to further decrease radiation exposure |

**Vascular Surgery** | CC

**SBP2: Coordination of Care**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates a basic understanding of the resources available for coordinating patient care, including social workers, visiting nurses, and physical and occupational therapists | Knows the necessary resources to provide optimal coordination of care and how to access them<br><br>Demonstrates awareness of specialized services | Efficiently and responsibly arranges patient disposition planning in preparing all materials necessary for discharge or transfer of their patients | Coordinates the activities of residents, nurses, social workers, and other health care professionals to provide optimal care to the patient at the time of discharge or transfer, and to provide post-discharge ambulatory care that is appropriate for the patient's particular needs | Completes a performance improvement project for coordination of care |

**Vascular Surgery** | QI PS

**SBP3: Improvement of Care**

| Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|
| Demonstrates basic knowledge of how health systems operate<br><br>Demonstrates knowledge of system factors that contribute to medical errors, and is aware that variations in care occur | Describes how patient care is provided in the system, and recognizes specific system failures that can affect patient care<br><br>Follows protocols and guidelines for patient care | Suggests changes in the health care system that may improve patient care<br><br>Reports problems with technology (e.g., devices and automated systems) or processes that could produce medical errors | Participates in work groups or performance improvement teams designed to reduce errors and improve health outcomes<br><br>Demonstrates understanding of the appropriate use of standardized approaches to care, and participates in creating such protocols of care | Functions as a team leader for work groups or performance improvement teams designed to reduce errors and improve health outcomes |

Abbreviations:
PS- Patient Safety, QI- Quality Improvement, CC- Care Coordination, HC- Healthcare

Guralnick S, Fondahn E, Amin A, Bittner EA. Systems-based practice: time to finally adopt the orphan competency. *J Grad Med Educ.* 2021;13(suppl 2):96-101.

## Residency Education in Systems-Based Practice - Literature 2008-2020

| | | Mapping to Milestones | Feedback | Learner Assessment | Program Improvement | System Change | Clinical Competency Committee Function (CCC) | Curriculum | Systems Thinking | SBP1: PS/QI | SBP2: System Navigation for Pt Centered Care | SBP3: Physician Role in Health Care Systems |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Purnell SM, Wolf L, Millar MM, Smith BK. A National Survey of Integrated Vascular Surgery Residents' Experiences With and Attitudes About Quality Improvement During Residency. J Surg Educ. 2020;77(1):158-165. doi:10.1016/j.jsurg.2019.09.003 | | | | Program Improvement | | | | | SBP1 | | |
| 2 | Kelleher M, Kinnear B, Wong SEP, O'Toole J, Warm E. Linking Workplace-Based Assessment to ACGME Milestones: A Comparison of Mapping Strategies in Two Specialties. Teach Learn Med. 2020;32(2):194-203. doi:10.1080/10401334.2019.1653764 | Mapping | | | | | | | | | | |
| 3 | Nahmias J, Smith B, Grigorian A, et al. Implementation of a High-Value Care Curriculum for General Surgery Residents [published online ahead of print, 2020 Mar 31]. J Surg Educ. 2020;S1931-7204(20)30072-6. doi:10.1016/j.jsurg.2020.03.006 | | | | | | | Curriculum | | SBP1 | | |
| 4 | Dolansky MA, Moore SM, Palmieri PA, Singh MK. Development and Validation of the Systems Thinking Scale. J Gen Intern Med. 2020 Aug;35(8):2314-2320. doi: 10.1007/s11606-020-05830-1. Epub 2020 Apr 27. PMID: 32342481; PMCID: PMC7403244. | | | Learner Assessment | | | | | Systems Thinking | SBP1 | SBP2 | SBP3 |
| 5 | Orsino A, Ng S. Can adaptive expertise, reflective practice, and activity theory help achieve systems-based practice and collective competence?. Can Med Educ J. 2019;10(3):e55-e60. Published 2019 Jul 24. | | | | | | | Curriculum | | | | |
| 6 | Samala RV, Hoeksema LJ, Colbert CY. A Qualitative Study of Independent Home Visits by Hospice Fellows: Addressing Gaps in ACGME Milestones by Fostering Reflection and Self-Assessment. Am J Hosp Palliat Care. 2019 Oct;36(10):885-892. doi: 10.1177/1049909119836218. Epub 2019 Mar 13. PMID: 30866641. | | | Learner Assessment | | | | Curriculum | | | SBP2 | SBP3 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | Lloyd RB, Park YS, Tekian A, Marvin R. Understanding Assessment Systems for Clinical Competency Committee Decisions: Evidence from a Multisite Study of Psychiatry Residency Training Programs [published online ahead of print, 2019 Dec 23]. Acad Psychiatry. 2019;10.1007/s40596-019-01168-x. doi:10.1007/s40596-019-01168-x | Mapping | | | | | CCC | | | | | |
| 8 | Srikumaran D, Tian J, Ramulu P, et al. Ability of Ophthalmology Residents to 7Self-Assess Their Performance T8hrough Established Milestones. J Su9rg Educ. 2019;76(4):1076-1087. doi:1010.1016/j.jsurg.2018.12.004 | | Feedback | | | | | | | | | | |
| 9 | Lloyd 11RB, Park YS, Tekian A, Marvin R. Under12standing Assessment Systems for13 Clinical Competency Committee De14cisions: Evidence from a Multisite 15Study of Psychiatry Residency Training 16Programs [published online ahe17ad of print, 2019 Dec 23]. Acad Psychiatry. 2019; doi:10.1007/s40596-019-0201168-x | | | | | | CCC | | | | | | |
| 10 | Rutz M, Turner J, Pettit K, Palmer MM, Perkins A, Cooper DD. Factors that Contribute to Resident Teaching Effectiveness. Cureus. 2019;11(3):e4290. Published 2019 Mar 21. doi:10.7759/cureus.4290 | | | | Program Imrpovement | | | | | | | | |
| 11 | Blake GH, Kemmet RK, Jenkins J, Heidel RE, Wilson GA. Milestones as a Guide for Academic Career Development. Fam Med. 2019;51(9):760-765. doi:10.22454/FamMed.2019.109290 | | Feedback | Learner Assessment | | | | | | | | | |
| 12 | Hoffman CR, Green MS, Liu J, Iqbal U, Voralu K. Using operating room turnover time by anesthesia trainee level to assess improving systems-based practice milestones. BMC Med Educ. 2018;18(1):295. Published 2018 Dec 5. doi:10.1186/s12909-018-1409-6 | | | Learner Assessment | | | | | | | | | SBP3 |
| 13 | Gaeta T, Mahalingam G, Pyle M, Dam A, Visconti A. Using an alumni survey to target improvements in an emergency medicine training programme. Emerg Med J. 2018;35(3):189-191. doi:10.1136/emermed-2017-206692 | | | | Program Improvement | | | | | | | | |
| 14 | Perry M, Linn A, Munzer BW, et al. Programmatic Assessment in Emergency Medicine: Implementation of Best Practices. J Grad Med Educ. 2018;10(1):84-90. doi:10.4300/JGME-D-17-00094.1 | | Feedback | Learner Assessment | Program Improvement | | | | | | | | |
| 15 | Radhakrishnan NS, Lo MC, Bishnoi R, et al. A resident-driven mortality case review innovation to teach and drive system-based practice improvements in the United States. J Educ Eval Health Prof. 2018;15:31. doi:10.3352/jeehp.2018.15.31 | | | | | Systems Change | | Curriculum | | SBP1 | | | SBP3 |

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| 16 | Edgar L, Roberts S, Yaghmour NA, et al. Competency Crosswalk: A Multispecialty Review of the Accreditation Council for Graduate Medical Education Milestones Across Four Competency Domains. Acad Med. 2018;93(7):1035-1041. doi:10.1097/ACM.0000000000002059 | | | Learner Assessment | | | | | | | | |
| 17 | Plack MM, Goldman EF, Scott AR, et al. Systems Thinking and Systems-Based Practice Across the Health Professions: An Inquiry Into Definitions, Teaching Practices, and Assessment. Teach Learn Med. 2018;30(3):242-254. doi:10.1080/10401334.2017.1398654 | | | Learner Assessment | | | | Curriculum | Systems Thinking | | | |
| 18 | Ghaderi KF, Schmidt ST, Drolet BC. Coding and Billing in Surgical Education: A Systems-Based Practice Education Program. J Surg Educ. 2017;74(2):199-202. doi:10.1016/j.jsurg.2016.08.011 | | | | | | | Curriculum | | | | SBP3 |
| 19 | Williamson K, Moreira M, Quattromani E, Smith JL. Remediation Strategies for Systems-Based Practice and Practice-Based Learning and Improvement Milestones. J Grad Med Educ. 2017;9(3):290-293. doi:10.4300/JGME-D-16-00334.1 | | Feedback | Learner Assessment | | | | Curriculum | | | | |
| 20 | Grissom MO, Iroku-Malize T, Peila R, Perez M, Philippe N. Mapping Residency Global Health Experiences to the ACGME Family Medicine Milestones. Fam Med. 2017;49(7):553-557.. | Mapping | | | | | | | | | | |
| 21 | Guarner J, Hill CE, Amukele T. Creation and Evaluation of a Laboratory Administration Curriculum for Pathology Residents. Am J Clin Pathol. 2017;148(4):368-373. doi:10.1093/ajcp/aqx085 | | | | | | | Curriculum | | | | SBP3 |
| 22 | Leddy R, Lewis M, Ackerman S, et al. Practical Implications for an Effective Radiology Residency Quality Improvement Program for Milestone Assessment. Acad Radiol. 2017;24(1):95-104. doi:10.1016/j.acra.2016.08.018 | Mapping | | Learner Assesment | | | | Curriculum | | SBP1 | | |
| 23 | Nordhues HC, Bashir MU, Merry SP, Sawatsky AP. Graduate medical education competencies for international health electives: A qualitative study. Med Teach. 2017;39(11):1128-1137. doi:10.1080/0142159X.2017.1361518 | | | | | | | Curriculum | | | SBP2 | SBP3 |
| 24 | Prince LK, Little DJ, Schexneider KI, Yuan CM. Integrating Quality Improvement Education into the Nephrology Curricular Milestones Framework and the Clinical Learning Environment Review. Clin J Am Soc Nephrol. 2017;12(2):349-356. doi:10.2215/CJN.04740416 | | | Learner Assessment | | | | Curriculum | | SBP1 | | |
| 25 | Williamson K, Moreira M, Quattromani E, Smith JL. Remediation Strategies for Systems-Based Practice and Practice-Based Learning and Improvement Milestones. J Grad Med Educ. 2017 Jun;9(3):290- | | | Learner Assessment | | | | | | SBP1 | SBP2 | SBP3 |

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| | 293. doi: 10.4300/JGME-D-16-00334.1. PMID: 28638505; PMCID: PMC5476376. | | | | | | | | | | | |
| 26 | Prince LK, Little DJ, Schexneider KI, Yuan CM. Integrating Quality Improvement Education into the Nephrology Curricular Milestones Framework and the Clinical Learning Environment Review. Clin J Am Soc Nephrol. 2017 Feb 7;12(2):349-356. doi: 10.2215/CJN.04740416. Epub 2016 Nov 10. PMID: 28174318; PMCID: PMC5293331. | | | Learner Assessment | | | | Curriculum | | SBP1 | | SBP3 |
| 27 | D'Eon M. Systems thinking and structural competence in and for medical education. Can Med Educ J. 2017 Feb 24;8(1):e1-e5. PMID: 28344711; PMCID: PMC5344060. | | | | | | | | Systems Thinking | | | |
| 28 | Gee DW, Phitayakorn R, Khatri A, Butler K, Mullen JT, Petrusa ER. A Pilot Study to Gauge Effectiveness of Standardized Patient Scenarios in Assessing General Surgery Milestones. J Surg Educ. 2016;73(6):e1-e8. doi:10.1016/j.jsurg.2016.08.012 | | | Learner Assessment | | | | | | | | |
| 29 | Prober AS, Mehan WA Jr, Bedi HS. Teaching the Healthcare Economics Milestones to Radiology Residents: Our Pilot Curriculum Experience. Acad Radiol. 2016;23(7):885-888. doi:10.1016/j.acra.2016.02.014 | | | | | | | Curriculum | | | | SBP3 |
| 30 | Gillen JR, Ramirez AG, Farineau DW, et al. Using Interdisciplinary Workgroups to Educate Surgery Residents in Systems-Based Practice. J Surg Educ. 2016;73(6):1052-1059. doi:10.1016/j.jsurg.2016.05.017 | | | | | | | Curriculum | | SBP1 | | SBP3 |
| 31 | Gee DW, Phitayakorn R, Khatri A, Butler K, Mullen JT, Petrusa ER. A Pilot Study to Gauge Effectiveness of Standardized Patient Scenarios in Assessing General Surgery Milestones. J Surg Educ. 2016 Nov-Dec;73(6):e1-e8. doi: 10.1016/j.jsurg.2016.08.012. PMID: 27886969. | | | Learner Assessment | | | | | | SBP1 | | |
| 32 | Yazdani S, Hosseini F, Ahmady S. System based practice: a concept analysis. J Adv Med Educ Prof. 2016 Apr;4(2):45-53. PMID: 27104198; PMCID: PMC4827756. | | | | | | | | | SBP1 | SBP2 | SBP3 |
| 33 | Mamtani M, Scott KR, DeRoos FJ, Conlon LW. Assessing EM Patient Safety and Quality Improvement Milestones Using a Novel Debate Format. West J Emerg Med. 2015;16(6):943-946. doi:10.5811/westjem.2015.9.27269 | | | Learner Assessment | | | CCC | Curriculum | | SBP1 | | |
| 34 | Gardner AK, Scott DJ, Choti MA, Mansour JC. Developing a comprehensive resident education evaluation system in the era of milestone assessment. J Surg Educ. 2015;72(4):618-624. doi:10.1016/j.jsurg.2014.12.007 | Mapping | | Learner Assessment | | | | | | | | |
| 35 | Yuan CM, Prince LK, Oliver JD 3rd, Abbott KC, Nee R. Implementation of nephrology subspecialty curricular milestones. Am J Kidney Dis. 2015;66(1):15-22. doi:10.1053/j.ajkd.2015.01.020 | Mapping | | | | | CCC | | | | | |

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| 36 | Sakai T, Emerick TD, Patel RM. A retrospective review of required projects in systems-based practice in a single anesthesiology residency: a 10-year experience. J Clin Anesth. 2015;27(6):451-456. doi:10.1016/j.jclinane.2015.06.009 | | | | | System Change | | Curriculum | | | | SBP3 |
| 37 | Harrington DT, Miner TJ, Ng T, Charpentier KP, Richardson P, Cioffi WG. What Shape is Your Resident in? Using a Radar Plot to Guide a Milestone Clinical Competency Discussion. J Surg Educ. 2015;72(6):e294-e298. doi:10.1016/j.jsurg.2015.04.005 | | Feedback | | | | | | | | | |
| 38 | Chan EY, Deziel DJ, Orkin BA, Wool NL. Systems-based practice: learning the concepts using a teamwork competition model. Am J Surg. 2015;209(1):40-44. doi:10.1016/j.amjsurg.2014.08.034 | | | | | | | Curriculum | | | | |
| 39 | Pulcrano M, Chahine AA, Saratsis A, Divine-Cadavid J, Narra V, Evans SR. Putting residents in the office: an effective method to teach the systems-based practice competency. J Surg Educ. 2015;72(2):286-290. doi:10.1016/j.jsurg.2014.09.001 | | | | | | | Curriculum | | | | SBP3 |
| 40 | Green M, Amad M, Woodland M. Innovative health systems projects. Clin Teach. 2015;12(1):17-21. doi:10.1111/tct.12218 | | | | | Systems Change | | Curriculum | | SBP1 | | SBP3 |
| 41 | Mamtani M, Scott KR, DeRoos FJ, Conlon LW. Assessing EM Patient Safety and Quality Improvement Milestones Using a Novel Debate Format. West J Emerg Med. 2015 Nov;16(6):943-6. doi: 10.5811/westjem.2015.9.27269. Epub 2015 Nov 12. PMID: 26594296; PMCID: PMC4651600. | | | Learner Assessment | | | | Curriculum | | SBP1 | SBP2 | SBP3 |
| 42 | Choudhery S, Richter M, Anene A, et al. Practice quality improvement during residency: where do we stand and where can we improve?. Acad Radiol. 2014;21(7):851-858. doi:10.1016/j.acra.2013.11.021 | | | | Program Improvement | | | | | | | |
| 43 | Naritoku WY, Alexander CB, Bennett BD, et al. The pathology milestones and the next accreditation system. Arch Pathol Lab Med. 2014;138(3):307-315. doi:10.5858/arpa.2013-0260-SA | | | Learner Assessment | | | | | | | | |
| 44 | Martinez J, Phillips E, Harris C. Where do we go from here? Moving from systems-based practice process measures to true competency via developmental milestones. Med Educ Online. 2014 Jun 27;19:24441. doi: 10.3402/meo.v19.24441. PMID: 24974832; PMCID: PMC4074604. | | | | | | | Curriculum | | | | |
| 45 | Aagaard E, Kane GC, Conforti L, et al. Early feedback on the use of the internal medicine reporting milestones in assessment of resident performance. J Grad Med Educ. 2013;5(3):433-438. doi:10.4300/JGME-D-13-00001.1 | | | Learner Assessment | | | | | | | | |
| 46 | Wilper AP, Smith CS, Weppner W. Instituting systems-based practice and practice-based | | | | | | | Curriculum | | SBP1 | SBP2 | SBP3 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | learning and improvement: a curriculum of inquiry. Med Educ Online. 2013;18:21612. Published 2013 Sep 16. doi:10.3402/meo.v18i0.21612 | | | | | | | | | | | |
| 47 | LeMelle S, Arbuckle MR, Ranz JM. Integrating systems-based practice, community psychiatry, and recovery into residency training. Acad Psychiatry. 2013;37(1):35-37. doi:10.1176/appi.ap.12030057 | | | | | | | Curriculum | | | SBP2 | SBP3 |
| 48 | Roberts SM, Jarvis-Selinger S, Pratt DD, et al. Reshaping orthopaedic resident education in systems-based practice [published correction appears in J Bone Joint Surg Am. 2012 Sep 19;94(18):e141. Polinijo, Andrea [corrected to Polonijo, Andrea]]. J Bone Joint Surg Am. 2012;94(15):e1131-e1137. doi:10.2106/JBJS.K.00638 | | | Learner Assessment | | | | Curriculum | | | | |
| 49 | Chen EH, O'Sullivan PS, Pfennig CL, Leone K, Kessler CS. Assessing systems-based practice. Acad Emerg Med. 2012;19(12):1366-1371. doi:10.1111/acem.12024 | | | Learner Assessment | | | | | | | | |
| 50 | Hingle ST, Robinson S, Colliver JA, Rosher RB, McCann-Stone N. Systems-based practice assessed with a performance-based examination simulated and scored by standardized participants in the health care system: feasibility and psychometric properties. Teach Learn Med. 2011;23(2):148-154. doi:10.1080/10401334.2011.561751 | | | Learner Assessment | | | | | | SBP1 | SBP2 | SBP3 |
| 51 | Wang EE, Dyne PL, Du H. Systems-based practice: Summary of the 2010 Council of Emergency Medicine Residency Directors Academic Assembly Consensus Workgroup--teaching and evaluating the difficult-to-teach competencies. Acad Emerg Med. 2011;18 Suppl 2:S110-S120. doi:10.1111/j.1553-2712.2011.01160.x | | | Learner Assessment | | | | Curriculum | | | | |
| 52 | Colbert CY, Ogden PE, Ownby AR, Bowe C. Systems-based practice in graduate medical education: systems thinking as the missing foundational construct. Teach Learn Med. 2011;23(2):179-185. doi:10.1080/10401334.2011.561758 | | | | | | | | Systems Thinking | | | |
| 53 | Sultana CJ, Baxter JK. A resident conference for systems-based practice and practice-based learning. Obstet Gynecol. 2011;117(2 Pt 1):377-382. doi:10.1097/AOG.0b013e318203e582 | | | | | | | Curriculum | | SBP1 | SBP2 | SBP3 |
| 54 | Didwania A, McGaghie WC, Cohen E, Wayne DB. Internal medicine residency graduates' perceptions of the systems-based practice and practice-based learning and improvement competencies. Teach Learn Med. 2010;22(1):33-36. doi:10.1080/10401330903446305 | | | | Program Improvement | | | | | | | |

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| 55 | Mitchell JD, Parhar P, Narayana A. Teaching and assessing systems-based practice: a pilot course in health care policy, finance, and law for radiation oncology residents. J Grad Med Educ. 2010;2(3):384-388. doi:10.4300/JGME-D-09-00092.1 | | | Learner Assessment | | | | Curriculum | | | | SBP3 |
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