Supplemental Guide:
Allergy and Immunology

ACGME

August 2019

Milestones Supplemental Guide

This document provides additional guidance and examples for the Allergy and Immunology Milestones. This is not designed to indicate any specific requirements for each level, but to provide insight into the thinking of the Milestone Work Group.

Included in this document is the intent of each Milestone and examples of what a Clinical Competency Committee (CCC) might expect to be observed/assessed at each level. Also included are suggested assessment models and tools for each subcompetency, references, and other useful information.

Review this guide with the CCC and faculty members. As the program develops a shared mental model of the Milestones, consider creating an individualized guide (Supplemental Guide Template available) with institution/program-specific examples, assessment tools used by the program, and curricular components.

Patient Care 1: Medical Interview and Physical Examination of Adult Allergy and Immunology Patients **Overall Intent:** To conduct comprehensive and detailed medical interviews for patients over 18 years old who present with suspected allergic and/or immunologic disorders; to perform a physical exam appropriate to age and to the specialty	
Milestones	**Examples**
Level 1 *Obtains a history and physical exam*	● Obtains a history but misses relevant items, such as pertinent aspects of environmental, occupational, or family history ● Misses critical elements in physical examination, such as skin and nail findings, nasal crease, or organomegaly ● Gives unfocused and/or poorly organized presentations
Level 2 *Obtains a complete history and physical exam, extracting relevant elements for presentation of a patient with common conditions*	● Elicits a complete history, including all elements, such as pertinent aspects of environmental, occupational, and family history ● Documents pertinent details of the home environment (e.g., a 30-year-old house with original wall-to-wall carpeting in bedroom, and the presence of a cat and a dog, in a patient with chronic rhinosinusitis and poorly controlled asthma) ● Identifies critical elements of common allergic and immunologic disorders in physical examination, such as dermatographism, nasal crease, and lymphadenopathy/hepatosplenomegaly ● Focused presentation of findings relevant to allergic and immunologic diseases, including a systematic and organized approach (e.g., atopic dermatitis, food allergy, allergic rhinitis, asthma, infections) and targeted physical findings (e.g., skin and nasal findings, nasal crease)
Level 3 *Obtains a complete history and physical exam, extracting relevant elements for presentation of a patient with complex conditions*	● Identifies more difficult-to-elicit elements of the history, such as a detailed infection history in a patient with suspected immunodeficiency (e.g., recurrent cold sores, thrush, shingles), complex social history, and detailed family history ● Performs a thorough review of previous medical records provided by the referring provider, including laboratory and radiologic testing ● Identifies previous responses to treatments in complex patients, such as refractory atopic dermatitis and asthma ● Performs a detailed physical examination, including a thorough examination of lymphoid organs, identifying stigmata of complex allergic and immunologic diseases, such as urticaria pigmentosa, telangiectasias, absence of tonsils, etc.
Level 4 *Efficiently obtains and communicates a focused history and physical exam for all patients*	● Without prompting, obtains a medical release for outside records from a patient and follows up to identify important pertinent details unavailable from documentation provided by the referring physician ● Obtains a thorough history in a patient with a suspected immunodeficiency, with attention to comorbidities, including autoimmunity and lymphoproliferative disorders ● Elicits a history of a recent tick bite in a patient presenting with possible anaphylaxis

	● Identifies a truncal rash as urticaria pigmentosa in a patient presenting with possible anaphylaxis ● Carefully characterizes the associated features in a patient presenting with recurrent angioedema, such as possible triggers (including medications, infection or trauma), the duration of episodes, occurrence of any associated symptoms, such as pruritus or joint pain, physical features, such as rashes, and efficacy or lack of efficacy of medications, such as antihistamines or corticosteroids
Level 5 *Efficiently obtains and communicates a focused history and exam, including sensitive, complicated, and detailed information that may not be volunteered by the patient*	● Explores complicated family history to develop a pedigree for a suspected genetic disease ● Explores concerns of non-compliance not directly offered by patient, including identifying barriers to consistently complying with treatment recommendations
Assessment Models or Tools	● Direct observation ● Multisource feedback ● Medical record (chart) audit ● Objective structured clinical examination ● Simulation
Curriculum Mapping	●
Notes or Resources	● American Academy of Allergy, Asthma, and Immunology (AAAAI)/American Academy of Allergy, Asthma, and Immunology (ACAAI) Joint Task Force on Practice Parameters. AAAAI and ACAAI Practice Parameters. https://www.allergyparameters.org/. ● Core clinical allergy/immunology textbooks, such as: • Adkinson N Jr, Bochner B, Bruks A, et al., *Middleton's Allergy: Principles and Practice.* 8th ed. Philadelphia, PA: Saunders; 2013. • Grammer L, Greenberger P. *Patterson's Allergic Diseases*. 8th ed. Philadelphia, PA: Wolters Kluwer; 2018. • Rich R, Fleisher T, Shearer W, Schroeder H, Frew A, Weyand C. *Clinical Immunology: Principles and Practice*. 5th ed. Philadelphia, PA: Elsevier; 2018. • Sullivan K, Stiehm ER. *Stiehm's Immune Deficiencies*. 1st ed. Academic Press; 2014.

Patient Care 2: Medical Interview and Physical Examination of Pediatric Allergy and Immunology Patients **Overall Intent:** To conduct comprehensive and detailed medical interviews for patients 0-18 years old who present with suspected allergic and/or immunologic disorders, including age-appropriate interactions with both child and parent(s); to perform a physical exam appropriate for the specialty and age of the patient that puts the child at ease	
Milestones	**Examples**
Level 1 *Obtains a complete history and physical exam*	● Obtains a history but misses relevant items, such as birth history, infection history, and pertinent aspects of family history ● Misses critical elements in physical examination, such as skin findings, dentition, short stature, failure to thrive ● Interacts with the child, but not in an age-appropriate manner ● Presentations not focused on relevant issues and/or poorly organized
Level 2 *Obtains a complete history and physical exam, extracting relevant elements for presentation of a patient with common conditions*	● Elicits complete history including all elements from both child and parent as appropriate ● Reviews growth charts and developmental history ● Focused presentation of findings relevant to allergic and immunologic diseases ● Identifies common stigmata of allergic and immunologic disease, such as nasal crease, allergic shiners
Level 3 *Obtains a complete history and physical exam, extracting relevant elements for presentation of a patient with complex conditions*	● Identifies more difficult to elicit elements of the history, such as anhidrosis, detailed infection history, detailed family history interacting comfortably with the child ● Requests and reviews complete immunization record ● Identifies previous responses to treatments in complex patients, such as refractory atopic dermatitis and asthma ● Performs satisfactorily as a camp physician at a summer asthma camp ● Performs a careful and thorough review of previous medical records, laboratory, and radiologic testing ● Identifies stigmata of allergic and immunologic diseases, such as urticaria pigmentosa
Level 4 *Efficiently obtains and communicates a focused history and physical exam for all patients*	● Without prompting, obtains a medical release for outside records from a patient and follows up to identify important pertinent details unavailable from documentation provided by the referring physician ● Elicits a history of sleep disturbance in a patient with sever atopic dermatitis ● In a patient with recently identified X-linked Lymphoproliferative Disease (SH2D1A deficiency), carefully explores the family history and discovers several male maternal cousins diagnosed in childhood with lymphoma ● Elicits a history of hypohidrosis and notes conical teeth in a male child presenting with a history recurrent infections ● Obtains a history of extraction of all the primary teeth in an older child with recurrent pneumonias and recurrent skin infections

Level 5 *Efficiently obtains and communicates a focused history and exam, including sensitive, complicated, and detailed information that may not be volunteered by the patient*	● Explores complicated family history to develop a pedigree for a suspected genetic disease, including immunodeficiency ● Identifies food allergy related anxiety and risks for bullying at school in a child with food allergies that is not directly reported by the parent or child ● Sensitively explores items of consanguinity or alienation of family members ● Explores concerns of non-compliance not directly offered by parents ● Discusses vaccine refusal and beliefs
Assessment Models or Tools	● Direct observation ● Medical record (chart) audit ● Multisource feedback ● Objective structured clinical examination ● Simulation
Curriculum Mapping	●
Notes or Resources	● AAAAI/ACAAI Joint Task Force on Practice Parameters. AAAAI and ACAAI Practice Parameters. https://www.allergyparameters.org/. ● Core clinical allergy/immunology textbooks, such as: • Adkinson N Jr, Bochner B, Bruks A, et al., *Middleton's Allergy: Principles and Practice.* 8th ed. Philadelphia, PA: Saunders; 2013. • Grammer L, Greenberger P. *Patterson's Allergic Diseases*. 8th ed. Philadelphia, PA: Wolters Kluwer; 2018. • Leung DYM, Szefler SJ, Bonilla FA, Akdis CA, Sampson, H. *Pediatric Allergy: Principles and Practice*. 3rd ed. Philadelphia, PA: Elsevier; 2015. • Rich R, Fleisher T, Shearer W, Schroeder H, Frew A, Weyand C. *Clinical Immunology: Principles and Practice*. 5th ed. Philadelphia, PA: Elsevier; 2018. • Sullivan K, Stiehm ER. *Stiehm's Immune Deficiencies*. 1st ed. Academic Press; 2014.

Patient Care 3: Diagnostic Tests and Procedures for Allergy and Immunology Patients **Overall Intent:** To select, perform, and interpret diagnostic tests or procedures	
Milestones	**Examples**
Level 1 *Demonstrates basic understanding of commonly used allergy and immunology diagnostic tests and procedures*	● Understands clinical scenarios when skin testing or spirometry is indicated
Interprets test results, with supervision	● Interprets skin testing or spirometry, with supervision
Level 2 *Selects tests for patients with common clinical conditions and according to evidence-based guidelines*	● Decides when to do venom testing or when to do lab work-up for chronic idiopathic urticaria (CIU)
Independently interprets common test results	● Interprets venom testing results
With supervision, performs common clinical diagnostic procedures (e.g., skin testing)	● Performs skin testing or spirometry, with supervision
Level 3 *Selects tests for patients with complex conditions, including selected use of specialized testing and an understanding of limitations of the test*	● Appropriately selects component testing for food allergy ● Understands that an increased total Immunoglobulin E (IgE) may provide falsely elevated results for ImmunoCAP
Interprets complex test results, with supervision	● Interprets B cell maturation panel in the work-up of common variable immunodeficiency (CVID), with supervision
Independently performs common clinical diagnostic procedures, and with supervision performs specialized procedures (e.g., challenges)	● Orders pneumococcal immunization and interprets the patient's subsequent antibody response in a work-up of a patient with recurrent respiratory infections ● Performs oral challenge for food or drug allergy, with supervision
Level 4 *Develops individualized cost-effective testing strategies to evaluate patients with complex conditions*	● Stepwise work-up for suspected immune deficiency, first ordering quantitative and qualitative immunoglobulins, and a basic flow cytometry panel before considering advanced flow cytometry studies
Independently interprets specialized and complex results in the context of the individual patient	● Interpretation of flow cytometry panels in immune deficient patient

Independently performs specialized clinical diagnostic procedures	● Identifies when a patient may benefit from genomic evaluation ● Performs oral challenge for suspected food or drug allergy
Level 5 *Participates in the writing or reviewing of local or national diagnostic guidelines or policies* *Identifies, critically evaluates and selectively utilizes emerging and investigational tests or procedures*	● Creates a local guideline for penicillin allergy testing in hospital ● Develops an algorithm for emergency department physicians for evaluation of patients presenting with angioedema
Assessment Models or Tools	● Direct observation ● Medical record (chart) audit ● Multisource feedback ● Objective structured clinical examination ● Simulation
Curriculum Mapping	●
Notes or Resources	● AAAAI/ACAAI Joint Task Force on Practice Parameters. AAAAI and ACAAI Practice Parameters. https://www.allergyparameters.org/ ● Core clinical allergy/immunology textbooks, such as: • Adkinson N Jr, Bochner B, Bruks A, et al., *Middleton's Allergy: Principles and Practice*. 8th ed. Philadelphia, PA: Saunders; 2013. • Grammer L, Greenberger P. *Patterson's Allergic Diseases*. 8th ed. Philadelphia, PA: Wolters Kluwer; 2018. • Leung DYM, Szefler SJ, Bonilla FA, Akdis CA, Sampson, H. *Pediatric Allergy: Principles and Practice*. 3rd ed. Philadelphia, PA: Elsevier; 2015. • Rich R, Fleisher T, Shearer W, Schroeder H, Frew A, Weyand C. *Clinical Immunology: Principles and Practice*. 5th ed. Philadelphia, PA: Elsevier; 2018. • Sullivan K, Stiehm ER. *Stiehm's Immune Deficiencies*. 1st ed. Academic Press; 2014. ● Learning Connection of the American College of Allergy, Asthma, & Immunology. ACAAI Review for the Allergy and Immunology Boards. https://education.acaai.org/content/acaai-review-allergy-immunology-boards-third-edition.

Patient Care 4: Management Plan for Allergy and Immunology Patients **Overall Intent:** To design appropriate management plans for allergic and immunologic disorders that address the indication, risks, benefits, and cost of therapy	
Milestones	**Examples**
Level 1 *Recognizes basic treatments for common allergic and immunologic disorders* *Identifies patient outcomes and adverse events associated with specific treatments*	● Recognizes the value of controller therapy in asthma and identifies improvement in asthma control; recognizes risk of oropharyngeal thrush with use of inhaled steroids ● Identifies when a patient has allergic rhinitis; recognizes sedation risk with first-generation antihistamine use
Level 2 *Selects and implements treatment from existing evidence with substantial supervision* *Formulates a plan for monitoring patient outcomes and adverse events*	● Uses guidelines for management of CIU or asthma after prompting by supervisor ● Creates an asthma action plan
Level 3 *Selects and implements cost-effective treatment from existing evidence with minimal supervision* *Monitors patient outcomes and adverse events; adjusts treatment with supervision*	● Uses guidelines for management of CIU or asthma with minimal supervision ● With supervision, recognizes oropharyngeal thrush in a patient with asthma and advises use of spacer and recommends rinsing ● Creates an anaphylaxis action plan for a patient with food allergy
Level 4 *Selects and implements cost-effective treatment from existing evidence independently* *Monitors patient outcomes and adverse events; adjusts treatment independently*	● Uses guidelines for management of CIU or asthma independently ● Reliably checks dosing for Immunoglobulin G (IgG) replacement during follow-up visits for children with primary immunodeficiency on intravenous immunoglobulin (IVIG) or subcutaneous immunoglobulin (SCIG) therapy ● Independently recognizes oropharyngeal thrush in a patient with asthma and advises use of spacer, as well as recommends rinsing
Level 5 *Participates in writing or reviewing local or national practice guidelines or policies* *Identifies and formally reports previously unrecognized patient outcomes or adverse events*	● Writes local policy for evaluation of patients presenting to the emergency department with angioedema ● Identifies and reports previously unrecognized vaccine adverse event to Vaccine Adverse Event Reporting System (VAERS); writes case report on unusual medication side effect
Assessment Models or Tools	● Direct observation ● Medical record (chart) audit ● Multisource feedback ● Objective structured clinical examination

	● Simulation
Curriculum Mapping	●
Notes or Resources	● AAAAI/ACAAI Joint Task Force on Practice Parameters. AAAAI and ACAAI Practice Parameters. https://www.allergyparameters.org/ ● Core clinical allergy/immunology textbooks, such as: • Adkinson N Jr, Bochner B, Bruks A, et al., *Middleton's Allergy: Principles and Practice.* 8th ed. Philadelphia, PA: Saunders; 2013. • Grammer L, Greenberger P. *Patterson's Allergic Diseases*. 8th ed. Philadelphia, PA: Wolters Kluwer; 2018. • Leung DYM, Szefler SJ, Bonilla FA, Akdis CA, Sampson, H. *Pediatric Allergy: Principles and Practice*. 3rd ed. Philadelphia, PA: Elsevier; 2015. • Rich R, Fleisher T, Shearer W, Schroeder H, Frew A, Weyand C. *Clinical Immunology: Principles and Practice*. 5th ed. Philadelphia, PA: Elsevier; 2018. • Sullivan K, Stiehm ER. *Stiehm's Immune Deficiencies*. 1st ed. Academic Press; 2014.

Medical Knowledge 1: Basic Science of Allergy and Immunology **Overall Intent:** To demonstrate the progression of basic science knowledge from immune system components to complex immunologic and allergic disease pathophysiology, as well as the basis for diagnosis, treatment, and research	
Milestones	**Examples**
Level 1 *Demonstrates basic knowledge of the cellular and humoral components of the immune system*	● Describes and differentiates features of innate and adaptive immunity ● Describes basic lymphocyte subsets and immunoglobulin classes and subclasses ● Describes the structure and function of primary and secondary lymphoid organs
Level 2 *Demonstrates advanced knowledge of the cellular and humoral components of the immune system and basic knowledge of normal physiology*	● Describes the major components of humaral and cellular innate immunity ● Describes the development of B and T cells ● Describes the T and B cell receptor signaling cascade
Level 3 *Applies the knowledge of basic immunology to understanding the pathophysiology of common immunologic and allergic diseases*	● Describes the role of filaggrin mutations and skin barrier compromise in the development and progression of atopic dermatitis and systemic allergic diseases, such a peanut allergy
Level 4 *Applies the knowledge of basic immunology to understanding the pathophysiology of complex immunologic and allergic diseases and the basis for diagnosis, treatment, and research*	● Describes the molecular defect resulting in the arrest of B cell development in X-linked agammaglobulinemia ● Describes the detailed immunologic basis for a vaccine response and use of diagnostic vaccination in immunodeficiency evaluation
Level 5 *Serves as a content expert, invited lecturer or subject matter expert*	● Is invited to present basic science research at a regional or national meeting
Assessment Models or Tools	● Board review participation ● In-training exam ● Journal club ● Program level exams/quizzes ● Staffing cases with attending
Curriculum Mapping	●
Notes or Resources	● Clinical Immunology Society (CIS) courses https://clinimmsoc.org/CIS.htm ● American Academy of Allergy Asthma and Immunology. Courses. https://education.aaaai.org/courses. ● American College of Allergy Asthma and Immunology. Courses. https://education.acaai.org/courses. ● American Academy of Allergy Asthma and Immunology. 2019 In-Training Exam for Fellows Timeline. https://www.aaaai.org/professional-education-and-training/fellows-in-training/in-training-exam-for-fellows-timeline. ● Core basic immunology and clinical allergy/immunology textbooks, such as:

	• Abbas AK, Lichtman AH, Pillai S. *Cellular and Molecular Immunology.* 9th ed. Philadelphia, PA: Elsevier; 2017. • Murphy K, Weaver C. *Janeway's Immunobiology*. 9th ed. New York, NY: Garland Science; 2016. • Geha RS, Notarangelo L. *Case Studies in Immunology*. 7th ed. New York, NY: Garland Science; 2016. • Delves PJ, Martin SJ, Burton DR, Roitt IM. *Riott's Essential Immunology*. 13th ed. West Sussex, UK: Wiley Blackwell; 2017. • Adkinson N Jr, Bochner B, Bruks A, et al., *Middleton's Allergy: Principles and Practice.* 8th ed. Philadelphia, PA: Saunders; 2013. • Rich R, Fleisher T, Shearer W, Schroeder H, Frew A, Weyand C. *Clinical Immunology: Principles and Practice*. 5th ed. Philadelphia, PA: Elsevier; 2018. • Sullivan K, Stiehm ER. *Stiehm's Immune Deficiencies*. 1st ed. Academic Press; 2014. ● Learning Connection of the American College of Allergy, Asthma, and Immunology. ACAAI Review for the Allergy and Immunology Boards. https://education.acaai.org/content/acaai-review-allergy-immunology-boards-third-edition.

Medical Knowledge 2: Clinical Science of Allergy and Immunology **Overall Intent:** To understand, apply, and teach others established and evolving biomedical, clinical, and psychosocial sciences and epidemiology relevant to patient care; to understand complex disease relationships and mechanisms.	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of clinical presentations for common immunologic and allergic conditions*	● Recognizes that nocturnal cough is a common presenting symptom of pediatric asthma
Level 2 *Demonstrates sufficient knowledge and applies it to the diagnosis and treatment of patients with common immunologic and allergic conditions*	● Recognizes that a diagnosis of chronic urticaria requires signs and symptoms for six weeks ● Describes evidence-based alternatives when antihistamine treatment is insufficient
Level 3 *Demonstrates sufficient knowledge and applies it to the diagnosis and treatment of patients with complex immunologic and allergic conditions*	● Describes the clinical presentation, diagnostic tests, and therapeutic interventions for a patient with common variable immune deficiency developing pulmonary granulomatous complications
Level 4 *Independently synthesizes the literature and patient care experiences to diagnose and treat patients with newly identified or emerging immunologic and allergic diseases*	● Uses the literature to expand the differential diagnosis to include DOCK8 deficiency or a newly discovered genetic basis for immune deficiency disorder in a patient with elevated Immunoglobulin E (IgE) and recurrent infections
Level 5 *Serves as a content expert, invited lecturer or subject matter expert*	● Is invited to present on the work-up of eosinophilia at a regional or national meeting
Assessment Models or Tools	● Assessment of case conference presentation ● Board review participation ● In-training exam ● Journal club presentations and participation ● Objective structured clinical examination and standardized patients ● Staffing cases
Curriculum Mapping	●
Notes or Resources	● AAAAI/ACAAI Joint Task Force on Practice Parameters. AAAAI and ACAAI Practice Parameters. https://www.allergyparameters.org/. ● Nowak-Węgrzyn A, Chehade M, Groetch ME, et al. International consensus guides for the diagnosis and management of food protein-induced entrocolities syndrome: Execuive summary - Workgroup Report of the Adverse Reactions to Foods Committee, American Academy of Allergy, Asthma & Immunology. *Journal of Allergy and Clinical Immunology*. 2017;139(4):1111-1126. ● Core clinical allergy/immunology textbooks, such as:

	• Adkinson N Jr, Bochner B, Bruks A, et al., *Middleton's Allergy: Principles and Practice.* 10th ed. Philadelphia, PA: Saunders Publications; 2013. • Grammer L, Greenberger P. *Patterson's Allergic Diseases*. 8th ed. Philadelphia, PA: Wolters Kluwer Publishing; 2018. • Leung DYM, Szefler SJ, Bonilla FA, Akdis CA, Sampson, H. *Pediatric Allergy: Principles and Practice*. 3rd ed. Philadelphia, PA: Elsevier Publishing; 2015. • Rich R, Fleisher T, Shearer W, Schroeder H, Frew A, Weyand C. *Clinical Immunology: Principles and Practice*. 5th ed. Philadelphia, PA: Elsevier Publishing; 2018. • Sullivan K, Stiehm ER. *Stiehm's Immune Deficiencies*. 1st ed. Academic Press; 2014. ● Learning Connection of the American College of Allergy, Asthma, & Immunology. ACAAI Review for the Allergy & Immunology Boards. https://education.acaai.org/content/acaai-review-allergy-immunology-boards-third-edition.

Medical Knowledge 3: Research and Scholarly Activity **Overall Intent:** To understand and participate in research and scholarly activities including laboratory-based, epidemiologic study, clinical research, or continuous quality improvement (QI)	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of the principles of Responsible Conduct of Research and study design*	● Completes CITI module on Responsible Conduct of Research
Level 2 *Develops a research hypothesis or scholarly activity and identifies the resources necessary, working with appropriate supervision*	● With attending support, hypothesizes that egg components will predict the outcome of oral food challenges to baked egg ● Consults with local quality officer to develop the goal of improving influenza vaccination rates among asthmatics
Level 3 *Designs and conducts a research study or scholarly activity with appropriate supervision*	● Designs a retrospective chart review of egg component specific Immunoglobulin E (IgE) levels correlated to oral food challenge outcomes ● With assistance, implements an electronic health record (EHR) pop-up window recommending appropriate influenza vaccination for asthmatics
Level 4 *Analyzes and reports the results of a research study or scholarly activity*	● Analyzes the data and presents or publishes the findings that egg components do not predict the outcomes of oral food challenges to baked egg ● Analyzes influenza vaccination rates among asthmatics before and after the implementation of the EHR pop-up window, and presents the results to the hospital QI committee
Level 5 *Independently designs and leads a complex research study or scholarly activity*	● Organizes a mentorship committee, develops a prospective study protocol, and submits an Institutional Review Board application to evaluate multiple possible predictors for the outcomes of oral food challenges to baked egg ● Fully overhauls influenza immunization modules in EHR throughout the hospital system, using multiple Plan, Do, Study, Act (PDSA) cycles
Assessment Models or Tools	● Course completion certificate ● Participation in journal clubs ● Direct observation ● Research mentorship ● Presentation/manuscript evaluations
Curriculum Mapping	●
Notes or Resources	● Institution-specific courses on research ethics, biostatistics and clinical and laboratory research ● National Institutes of Health. Introduction to the Principles and Practice of Clinical Research (IPPCR). https://ocr.od.nih.gov/courses/ippcr.html.

	● National Institutes of Health. Responsible Conduct of Research Training. https://oir.nih.gov/sourcebook/ethical-conduct/responsible-conduct-research-training. 2016. ● Institute for Healthcare Improvement. Open School. http://www.ihi.org/education/ihiopenschool/Pages/default.aspx. ● CITI Program. Responsible Conduct of Research (RCR). https://about.citiprogram.org/en/series/responsible-conduct-of-research-rcr/.

Systems-Based Practice 1: Patient Safety and Quality Improvement (QI) **Overall Intent:** To demonstrate competence in the analysis and management of patient safety events, including relevant communication with patients, families, and health care professionals; and ability to conduct a QI project	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of common patient safety events*	● Acknowledges risks associated with allergen immunotherapy injections
Demonstrates knowledge of how to report patient safety events	● Identifies the safety event reporting mechanism for their institution
Demonstrates knowledge of basic quality improvement methodologies and metrics	● Describes the components of a PDSA cycle
Level 2 *Identifies system factors that lead to patient safety events*	● Identifies inadequate allergen immunotherapy vial labeling practices as a system risk factor contributing to injection reactions
Reports patient safety events through institutional reporting systems (actual or simulated)	● Enters a safety event report after discovering that the wrong dose of influenza vaccine was administered to a pediatric patient
Demonstrates knowledge of and participates in local quality improvement initiatives	● Describes a current QI project to improve the accuracy of medication administration in the clinic
Level 3 *Participates in analysis of patient safety events (simulated or actual)*	● Participates in a simulated root cause analysis related to anaphylaxis due to the incorrect immunotherapy injection being given to a patient
Participates in disclosure of patient safety events to patients and families (simulated or actual)	● In collaboration with the attending, discloses the vaccination error to the patient's parent(s)
Demonstrates the ability to identify and develop a quality improvement project or advance an existing project	● Recognizes a need for better anaphylaxis management among staff, and creates a QI project including simulation exercises to achieve this
Level 4 *Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)*	● Performs a chart review of injection reactions
Discloses patient safety events to patients and families (simulated or actual)	● Independently discloses the vaccination error to the patient's parent(s)

Demonstrates the ability to implement or assess quality improvement initiatives	● Shares outcomes of a full PDSA cycle related to improving anaphylaxis management with mentor
Level 5 *Actively engages teams and processes to modify systems to prevent patient safety events* *Role models or mentors others in the disclosure of patient safety events* *Independently creates, implements, and assesses quality improvement initiatives*	● Leads an initiative to improve allergen immunotherapy administration practices ● Coaches a resident on disclosure of a safety event related to a vaccination error ● Completes and shares outcomes of a full PDSA cycle related to improving anaphylaxis management at grand rounds
Assessment Models or Tools	● Direct observation ● E-module multiple choice tests ● Medical record (chart) audit ● Multisource feedback ● Portfolio ● Simulation
Curriculum Mapping	●
Notes or Resources	● Institute for Healthcare Improvement. http://www.ihi.org/Pages/default.aspx. ● Chong M, Pasqua D, Kutzin J, Davis-Lorton M, Fonacier L, Aquino M. Educational and process improvements after a simulation-based anaphylaxis simulation workshop. *Annals of Allergy, Asthma & Immunology*. 2016;117:432-433.

Systems-Based Practice 2: System Navigation for Patient Centered Care **Overall Intent:** To effectively navigate the health care system, including the interdisciplinary team and other care providers and to adapt care to a specific patient population to ensure high-quality patient outcomes	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of care coordination*	● Identifies and describes the roles of technicians and nursing staff members in the clinic
Level 2 *Coordinates care of patients in routine clinical situations effectively utilizing the roles of interprofessional teams* *Identifies key elements for safe and effective transitions of care and handoffs*	● Independently engages clinic technicians when coordinating routine skin prick tests, but requires instruction when coordinating patient care that involves multiple team members or consultants ● Lists the essential components of transitioning patient care from one provider to another, but needs prompting for details when verbally transitioning care of a patient with allergic rhinitis on immunotherapy to another provider
Level 3 *Coordinates care of patients in complex clinical situations effectively utilizing the roles of interprofessional teams* *Performs safe and effective transitions of care/handoffs in routine clinical situations*	● Independently coordinates care with hospital technicians and nursing staff members for a high-risk penicillin desensitization protocol, including educating ancillary staff members on the steps involved and possible complications of the procedure ● Provides complete and pertinent history and current treatment plan when transitioning care of a patient with an asthma exacerbation from the clinic to the emergency room
Level 4 *Role models effective coordination of patient-centered care among different disciplines and specialties* *Performs safe and effective transitions of care/handoffs in complex clinical situations*	● Mentors junior fellow to coordinate care with pulmonology, hematology, and social work for a newly diagnosed patient with common variable immune deficiency (CVID), interstitial lung disease (ILD), and idiopathic thrombocytopenic purpura (ITP), who requires IVIG infusions at an outside infusion clinic ● Provides pertinent history, treatment plan, and goals of care when transitioning care of a sick patient with DiGeorge Syndrome to admission as an inpatient
Level 5 *Analyzes the process of care coordination and leads in the design and implementation of improvements* *Role models or improves safe and effective transitions of care/handoffs within and across healthcare delivery systems*	● Analyzes outgoing referrals from the clinic to develop a quality improvement plan to streamline the referral process ● Collaborates with a working group to develop standardized documentation for AIT formulations and dosing schedules in the EHR
Assessment Models or Tools	● Direct observation ● Medical record (chart) audit ● Multisource feedback
Curriculum Mapping	●

Notes or Resources	● Agency for Healthcare Research and Quality. Handoffs and Signouts. https://psnet.ahrq.gov/primers/primer/9/resource.aspx?resourceID=18439. 2019. ● Wohlauer MV, Arora VM, Horwitz LI, Bass EJ, Mahar SE, Philibert I. The patient handoff: a comprehensive curricular blueprint for resident education to improve continuity of care. *Academic Medicine.* 2012;87(4):411-418.

Systems-Based Practice 3: Physician Role in Health Care Systems **Overall Intent:** To understand his/her role in the complex health care system and how to effectively navigate the system to improve patient care and the health system's performance	
Milestones	**Examples**
Level 1 *Describes basic health payment systems and practice models*	● Recognizes the many different groups involved in health care, including patients, providers, payors, and health systems ● Compares payment systems, such as Medicare, Medicaid, the VA, and commercial third-party payers
Level 2 *Identifies and describes how components of a complex healthcare system are inter-related, and how this impacts patient care* *Delivers care with consideration of each patient's payment model*	● Recognizes the interplay between payors and providers to obtain prior authorization for biologic medicines for severe asthma ● Describes the different requirements for medication coverage among different payment systems
Level 3 *Discusses how individual practice affects the broader system* *Engages with patients in shared-decision making informed by each patient's payment models*	● Analyzes the costs and benefits of biologics for severe asthma ● Displays ability to counsel patients on the costs of a variety of treatment options based on their coverage and insurance type
Level 4 *Utilizes various components of the complex healthcare system to provide efficient and effective patient care and transition of care* *Advocates for patient care needs with consideration of the limitations of the patient's payment model*	● Works with the social work team to help a patient obtain financial assistance to be able to afford a biologic medicine for severe asthma ● Independently obtains prior authorization for a patient, after completing a peer-to-peer review
Level 5 *Advocates for or leads systems change that enhances high value, efficient and effective patient care and transition of care* *Participates in health policy advocacy activities*	● Presents institution specific data to show the impact of the use of biologics for severe asthmatics ● Participates in a legislative action day to support stricter immunization laws on behalf of patients with primary immune deficiency
Assessment Models or Tools	● Direct observation ● Medical record (chart) audit ● Objective structured clinical examination ● Portfolio

Curriculum Mapping	●
Notes or Resources	● Centers for Medicare and Medicaid Services (CMS). Medicare and Medical programs: Hospice conditions of participations; final rule. Federal Register. 2008 June;(73)109. https://www.gpo.gov/fdsys/pkg/FR-2008-06-05/pdf/08-1305.pdf ● Agency for Healthcare Research and Quality (AHRQ): The Challenges of Measuring Physician Quality https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/challenges.html. 2016. ● Region V Public Health Training Center. Measuring Health Disparities Course. https://www.mitrainingcenter.org/courses/mhdis0418. ● Agency for Healthcare Research and Quality. Major Physician Measurement Sets. https://www.ahrq.gov/talkingquality/measures/setting/physician/measurement-sets.html. 2015.

Systems-Based Practice 4: Community and Population Health **Overall Intent:** To effectively navigate the health care system, including the interdisciplinary team and other care providers, to adapt care to a specific patient population to ensure high-quality patient outcomes	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of population or community health needs and disparities*	● Identifies patients low socioeconomic status as the reason they cannot afford medications or get transportation to the clinic ● Describes food deserts and the implications on food allergy management
Level 2 *Identifies specific population or community health needs and inequities for their local population*	● Knows which patients are at risk for underutilization of appropriate biologic medications in the treatment of asthma, due to low socioeconomic status ● Identifies that patients with food allergies that live in a "food desert" may have difficulty with strict avoidance ● Identifies a group of patients that prefer homeopathy over medication
Level 3 *Accesses local resources to meet the needs of a specific patient population or community*	● Engages clinic and/or local resources to ensure patients with low literacy understand how to administer SCIG at home
Level 4 *Participates in changing and adapting practice to provide for the needs of specific populations or communities*	● Designs educational handouts for patients for whom English is their second language and has them translated to their native language and encourages peers to do the same ● Uses shared decision making for a group of patients that will only use a special tea to treat an asthma exacerbation instead of medication and adapts educational plan accordingly
Level 5 *Leads innovations to advocate for specific populations or communities with health care inequities*	● Develops a community program to identify and train high risk asthmatics on their diagnosis, ACT scores, inhaler administration techniques, home assessments, etc.
Assessment Models or Tools	● Direct observation ● Medical record (chart) audit ● Multisource feedback
Curriculum Mapping	●
Notes or Resources	● Agency for Healthcare Research and Quality. Handoffs and Signouts. https://psnet.ahrq.gov/primers/primer/9/resource.aspx?resourceID=18439. 2019. ● Wohlauer MV, Arora VM, Horwitz LI, Bass EJ, Mahar SE, Philibert I. The patient handoff: a comprehensive curricular blueprint for resident education to improve continuity of care. *Acad Med.* 2012;87(4):411-418.

Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice **Overall Intent:** To incorporate evidence and patient values into clinical practice	
Milestones	**Examples**
Level 1 *Demonstrates how to access and use available evidence, and incorporate patient preferences and values in order to take care of a routine patient*	● Identifies clinical practice guideline for treatment of asthma
Level 2 *Articulates clinical questions and elicits patient preferences and values in order to guide evidence based care*	● Refines search of evidence for treatment of asthma to include comorbidities and patient preferences for intervention
Level 3 *Locates and applies the best available evidence, integrated with patient preference, to the care of complex patients*	● Synthesizes available evidence to make a recommendation for monoclonal antibody therapy in conjunction with oral and inhaled therapy for asthma
Level 4 *Critically appraises and applies evidence even in the face of uncertainty and conflicting evidence to guide care, tailored to the individual patient*	● Recognizes gaps in high-level evidence and incorporates other case reports or non-clinical studies to guide recommendation for treatment of refractory asthma
Level 5 *Coaches others to critically appraise and apply evidence for complex patients; and/or participates in the development of guidelines*	● Leads journal club for critical appraisal of available evidence and its application to severe asthma patients
Assessment Models or Tools	● Direct observation ● Journal club ● Objective structured clinical examination ● Oral or written examination ● Portfolio ● Simulation
Curriculum Mapping	●
Notes or Resources	● AAAAI/ACAAI Joint Task Force on Practice Parameters. AAAAI and ACAAI Practice Parameters. https://www.allergyparameters.org/. ● American Academy of Allergy Asthma & Immunology. https://www.aaaai.org/. ● Nowak-Węgrzyn A, Chehade M, Groetch ME, et al. International consensus guides for the diagnosis and management of food protein-induced entrocolities syndrome: Executive summary - Workgroup Report of the Adverse Reactions to Foods Committee, American Academy of Allergy, Asthma & Immunology. *Journal of Allergy and Clinical Immunology*. 2017;139(4):1111-1126. ● Systematic reviews and meta-analyses

Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth **Overall Intent:** To seek performance information with the intent to improve care; to reflect on all domains of practice, personal interactions, and behaviors, and their impact on patients and colleagues (reflective practice); to develop clear objectives and goals for improvement in an individualized learning plan	
Milestones	**Examples**
Level 1 *Accepts responsibility for personal and professional development by establishing goals*	● Sets a goal of closing charts within 24 hours to exceed institutional standards
Identifies the factors contributing to gaps between expectations and actual performance	● Identifies that fatigue and a new baby at home contribute to being late to clinic
Level 2 *Demonstrates openness to feedback and other input to inform goals*	● Integrates external feedback on timeliness of their notes
Analyzes and reflects on the factors contributing to gap(s) between expectations and actual performance	● Considers strategies to improve timeliness, including advanced preparedness for the morning
Designs and implements a learning plan	● Designs a plan to improve knowledge on basic immunology and creates a reading list
Level 3 *Periodically seeks feedback or other input, with adaptability*	● Periodically does a chart audit to see the percent of completed in 24 hours
Institutes behavioral change to narrow the gap between expectations and actual performance	● Institutes new strategies for improving time management
Uses performance data to measure the effectiveness of the learning plan	● Based on In-Training Examination scores, identifies areas of weakness and expands reading list
Level 4*Consistently seeks feedback or other input, with adaptability*	● Completes a quarterly chart audit to see the percent of notes completed in 24 hours
Critically analyzes and considers alternatives to narrow the gap(s) between expectations and actual performance	● Analyzes and adjusts new strategies to continue improvement
Continuously modifies the learning plan based on feedback and other input	● Solicits feedback and expands learning plan to focus on specific deficient areas
Level 5 *Role models consistently seeking feedback or other input with adaptability*	● Coaches others on performing a chart audit to see the percent of notes completed in 24 hours

Coaches others on reflective practice *Facilitates the design and implementation of learning plans for others*	● Coaches others in time management ● Assists other learners in identifying resources for their learning plan
Assessment Models or Tools	● Direct observation ● Mentored review of learning plan ● Targeted reflective writing
Curriculum Mapping	●
Notes or Resources	● Hojat M, Veloski JJ, Gonnella JS. Measurement and correlates of physicians' lifelong learning. *Academic Medicine* 2009. Aug;84(8):1066-1074. ● Lockspeiser TM, Schmitter PA, Lane JL et al. Assessing Fellows' Written Learning Goals and Goal Writing Skill: Validity Evidence for the Learning Goal Scoring Rubric. Academic Medicine 2013. 88 (10) ● Burke AE, Benson B, Englander R, Carraccio C, Hicks PJ. Domain of competence: practice-based learning and improvement. *Academic Pediatrics* 2014. 14: S38-S54. ● Sockalingam S, Wiljer D, Yufe S, et al. The relationship between academic motivation and lifelong learning during residency: a study of psychiatry residents. *Academic Medicine*. 2016;91(10):1423-1430.

Professionalism 1: Professional Behavior and Ethical Principles **Overall Intent:** To recognize and address lapses in ethical and professional behavior, demonstrate ethical and professional behaviors, and to use appropriate resources for managing ethical and professional dilemmas	
Milestones	**Examples**
Level 1 *Demonstrates understanding of professional behaviors* *Demonstrates knowledge of ethical principles*	● Recognizes that fatigue may lead to rude behavior ● Describes beneficence, non-maleficence, justice, and autonomy
Level 2 *Acts in a professional manner in routine situations and takes responsibility for own professionalism lapses* *Analyzes straightforward situations using ethical principles*	● Acknowledges being rude to a nurse over the phone without becoming defensive, making excuses, or blaming others ● Recognizing patient autonomy when an allergic asthmatic declines undergoing AIT
Level 3 *Acts in a professional manner in complex or stressful situations* *Recognizes complex ethical situations and utilizes appropriate resources for managing and resolving them when appropriate*	● Apologizes for being rude, takes steps to make amends if needed, and articulates strategies for preventing similar lapses in the future ● Recognizes the need to involve an ethics committee when the parent of a patient with X-linked agammaglobulinemia (XLA) refuses IVIG
Level 4 *Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others* *Encourages others to utilize appropriate resources for managing and resolving ethical dilemmas as needed*	● Self-monitors for fatigue and stress and proactively asks for help with caseload when at risk of rude behavior ● Describes the process of using an ethics committee to co-fellows
Level 5 *Coaches others when their behavior fails to meet professional expectations* *Seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution*	● Coaches colleagues to connect rude behavior with fatigue and stress ● Joins ethics committee
Assessment Models or Tools	● Direct observation ● Global evaluation ● Multisource feedback ● Objective structured clinical examination

	● Oral or written self-reflection ● Simulation
Curriculum Mapping	●
Notes or Resources	● American Society of Anesthesiologists. Guidelines for the Ethical Practice of Anesthesiology. https://www.asahq.org/standards-and-guidelines/guidelines-for-the-ethical-practice-of-anesthesiology. ● American Medical Association. Code of Ethics. https://www.ama-assn.org/delivering-care/ama-code-medical-ethics. ● ABIM Foundation. American Board of Internal Medicine. Medical professionalism in the new millennium: a physician charter. *Annals of Internal Medicine*. 2002; 136:243-246. ● Byyny RL, Papadakis MA, Paauw DS. *Medical Professionalism Best Practices*. Menlo Park, CA: Alpha Omega Alpha Honor Medical Society; 2015. ● Levinson W, Ginsburg S, Hafferty FW, Lucey CR. *Understanding Medical Professionalism*. 1st ed. New York, NY: McGraw-Hill Medical; 2014. ● American Academy of Pediatrics. Case Based Teaching Guides for Resident Training. https://www.aap.org/en-us/continuing-medical-education/Bioethics-Cased-Based-Teaching-Guides/Pages/Bioethics-Case-Based-Teaching-Guides.aspx. ● American Academy of Pediatrics, Committee on Bioethics. Informed consent, parental permission, and assent in pediatric practice. *Pediatrics*. 1995; 95(2):314-317. ● Jonsen AR, Siegler M, Winslade WJ. *Clinical Ethics: A Practical Approach to Ethical Decisions in Clinical Medicine.* 8th ed. New York, NY: McGraw-Hill Medical; 2015.

Professionalism 2: Accountability/Conscientiousness **Overall Intent:** To take responsibility for his/her actions and the impact on patients and other members of the health care team	
Milestones	**Examples**
Level 1 *Requires prompting to complete professional duties*	● Promptly responds to prescription refill request from the outpatient clinic staff
Level 2 *Performs professional duties in a timely manner with appropriate attention to detail and without the need for reminders in routine situations*	● During outpatient clinic encounter completes all necessary prescription orders before patient leaves clinic
Level 3 *Performs professional duties in a timely manner with appropriate attention to detail in complex or stressful situations*	● Completes prior authorization for a necessary asthma medication in a timely manner
Level 4 *Intervenes in situations that may affect self or other team members' ability to complete professional duties*	● Completes all medication refill requests prior to vacation, to minimize impact on peers
Level 5 *Participates in methods to improve system outcomes*	● Assists outpatient clinic to develop streamlined processes for completion of prior authorizations ● Takes the initiative in helping design new clinics or revising clinic operation procedures
Assessment Models or Tools	● Compliance with deadlines and timelines ● Direct observation ● Multisource feedback ● Objective structured clinical evaluation ● Self-evaluations ● Simulation
Curriculum Mapping	●
Notes or Resources	● ABIM Foundation, ACP-ASIM Foundation, and European Federation of Internal Medicine. Medical Professionalism in the New Millennium: A Physician Charter. *Ann Intern Med*. 2002;136(3):243-6. ● Code of conduct from program manual/handbook.

Professionalism 3: Self-Awareness and Help-Seeking **Overall Intent:** To identify, use, manage, improve, and seek help for personal and professional well-being for self and others	
Milestones	**Examples**
Level 1 *With assistance, recognizes status of personal and professional well-being.* *Recognizes limits in the knowledge/skills of self or team, with assistance*	● Acknowledges own response to patient death, when asked ● Acknowledges responsibility for miscommunications with staff or patients
Level 2 *Independently recognizes status of personal and professional well-being* *Independently recognizes limits in the knowledge/skills of self or team; demonstrates appropriate help-seeking behaviors*	● Independently identifies and communicates personal impact of a patient death ● Understands the basis for deficiencies of self in miscommunications
Level 3 *With assistance, proposes a plan to optimize personal and professional well-being* *With assistance, proposes a plan to remediate or improve limits in the knowledge/ skills of self or team*	● With the interdisciplinary team, develops a reflective response to deal with personal impact after patient death ● Develops a plan for analyzing and correcting difficulties in interactions with patients and staff, (e.g., personality assessment tools, counseling)
Level 4 *Independently develops a plan to optimize personal and professional well being* *Independently develops a plan to remediate or improve limits in the knowledge/skills of self or team*	● Independently develops a personal practice to sustain resilience in response to patient deaths ● Implements positive measures to correct difficulties with patients and staff members
Level 5 *Coaches others when emotional responses or limitations in knowledge/skills do not meet professional expectations* *Seeks to develop plans that improve knowledge/skills applicable to program or system as a whole*	● Assists in organizational efforts to address clinician well-being after patient death ● Works with other residents and students to help build self-awareness of deficiencies in interactions with others
Assessment Models or Tools	● Direct observation ● Group interview or discussions for team activities ● Individual interview

	● Participation in institutional well-being programs ● Review of learning plan ● Self-assessment
Curriculum Mapping	●
Notes or Resources	● Local resources, including Employee Assistance Program. ● Accreditation Council for Graduate Medical Education. Tools and Resources. https://www.acgme.org/What-We-Do/Initiatives/Physician-Well-Being/Resources. ● Stanford Medicine. WELLMD. https://wellmd.stanford.edu/. ● American Academy of Pediatrics. Resilience Curriculum: Resilience in the face of grief and loss. Part D. https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/hospice-palliative-care/Pages/Resilience-Curriculum.aspx.

Interpersonal and Communication Skills 1: Patient- and Family-Centered Communication **Overall Intent:** To use listening, language, behaviors, and self-awareness to form a therapeutic relationship with a patient and his/her family while identifying and minimizing potential barrier to communication	
Milestones	**Examples**
Level 1 *Uses language and nonverbal behavior to demonstrate respect and establish rapport* *Identifies common barriers to effective communication (e.g., language, disability) while accurately communicating own role within the healthcare system*	● Uses active listening to establish rapport with patient/family members in new immunodeficiency evaluations ● Identifies the need for an interpreter for a patient/family member who does not speak English ● Recognizes when certain situations may upset a child with autism, prevent them from leaning about their condition
Level 2 *Establishes a therapeutic relationship and uses shared decision making in straightforward encounters using active listening and clear language* *Identifies more subtle barriers to effective communication (e.g. health literacy, cultural preferences)*	● Demonstrates therapeutic relationship with shared decision making in initial immunodeficiency diagnostic work-up ● Identifies non-English-speaking patient who prefers to defer decision making to his or her family member as a potential communication challenge
Level 3 *Establishes and maintains a therapeutic relationship and uses shared decision making and compassionate language in challenging patient encounters, with assistance* *Reflects on personal biases and attempts to minimize communication barriers*	● Successfully maintains therapeutic relationship in the context of patient's/family members' concerns with diagnosis and treatment choices ● Identifies and reflects on personal bias towards patient autonomy over cultural preferences in decision making
Level 4 *Independently establishes and maintains a therapeutic relationship and uses shared decision making and compassionate language in challenging patient encounters* *Independently recognizes personal and implicit biases and proactively minimizes communication barriers*	● Maintains rapport and therapeutic relationship over time with patient and family members who are frustrated that patient continues to have frequent infections despite treatment for immune deficiency ● Acknowledges personal bias and successfully manages communication with non-English-speaking patient who defers decision making to their family member
Level 5 *Mentors others in situational awareness and critical self-reflection to consistently develop positive therapeutic relationships*	● Teaches a model for maintaining therapeutic relationships with patients/family members diagnosed with complex immunodeficiency

Role models self-awareness practice and teaches a contextual approach to minimize communication barriers	● Coaches a learner to acknowledge personal bias and successfully manage communication with non-English-speaking patient who defers decision making to their family member
Assessment Models or Tools	● Direct observation ● Mini-clinical evaluation exercise ● SECURE - Kalamazoo Essential Elements Communication Checklist (Adapted) ● SEGUE - Skills needed to Set the state, Elicit information, Give information, Understand the patient, and End the encounter ● Self-assessment ● Standardized patients or structured case discussions
Curriculum Mapping	●
Notes or Resources	● Back A, Arnold R, Tulsky J. Mastering Communication with Seriously Ill Patients: Balancing Honesty with Empathy and Hope. Cambridge: *Cambridge University Press*; 2009. ● Makoul G. The SEGUE Framework for teaching and assessing communication skills. *Patient Educ and Counseling*. 2001;45(1):23-34. ● O'Sullivan P, Chao S, Russell M, Levine S, Fabiny A. Development and implementation of an objective structured clinical examination to provide formative feedback on communication and interpersonal skills in geriatric training. *Journal of the American Geriatrics Society.* 2008;56(9):1730-5. ● Vital Talk: www.vitaltalk.org. ● Symons AB, Swanson A, McGuigan D, Orrange S, Akl EA. A tool for self-assessment of communication skills and professionalism in fellows. *BMC Med Educ* 2009; 9:1.

Interpersonal and Communication Skills 2: Interprofessional and Team Communication **Overall Intent:** To effectively communicate with the interdisciplinary team and other health care providers in both straightforward and complex situations	
Milestones	**Examples**
Level 1 *Respectfully receives and clarifies a consultation request* *Uses language that values and respects all members of the team*	● Receives consult request for drug desensitization, asks clarifying questions politely, and expresses thanks for the consult ● Uses respectful language to identify which issues should be managed by the pulmonary team in a shared patient with bronchiectasis
Level 2 *Responds to a consultation request clearly, concisely and in a timely manner* *Communicates information effectively and solicits feedback with all members of the team*	● Communicates drug desensitization protocol and plan clearly and concisely in an organized and timely manner ● Elicits history from the pulmonology team and asks their thoughts about adding prophylactic antibiotics for management
Level 3 *Confirms understanding of recommendations when providing consultation* *Solicits feedback and communicates concerns to peers and learners*	● Speaks directly to the consulting team to verify understanding of drug desensitization and discusses potential next steps if plan is not effective ● Negotiates who will be primary prescriber of prophylactic antibiotics to address the concerns about continuity of care with the pulmonary team
Level 4 *Coordinates recommendations from different members of the healthcare team to optimize patient care* *Communicates feedback and constructive criticism to superiors, as indicated*	● Coordinates directly with consulting team, nursing staff, pharmacy, and infectious disease to minimize obstacles to drug desensitization ● Initiates a direct discussion with the pulmonology team attending to address conflict regarding differences in opinions about the choice of prophylactic antibiotics
Level 5 *Role models flexible communication strategies that value input from all healthcare team members, resolving conflict when needed* *Facilitates team-based feedback in complex situations (e.g., fostering debriefing sessions)*	● Mediates a conflict resolution between the primary team and infectious disease regarding goals of antimicrobial therapy ● Leads an interdisciplinary conference with allergy and immunology, infectious diseases, and pulmonary on management of complex patient with bronchiectasis, recurrent infections, and multiple antibiotic allergies
Assessment Models or Tools	● Checklists ● Direct observation ● Medical record (chart) audit ● Multisource feedback ● Objective structured clinical examination

	● Simulation ● Standardized patient encounters
Curriculum Mapping	●
Notes or Resources	● François, J. Tool to assess the quality of consultation and referral request letters in family medicine. *Canadian Family Physician*. 2011;57(5), 574–575. ● Dehon E, Simpson K, Fowler D, Jones A. Development of the Faculty 360. *MedEdPORTAL*. 2015;11:10174.

Interpersonal and Communication Skills 3: Communication within Health Care Systems **Overall Intent:** To effectively communicate through established institutional pathways using a variety of methods	
Milestones	**Examples**
Level 1 *Accurately records information in the patient record*	● Documents accurate subjective and objective components of patient's anaphylaxis history
Level 2 *Demonstrates organized diagnostic and therapeutic reasoning through notes in the patient record* *Identifies institutional policy on safeguarding patient personal health information and maintains confidentiality in communications*	● Documents thoughtful differential diagnosis of anaphylaxis etiology and justifies diagnostic work up ● Uses current EHR template for telephone consult documentation, and logs off computer when leaving clinical workstation
Level 3 *Communicates clearly, timely, and in an organized written form for routine patient encounters* *Selects appropriate direct and indirect forms of communication based on context, with assistance*	● Documents streamlined assessment and plan for anaphylaxis management ● Communicates routine lab results in person or via telephone with guidance
Level 4 *Communicates clearly, timely, and in an organized written form for complex patient encounters* *Independently selects appropriate direct and indirect forms of communication based on context*	● Provides anaphylaxis contingency plan in the EHR if patient develops recurrent anaphylaxis ● Consistently communicates routine lab results in person or via telephone independently
Level 5 *Communicates evidence basis for therapeutic reasoning for complex cases* *Achieves written or verbal communication that serves as an example for others to follow*	● Documents literature support for evaluation and management of idiopathic anaphylaxis ● Develops new EHR template to document communication for multi-disciplinary provider conferences
Assessment Models or Tools	● Direct observation ● Chart stimulated recall ● Log of event reporting, QI and committee activities ● Medical record (chart) audit ● Multisource feedback

Curriculum Mapping	●
Notes or Resources	● Bierman JA, Hufmeyer KK, Liss DT, Weaver AC, Heiman HL. Promoting responsible electronic documentation: validity evidence for a checklist to assess progress notes in the electronic health record. *Teaching and Learning in Medicine*. 2017;29(4):420-432. ● Starmer AJ, Spector ND, Srivastava R, Allen AD, Landrigan CP, Sectish TC. I-pass, a mnemonic to standardize verbal handoffs. *Pediatrics*. 2012;129(2):201-204.

In an effort to aid programs in the transition to using the new version of the Milestones, we have mapped the original Milestones 1.0 to the new Milestones 2.0. Below we have indicated where the subcompetencies are similar between versions. These are not necessarily exact matches, but are areas that include some of the same elements. Note that not all subcompetencies map between versions. Inclusion or exclusion of any subcompetency does not change the educational value or impact on curriculum or assessment.

Milestones 1.0	Milestones 2.0
PC1: Medical Interview and Physical Examination	PC1: Medical Interview and Physical Examination of Adult Allergy and Immunology Patients PC2: Medical Interview and Physical Examination of Pediatric Allergy and Immunology Patients
PC2: Diagnostic Tests and Procedures	PC3: Diagnostic Tests and Procedures for Allergy and Immunology Patients
PC3: Management Plan	PC4: Management Plan for Allergy and Immunology Patients
PC4: Coordination of Care	SBP2: System Navigation for Patient-Centered Care
MK1: Allergy and Immunology Medical Knowledge	MK1: Basic Science of Allergy and Immunology MK2: Clinical Science of Allergy and Immunology PROF2: Accountability/Conscientiousness
SBP1: 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.	SBP1: Patient Safety and Quality Improvement SBP3: Physician Role in Health Care Systems SBP4: Community and Population Health
PBLI1: Research and Scholarly Activity	MK3: Research and Scholarly Activity
PBLI2: Self-evaluates performance. Identifies strengths, deficiencies, and limits in self knowledge and expertise. Sets learning and improvement goals in a manner that fosters productive self-directed learning. Actively participates in quality improvement project(s). Locates, appraises, and assimilates evidence from scientific studies pertinent to patients. Uses technology to enhance patient care and self-improvement.	SBP1: Patient Safety and Quality Improvement PBLI1: Evidence-Based and Informed Practice PBLI2: Reflective Practice and Commitment to Personal Growth PROF3: Self-Awareness and Help-Seeking

PROF1: Exhibits ethical and responsible behavior, including respect, compassion, honesty, and integrity in all aspects of practice and scholarly activity. Is accountable to patients, society, and the profession and acknowledges errors. Maintains responsibility for his or her own emotional, physical, and mental health, including fatigue awareness and avoidance, and commitment to lifelong learning and self-assessment. Demonstrates sensitivity to diverse patient, staff, and support personnel populations. Considers needs of patients, families, and colleagues	PROF1: Professional Behavior and Ethical Principles PROF2: Accountability/Conscientiousness PROF3: Self-Awareness and Help-Seeking ICS2: Interprofessional and Team Communication ICS3: Communication within Health Care Systems
ICS1: Provides team-based care and develops productive relationships with patients, peers, staff members, and interdisciplinary care team members. Ensures that patients understand their condition(s) and treatments, encourages questions from patients, and provides explanations appropriate to patient needs. Educates and counsels patients, families, and colleagues when appropriate. Identifies and accommodates special communication needs of vulnerable populations [e.g., children, elderly, patients with complex biomedical or psychosocial conditions, persons with disabilities, immigrant and refugee populations, veterans, prisoners, LGBT (lesbians, gay, bisexual, transgender) patients, etc.]. Uses technology and information sharing modalities to facilitate communication.	SBP4: Community and Population Health ICS1: Patient- and Family-Centered Communication ICS2: Interprofessional and Team Communication ICS3: Communication within Health Care Systems