Supplemental Digital Appendix 1: Examples of Patient Care Milestones From Each Specialty . . . . . . . . . 2-4
Supplemental Digital Appendix 1A: Examples of Patient Care Milestones From Emergency Medicine . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
Supplemental Digital Appendix 1

Examples of Patient Care Milestones From Each Specialty

Supplemental Digital Appendix 1A

Examples of Patient Care Milestones From Emergency Medicine*

| Performance of Focused History and Physical Exam: Abstracts current findings in a patient with multiple chronic medical problems and, when appropriate, compares with a prior medical record and identifies significant differences between the current presentation and past presentations. |
|---|---|---|---|---|---|
| Has not Achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
| Performs and communicates a reliable, comprehensive history and physical exam | Performs and communicates a focused history and physical exam which effectively addresses the chief complaint and urgent patient issues | Prioritizes essential components of a history given a limited or dynamic circumstance -- Prioritizes essential components of a physical examination given a limited or dynamic circumstance | Synthesizes essential data necessary for the correct management of patients using all potential sources of data | Identifies obscure, occult or rare patient conditions based solely on historical and physical exam findings |

Comments:

*Accessed at [https://www.acgme.org/Portals/0/PDFs/Milestones/EmergencyMedicineMilestones.pdf?ver=2015-11-06-120531-877](https://www.acgme.org/Portals/0/PDFs/Milestones/EmergencyMedicineMilestones.pdf?ver=2015-11-06-120531-877) on July 10, 2019.
**Supplemental Digital Appendix 1B**

**Examples of Patient Care Milestones From Family Medicine** *

| Has not achieved | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|------------------|---------|---------|---------|---------|---------|
|                  | Gathers essential information about the patient (history, exam, diagnostic testing, psychosocial context) | Consistently recognizes common situations that require urgent or emergent medical care | Consistently recognizes complex situations requiring urgent or emergent medical care | Coordinates care of acutely ill patient with consultants and community services | Provides and coordinates care for acutely ill patients within local and regional systems of care |
|                  | Generates differential diagnoses | Stabilizes the acutely ill patient utilizing appropriate clinical protocols and guidelines | Appropriately prioritizes the response to the acutely ill patient | Demonstrates awareness of personal limitations regarding procedures, knowledge, and experience in the care of acutely ill patients |
|                  | Recognizes role of clinical protocols and guidelines in acute situations | Generates appropriate differential diagnoses for any presenting complaint | Develops appropriate diagnostic and therapeutic management plans for less common acute conditions | Arranges appropriate transitions of care |
|                  | | | Addresses the psychosocial implications of acute illness on patients and families | |
|                  | | | Develops appropriate diagnostic and therapeutic management plans for acute conditions | |
|                  | | | | |
|                  | | | | |
|                  | | | | |

**Comments:**

*Accessed at [https://www.acgme.org/Portals/0/PDFs/Milestones/FamilyMedicineMilestones.pdf?ver=2017-01-20-103353-463](https://www.acgme.org/Portals/0/PDFs/Milestones/FamilyMedicineMilestones.pdf?ver=2017-01-20-103353-463) on July 10, 2019.*
### Supplemental Digital Appendix 1C

**Examples of Patient Care Milestones From Internal Medicine**

| Gathers and synthesizes essential and accurate information to define each patient’s clinical problem(s). | Read for unsupervised practice | Aspirational |
|---|---|---|
| **Critical Deficiencies** | Inconsistently able to acquire accurate historical information in an organized fashion | Consistently acquires accurate and relevant histories from patients | Acquires accurate histories from patients in an efficient, prioritized, and hypothesis-driven fashion |
| Does not collect accurate historical data | Does not perform an appropriately thorough physical exam or misses key physical exam findings | Consistently performs accurate and appropriately thorough physical exams | Performs accurate physical exams that are targeted to the patient’s complaints |
| Does not use physical exam to confirm history | Does not seek or is overly reliant on secondary data | Uses collected data to define a patient’s central clinical problem(s) | Synthesizes data to generate a prioritized differential diagnosis and problem list |
| Relies exclusively on documentation of others to generate own database or differential diagnosis | Inconsistently recognizes patients’ central clinical problem or develops limited differential diagnoses | | Effectively uses history and physical examination skills to minimize the need for further diagnostic testing |
| Fails to recognize patient’s central clinical problems | | | Role models and teaches the effective use of history and physical examination skills to minimize the need for further diagnostic testing |
| Fails to recognize potentially life threatening problems | | | |

**Comments:**

*Accessed at: [https://www.acgme.org/Portals/0/PDFs/Milestones/InternalMedicineMilestones.pdf?ver=2017-07-28-090326-787](https://www.acgme.org/Portals/0/PDFs/Milestones/InternalMedicineMilestones.pdf?ver=2017-07-28-090326-787) on July 10, 2019*
### Supplemental Digital Appendix 2

**Cross Classification Table of the Number of Residents by Outcome and Threshold Used to Calculate Odds Ratios, Positive Predictive Values, and Negative Predictive Values**

| Predictor (threshold) | Outcome                                      | Rated LESS THAN level 4 at the time of graduation (< Lev 4) | Rated GREATER THAN or EQUAL TO level 4 at the time of graduation (≥ Lev 4) |
|-----------------------|----------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------|
| Rated LESS THAN or EQUAL TO level 2.5 (≤ Lev 2.5) during post-graduate year 2 | a                                             | b                                                           |
| Rated GREATER THAN level 2.5 (> Lev 2.5) during post-graduate year 2 | c                                             | d                                                           |

* Definitions:

  - Sensitivity = number of residents rated ≤ to level 2.5 during the second year out of those who were rated < level 4 at the time of graduation \((a/(a+c))\);
  - Specificity = number of residents rated > level 2.5 during the second year out of those who were rated ≥ level 4 at the time of graduation \((d/(b+d))\);
  - Positive predictive value (PPV) = number of residents who were rated < level 4 at the time of graduation out of those who were rated ≤ level 2.5 during the second year \((a/(a+b))\);
  - Negative predictive value (NPV) = number of residents who were rated ≥ level 4 at the time of graduation out of those who were rated > level 2.5 during the second year \((d/(c+d))\).
  - Odds ratio = ratio of the odds for not reaching level 4 for those who are rated at or under level 2.5 to the odds for those who are rated greater than level 2.5 \(((a/b)/(c/d))\).
### Supplemental Digital Appendix 3

**Milestones Ratings and Predictive Analytics for Each Specialty by Milestones Review Occasion**

#### Supplemental Digital Appendix 3A

**Milestones Ratings and Predictive Analytics for the Third Milestones Review Occasion (December 2015 – January 2016 Reporting Period) for Family Medicine**

| Subcompetency | Description of Subcompetency                                                                 | # (% residents not reaching L4 at graduation) | # rated ≤ 2.5 | Sensitivity | Specificity | PPV       | NPV       | OR with CI (99.886CI) |
|---------------|--------------------------------------------------------------------------------------------|---------------------------------------------|---------------|-------------|-------------|-----------|-----------|----------------------|
| PC01          | Cares for acutely ill or injured patients in urgent and emergent situations and in all settings | 601/3276 (18.3%)                           | 1787          | 79.3%       | 51.4%       | 26.7%     | 92.7%     | 4.62* (2.99,7.12)    |
| PC02          | Cares for patients with chronic conditions                                                  | 704/3276 (21.5%)                           | 1884          | 79.4%       | 49.0%       | 28.8%     | 90.0%     | 3.65* (2.48,5.36)    |
| PC03          | Partners with the patient, family, and community to improve health through disease prevention and health promotion | 1068/3276 (32.6%)                          | 1955          | 72.3%       | 46.7%       | 38.8%     | 77.2%     | 2.15* (1.64,2.84)    |
| PC04          | Partners with the patient to address issues of ongoing signs, symptoms, or health concerns that remain over time without clear diagnosis despite evaluation and treatment, in a patient-centered, cost-effective manner | 747/3276 (22.8%)                           | 1970          | 80.3%       | 46.2%       | 30.9%     | 90.4%     | 4.21* (2.95,6.03)    |
| PC05          | Performs specialty-appropriate procedures to meet the health care needs of individual patients, families, and communities, and is knowledgeable about procedures performed by other specialists to guide their patients' care | 977/3276 (29.8%)                           | 1970          | 74.8%       | 45.9%       | 36.4%     | 81.3%     | 2.48* (1.80,3.43)    |
| MK01          | Demonstrates medical knowledge of sufficient breadth and depth to practice family medicine | 623/3276 (19.0%)                           | 2068          | 82.6%       | 42.3%       | 24.2%     | 91.5%     | 3.45* (2.30,5.16)    |
| MK02          | Applies critical thinking skills in patient care                                             | 952/3276 (29.1%)                           | 1797          | 73.3%       | 52.9%       | 38.7%     | 82.4%     | 2.97* (2.16,4.07)    |
| Subcompetency | Description of Subcompetency | # (% residents not reaching L4 at graduation) | # rated ≤ 2.5 | Sensitivity | Specificity | PPV | NPV | OR with CI (99.886CI) |
|---------------|------------------------------|---------------------------------------------|---------------|-------------|-------------|-----|-----|---------------------|
| SBP01         | Provides cost-conscious medical care | 881/3276 (26.9%) | 1853 | 72.5% | 50.3% | 35.0% | 84.9% | 3.03* (2.14,4.29) |
| SBP02         | Emphasizes patient safety | 1262/3276 (38.5%) | 2404 | 87.3% | 34.6% | 44.5% | 78.9% | 3.01* (2.16,4.20) |
| SBP03         | Advocates for individual and community health | 1497/3276 (45.7%) | 2198 | 78.3% | 41.5% | 53.0% | 70.2% | 2.66* (1.97,3.59) |
| SBP04         | Coordinates team-based care | 586/3276 (17.9%) | 1529 | 66.0% | 58.3% | 25.5% | 89.8% | 3.02* (2.05,4.46) |
| PBLI01        | Locates, appraises, and assimilates evidence from scientific studies related to the patients’ health problems | 1069/3276 (32.6%) | 2327 | 85.5% | 35.9% | 38.8% | 83.2% | 3.15* (2.05,4.46) |
| PBLI02        | Demonstrates self-directed learning | 967/3276 (29.5%) | 1737 | 69.9% | 54.0% | 38.1% | 81.4% | 2.69* (1.98,3.64) |
| PBLI03        | Improves systems in which the physician provides care | 1737/3276 (53.0%) | 2534 | 85.7% | 32.1% | 58.6% | 63.4% | 2.46* (1.79,3.38) |
| PROF01        | Completes a process of professionalization | 680/3276 (20.8%) | 1609 | 72.5% | 57.1% | 32.1% | 90.0% | 4.27* (2.89,6.31) |
| PROF02        | Demonstrates professional conduct and accountability | 1088/3276 (33.2%) | 1893 | 74.4% | 50.5% | 44.1% | 81.4% | 3.45* (2.55,4.68) |
| PROF03        | Demonstrates humanism and cultural proficiency | 631/3276 (19.3%) | 1529 | 66.3% | 58.8% | 28.8% | 89.1% | 3.30* (2.26,4.82) |
| PROF04        | Maintains emotional, physical, and mental health; and pursues continual personal and professional growth | 794/3276 (24.2%) | 1754 | 70.7% | 52.3% | 32.7% | 85.6% | 2.90* (2.09,4.02) |
| ICS01         | Develops meaningful, therapeutic relationships with patients and families | 528/3276 (16.1%) | 1250 | 57.5% | 66.6% | 26.1% | 90.9% | 3.54* (2.41,5.20) |
| ICS02         | Communicates effectively with patients, families, and the public | 622/3276 (19.0%) | 1659 | 72.3% | 55.0% | 27.7% | 90.4% | 3.62* (2.54,5.17) |
| ICS03         | Develops relationships and effectively communicates with physicians, other health professionals, and health care teams | 870/3276 (26.6%) | 1504 | 63.2% | 61.6% | 38.1% | 83.2% | 3.04* (2.25,4.12) |
| Subcompetency | Description of Subcompetency                                                                 | # (% ) residents not reaching L4 at graduation | # rated ≤ 2.5 | Sensitivity | Specificity | PPV | NPV | OR with CI (99.886 CI) |
|---------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------|---------------|-------------|------------|-----|-----|-------------------------|
| ICS04         | Utilizes technology to optimize communication                                                 | 766/3276 (23.4%)                              | 1684          | 73.0%       | 56.2%      | 33.9%| 88.7%| 4.01* (2.73, 5.90)      |

*Significant at p < 0.00114 [0.05/(22*2)].

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### Supplemental Digital Appendix 3B

**Milestones Ratings and Predictive Analytics for the Fourth Milestones Review Occasion (May – June 2017 Reporting Period) for Family Medicine**

| Subcompetency | Description of Subcompetency                                                                 | # (% ) residents not reaching L4 at graduation | # rated ≤ 2.5 | Sensitivity | Specificity | PPV | NPV | OR with CI (99.886CI) |
|---------------|---------------------------------------------------------------------------------------------|-----------------------------------------------|--------------|-------------|------------|-----|-----|----------------------|
| PC01          | Cares for acutely ill or injured patients in urgent and emergent situations and in all settings | 601/3276 (18.3%)                               | 710          | 52.4%       | 85.4%      | 43.2% | 89.5% | 6.48* (4.32,9.73)    |
| PC02          | Cares for patients with chronic conditions                                                  | 704/3276 (21.5%)                               | 703          | 46.6%       | 85.9%      | 45.2% | 86.5% | 5.31* (3.50,8.05)    |
| PC03          | Partners with the patient, family, and community to improve health through disease prevention and health promotion | 1068/3276 (=32.6%)                             | 766          | 38.6%       | 84.4%      | 52.9% | 74.2% | 3.23* (2.31,4.51)    |
| PC04          | Partners with the patient to address issues of ongoing signs, symptoms, or health concerns that remain over time without clear diagnosis despite evaluation and treatment, in a patient-centered, cost-effective manner | 747/3276 (22.8%)                               | 793          | 53.7%       | 85.0%      | 49.1% | 87.0% | 6.46* (4.46,9.37)    |
| PC05          | Performs specialty-appropriate procedures to meet the health care needs of individual patients, families, and communities, and is knowledgeable about procedures performed by other specialists to guide their patients’ care | 977/3276 (29.8%)                               | 930          | 47.6%       | 80.2%      | 49.5% | 78.9% | 3.66* (2.62,5.09)    |
| MK01          | Demonstrates medical knowledge of sufficient breadth and depth to practice family medicine   | 623/3276 (19.0%)                               | 1244         | 68.7%       | 69.3%      | 31.6% | 90.3% | 4.28* (3.01,6.08)    |
| MK02          | Applies critical thinking skills in patient care                                             | 952/3276 (29.1%)                               | 759          | 45.0%       | 85.5%      | 53.1% | 78.5% | 4.12* (2.94,5.77)    |
| SBP01         | Provides cost-conscious medical care                                                        | 881/3276 (26.9%)                               | 776          | 43.6%       | 84.4%      | 49.2% | 81.2% | 4.18* (2.83,6.19)    |
| SBP02         | Emphasizes patient safety                                                                   | 1262/3276 (38.5%)                              | 1371         | 61.9%       | 70.8%      | 56.4% | 74.9% | 3.86* (2.78,5.36)    |
Supplemental digital content for Holmboe ES, Yamazaki K, Nasca TJ, Hamstra SJ. Using longitudinal milestones data and learning analytics to facilitate the professional development of residents: Early lessons from three specialties. Acad Med.

| Subcompetency | Description of Subcompetency | # (%) residents not reaching L4 at graduation | # rated ≤ 2.5 | Sensitivity | Specificity | PPV | NPV | OR with CI (99.886CI) |
|---------------|------------------------------|----------------------------------------------|---------------|-------------|-------------|-----|-----|-----------------|
| SBP03         | Advocates for individual and community health | 1497/3276 (45.7%) | 1187 | 52.1% | 77.0% | 67.1% | 67.0% | 4.14* (3.01,5.70) |
| SBP04         | Coordinates team-based care | 586/3276 (17.9%) | 604 | 44.7% | 87.4% | 40.3% | 88.5% | 5.21* (3.48,7.80) |
| PBLI01        | Locates, appraises, and assimilates evidence from scientific studies related to the patients’ health problems | 1069/3276 (32.6%) | 1256 | 60.7% | 71.9% | 51.7% | 80.2% | 4.34* (3.15,5.98) |
| PBLI02        | Demonstrates self-directed learning | 967/3276 (29.5%) | 768 | 42.8% | 84.3% | 51.6% | 78.3% | 3.86* (2.70,5.53) |
| PBLI03        | Improves systems in which the physician provides care | 1737/3276 (53.0%) | 1584 | 62.1% | 65.8% | 67.4% | 59.5% | 3.03* (2.28,4.04) |
| PROF01        | Completes a process of professionalization | 680/3276 (20.8%) | 718 | 50.7% | 85.7% | 49.7% | 87.6% | 6.97* (4.78,10.14) |
| PROF02        | Demonstrates professional conduct and accountability | 1088/3276 (33.2%) | 996 | 56.8% | 82.3% | 62.0% | 79.6% | 6.38* (4.70,8.66) |
| PROF03        | Demonstrates humanism and cultural proficiency | 631/3276 (19.3%) | 566 | 39.6% | 88.2% | 46.3% | 86.8% | 5.70* (3.78,8.57) |
| PROF04        | Maintains emotional, physical, and mental health; and pursues continual personal and professional growth | 794/3276 (24.2%) | 819 | 52.6% | 83.4% | 50.3% | 85.0% | 5.74* (4.11,8.02) |
| ICS01         | Develops meaningful, therapeutic relationships with patients and families | 528/3276 (16.1%) | 452 | 34.7% | 90.9% | 43.6% | 89.1% | 6.34* (4.11,9.78) |
| ICS02         | Communicates effectively with patients, families, and the public | 622/3276 (19.0%) | 645 | 49.2% | 87.6% | 46.0% | 88.4% | 6.49* (4.29,9.83) |
| ICS03         | Develops relationships and effectively communicates with physicians, other health professionals, and health care teams | 870/3276 (26.6%) | 625 | 37.8% | 87.9% | 52.7% | 80.0% | 4.44* (3.13,6.30) |
| ICS04         | Utilizes technology to optimize communication | 766/3276 (23.4%) | 736 | 50.5% | 86.0% | 48.9% | 85.3% | 5.57* (3.79,8.19) |

*Significant at p < 0.00114 [0.05/(22*2)].
### Supplemental Digital Appendix 3C

#### Milestones Ratings and Predictive Analytics for the Third Milestones Review Occasion (December – January 2016 Reporting Period) for Emergency Medicine

| Subcompetency | Description of Subcompetency | # (%) residents not reaching L4 at graduation | # rated ≤ 2.5 | Sensitivity | Specificity | PPV | NPV | OR with CI (99.891CI) |
|---------------|------------------------------|---------------------------------------------|--------------|------------|------------|-----|-----|----------------------|
| PC01          | Emergency stabilization      | 199/1386 (14.4%)                           | 707          | 72.5%      | 53.5%      | 23.7% | 93.4% | 4.35* (2.10,9.01)   |
| PC02          | Performance of focused history and physical exam | 214/1386 (15.4%) | 712 | 75.1% | 51.9% | 25.0% | 93.0% | 4.40* (2.04,9.49) |
| PC03          | Diagnostic studies        | 260/1386 (18.8%)                           | 732          | 71.1%      | 50.7%      | 26.0% | 88.7% | 2.75* (1.55,4.90)   |
| PC04          | Diagnosis                   | 213/1386 (15.4%)                           | 732          | 73.1%      | 51.4%      | 24.2% | 92.6% | 3.96* (2.02,7.78)   |
| PC05          | Pharmacotherapy             | 291/1386 (21.0%)                           | 873          | 77.0%      | 40.6%      | 28.1% | 87.7% | 2.78* (1.42,5.44)   |
| PC06          | Observation and reassessment | 292/1386 (21.1%) | 698 | 65.5% | 52.9% | 28.9% | 83.5% | 2.06* (1.22,3.47) |
| PC07          | Disposition                 | 213/1386 (15.4%)                           | 703          | 69.2%      | 53.3%      | 24.1% | 91.8% | 3.55* (2.01,6.25)   |
| PC08          | Task switching               | 245/1386 (17.7%)                           | 718          | 75.8%      | 52.7%      | 28.2% | 92.2% | 4.60* (2.48,8.56)   |
| PC09          | General approach to procedures | 226/1386 (16.3%) | 724 | 70.0% | 50.6% | 23.6% | 90.3% | 2.86* (1.51,5.41) |
| PC10          | Airway management           | 158/1386 (11.4%)                           | 673          | 69.7%      | 54.1%      | 17.9% | 94.3% | 3.58* (1.47,8.72)   |
| PC11          | Anesthesia and acute pain management | 232/1386 (16.7%) | 875 | 72.3% | 39.2% | 20.6% | 87.7% | 1.84* (1.00,3.39) |
| PC12          | Ultrasound                  | 252/1386 (18.2%)                           | 546          | 61.0%      | 64.6%      | 30.6% | 89.9% | 3.91* (1.95,7.85)   |
| PC13          | Wound management            | 314/1386 (22.7%)                           | 816          | 69.2%      | 43.6%      | 27.8% | 80.8% | 1.62 (1.00,2.63)    |
| PC14          | Vascular access             | 184/1386 (13.3%)                           | 672          | 66.3%      | 53.8%      | 19.5% | 92.2% | 2.88* (1.47,5.65)   |
Supplemental digital content for Holmboe ES, Yamazaki K, Nasca TJ, Hamstra SJ. Using longitudinal milestones data and learning analytics to facilitate the professional development of residents: Early lessons from three specialties. Acad Med.

| Subcompetency | Description of Subcompetency | # (% residents not reaching L4 at graduation) | # rated ≤ 2.5 | Sensitivity | Specificity | PPV | NPV | OR with CI (99.891CI) |
|----------------|-----------------------------|---------------------------------------------|--------------|-------------|-------------|-----|-----|-----------------------|
| MK01           | Medical knowledge           | 428/1386 (30.9%)                           | 1018         | 85.7%       | 32.5%       | 38.0%| 87.2%| 4.17* (2.13, 8.16)   |
| SBP01          | Patient safety              | 302/1386 (21.8%)                           | 795          | 69.4%       | 45.3%       | 28.7%| 84.0%| 2.11* (1.24, 3.60)   |
| SBP02          | Systems-based management    | 290/1386 (20.9%)                           | 839          | 69.1%       | 41.6%       | 26.8%| 83.2%| 1.82* (1.13, 2.93)   |
| SBP03          | Technology                  | 247/1386 (17.8%)                           | 755          | 65.0%       | 47.6%       | 23.4%| 87.1%| 2.06* (1.08, 3.92)   |
| PBLI01         | Practice-based performance improvement | 342/1386 (24.7%) | 805 | 71.9% | 46.8% | 31.9% | 83.7% | 2.40* (1.40, 4.11) |
| PROF01         | Professional values         | 255/1386 (18.4%)                           | 620          | 63.3%       | 59.7%       | 28.6%| 88.7%| 3.15* (1.70, 5.83)   |
| PROF02         | Accountability              | 382/1386 (27.6%)                           | 680          | 65.1%       | 56.6%       | 36.7%| 81.4%| 2.54* (1.47, 4.38)   |
| ICS01          | Patient-centered communication | 212/1386 (15.3%) | 666 | 68.4% | 55.2% | 24.5% | 91.8% | 3.64* (1.82, 7.30) |
| ICS02          | Team management             | 283/1386 (20.4%)                           | 728          | 71.2%       | 53.2%       | 31.1%| 88.3%| 3.40* (1.91, 6.04)   |

*Significant at p < 0.0011 [0.05/(23*2)].
### Supplemental Digital Appendix 3D

**Milestones Ratings and Predictive Analytics for the Fourth Milestones Review Occasion (May – June 2017 Reporting Period) for Emergency Medicine**

| Subcompetency | Description of Subcompetency | # (% ) residents not reaching L4 at graduation | # rated ≤ 2.5 | Sensitivity | Specificity | PPV | NPV | OR with CI (99.891 CI) |
|---------------|-------------------------------|-----------------------------------------------|--------------|-------------|------------|-----|-----|-----------------------|
| PC01          | Emergency stabilization       | 199/1386 (14.4%)                             | 253          | 53.2%       | 87.8%      | 44.9% | 92.0% | 9.34* (4.67,18.66)    |
| PC02          | Performance of focused history and physical exam | 214/1386 (15.4%)                             | 215          | 45.5%       | 90.4%      | 47.1% | 89.8% | 7.81* (3.61,16.93)    |
| PC03          | Diagnostic studies            | 260/1386 (18.8%)                             | 231          | 46.2%       | 89.8%      | 45.2% | 87.0% | 5.52* (2.51,12.13)    |
| PC04          | Diagnosis                     | 213/1386 (15.4%)                             | 226          | 46.1%       | 89.5%      | 46.9% | 90.2% | 8.15* (3.82,17.36)    |
| PC05          | Pharmacotherapy               | 291/1386 (21.0%)                             | 307          | 50.9%       | 84.8%      | 49.0% | 85.8% | 5.80* (2.46,13.65)    |
| PC06          | Observation and reassessment  | 292/1386 (21.1%)                             | 211          | 38.5%       | 91.1%      | 50.3% | 82.7% | 4.82* (2.24,10.35)    |
| PC07          | Disposition                   | 213/1386 (15.4%)                             | 235          | 46.7%       | 88.7%      | 43.0% | 89.7% | 6.54* (3.20,13.35)    |
| PC08          | Task switching                | 245/1386 (17.7%)                             | 267          | 52.8%       | 88.2%      | 49.7% | 89.2% | 8.16* (4.29,15.51)    |
| PC09          | General approach to procedures| 226/1386 (16.3%)                             | 256          | 44.2%       | 87.0%      | 43.0% | 89.3% | 6.33* (3.06,13.11)    |
| PC10          | Airway management             | 158/1386 (11.4%)                             | 204          | 38.6%       | 89.2%      | 32.2% | 92.3% | 5.74* (2.36,13.96)    |
| PC11          | Anesthesia and acute pain management | 232/1386 (16.7%)                           | 343          | 50.9%       | 81.0%      | 36.4% | 89.6% | 4.96* (2.17,11.33)    |
| PC12          | Ultrasound                    | 252/1386 (18.2%)                             | 214          | 36.8%       | 89.8%      | 42.6% | 86.4% | 4.72* (2.05,10.89)    |
| PC13          | Wound management              | 314/1386 (22.7%)                             | 330          | 47.9%       | 83.6%      | 42.6% | 82.5% | 3.49* (1.71,7.16)     |
| PC14          | Vascular access               | 184/1386 (13.3%)                             | 246          | 42.9%       | 86.3%      | 31.3% | 90.9% | 4.57* (2.07,10.10)    |
| Subcompetency | Description of Subcompetency | # (% residents not reaching L4 at graduation) | # rated ≤ 2.5 | Sensitivity | Specificity | PPV  | NPV   | OR with CI (99.891CI) |
|---------------|-----------------------------|-----------------------------------------------|--------------|-------------|------------|------|-------|----------------------|
| MK01          | Medical knowledge           | 428/1386 (30.9%)                              | 400          | 52.8%       | 81.6%      | 56.1%| 79.4% | 4.93* (2.89,8.39)    |
| SBP01         | Patient safety              | 302/1386 (21.8%)                              | 290          | 42.5%       | 85.6%      | 47.6%| 83.9% | 4.71* (2.42,9.18)    |
| SBP02         | Systems-based management    | 290/1386 (20.9%)                              | 279          | 39.6%       | 85.1%      | 41.9%| 82.5% | 3.40* (1.76,6.59)    |
| SBP03         | Technology                  | 247/1386 (17.8%)                              | 233          | 41.1%       | 88.4%      | 43.0%| 86.8% | 4.96* (2.61,9.41)    |
| PBLI01        | Practice-based performance improvement | 342/1386 (24.7%)                             | 288          | 42.9%       | 87.6%      | 49.4%| 81.4% | 4.27* (2.50,7.27)    |
| PROF01        | Professional values         | 255/1386 (18.4%)                              | 205          | 37.0%       | 90.7%      | 49.2%| 86.4% | 6.18* (3.40,11.26)   |
| PROF02        | Accountability              | 382/1386 (27.6%)                              | 331          | 45.9%       | 85.6%      | 52.7%| 80.2% | 4.52* (2.60,7.87)    |
| ICS01         | Patient-centered communication | 212/1386 (15.3%)                             | 206          | 44.9%       | 90.3%      | 48.9%| 90.3% | 8.92* (4.59,17.32)   |
| ICS02         | Team management             | 283/1386 (20.4%)                              | 249          | 45.1%       | 89.5%      | 52.3%| 85.1% | 6.26* (3.52,11.14)   |

*Significant at p < 0.0011 [0.05/(23*2)].
**Supplemental Digital Appendix 3E**

**Milestones Ratings and Predictive Analytics for the Third Milestones Review Occasion (December – January 2016 Reporting Period) for Internal Medicine**

| Subcompetency | Description of Subcompetency | # (%): residents not reaching L4 at graduation | # rated ≤ 2.5 | Sensitivity | Specificity | PPV | NPV | OR with CI (99.886CI) |
|---------------|------------------------------|-----------------------------------------------|--------------|-------------|-------------|-----|-----|----------------------|
| PC01          | Gathers and synthesizes essential and accurate information to define each patient's clinical problem(s) | 367/7399 (5.0%) | 824 | 32.0% | 89.5% | 15.6% | 96.0% | 4.39* (2.53, 7.62) |
| PC02          | Develops and achieves comprehensive management plan for each patient | 445/7399 (6.0%) | 986 | 30.0% | 87.1% | 14.7% | 94.8% | 3.14* (1.95, 5.05) |
| PC03          | Manages patients with progressive responsibility and independence | 429/7399 (5.8%) | 961 | 33.0% | 87.8% | 15.6% | 95.3% | 3.78* (2.38, 6.01) |
| PC04          | Skill in performing procedures | 1090/7399 (14.7%) | 1956 | 39.3% | 75.5% | 21.8% | 87.5% | 1.96* (1.47, 2.61) |
| PC05          | Requests and provides consultative care | 483/7399 (6.5%) | 1281 | 27.2% | 84.5% | 12.6% | 94.2% | 2.36* (1.54, 3.61) |
| MK01          | Clinical knowledge | 851/7399 (=11.5%) | 1236 | 42.1% | 85.8% | 30.1% | 91.4% | 4.59* (3.19, 6.61) |
| MK02          | Knowledge of diagnostic testing and procedures | 720/7399 (9.7%) | 1159 | 33.3% | 85.5% | 21.3% | 92.0% | 3.11* (2.10, 4.60) |
| SBP01         | Works effectively within an | 416/7399 (5.6%) | 715 | 22.8% | 91.1% | 15.1% | 94.9% | 3.28* (1.97, 5.48) |
| Subcompetency | Description of Subcompetency | # (%): residents not reaching L4 at graduation | # rated ≤ 2.5: residents rated ≤ 2.5 | Sensitivity | Specificity | PPV | NPV | OR with CI (99.886CI) |
|---------------|-------------------------------|-----------------------------------------------|-------------------------------------|-------------|------------|-----|-----|---------------------|
| interprofessional team | | | | | | | | |
| SBP02 | Recognizes system error and advocates for system improvement | 715/7399 (9.7%) | 1255 | 27.6% | 84.1% | 17.4% | 90.8% | 2.09* (1.52,2.86) |
| SBP03 | Identifies forces that impact the cost of health care, and advocates for, and practices cost-effective care | 666/7399 (9.0%) | 1169 | 27.1% | 85.5% | 16.5% | 91.7% | 2.20* (1.47,3.29) |
| SBP04 | Transitions patients effectively within and across health delivery systems | 384/7399 (5.2%) | 830 | 22.3% | 89.2% | 11.7% | 95.2% | 2.63* (1.57,4.42) |
| PBLI01 | Monitors practice with a goal for improvement | 591/7399 (8.0%) | 940 | 23.9% | 88.0% | 16.4% | 92.6% | 2.47* (1.50,4.07) |
| PBLI02 | Learns and improves via performance audit | 846/7399 (11.4%) | 1698 | 32.9% | 79.6% | 18.7% | 90.1% | 2.10* (1.51,2.91) |
| PBLI03 | Learns and improves via feedback | 554/7399 (7.5%) | 794 | 23.5% | 90.4% | 18.3% | 93.1% | 3.04* (1.88,4.91) |
| PBLI04 | Learns and improves at the point of care | 508/7399 (6.9%) | 899 | 23.6% | 88.9% | 15.0% | 93.4% | 2.51* (1.64,3.85) |
| PROF01 | Has professional and respectful interactions with patients, caregivers and members of the | 387/7399 (5.2%) | 597 | 20.2% | 92.3% | 14.5% | 95.2% | 3.32* (1.99,5.54) |
| Subcompetency | Description of Subcompetency | # (%): residents not reaching L4 at graduation | # rated ≤ 2.5 | Sensitivity | Specificity | PPV  | NPV  | OR with CI (99.886CI) |
|---------------|-------------------------------|-----------------------------------------------|--------------|-------------|------------|------|------|---------------------|
| interprofessional team |                              |                                               |              |             |            |      |      |                     |
| PROF02 | Accepts responsibility and follows through on tasks | 627/7399 (8.5%) | 837 | 27.5% | 89.9% | 21.8% | 92.8% | 3.57* (2.46,5.19) |
| PROF03 | Responds to each patient’s unique characteristics and needs | 416/7399 (5.6%) | 742 | 17.1% | 90.3% | 11.2% | 94.6% | 2.20* (1.15,4.21) |
| PROF04 | Exhibits integrity and ethical behavior in professional conduct | 436/7399 (5.9%) | 626 | 19.3% | 92.2% | 14.9% | 94.3% | 2.92* (1.67,5.09) |
| ICS01 | Communicates effectively with patients and caregivers | 372/7399 (5.0%) | 685 | 22.7% | 91.4% | 13.9% | 95.5% | 3.45* (2.14,5.56) |
| ICS02 | Communicates effectively in interprofessional teams | 412/7399 (5.6%) | 681 | 20.0% | 91.3% | 13.5% | 94.8% | 2.83* (1.80,4.46) |
| ICS03 | Appropriate utilization and completion of health records | 434/7399 (5.9%) | 734 | 19.7% | 90.6% | 12.6% | 94.6% | 2.51* (1.42,4.42) |

*Significant at p < 0.00114 [0.05/(22*2)].
Supplemental Digital Appendix 3F
Milestones Ratings and Predictive Analytics for the Fourth Milestones Review Occasion (May – June 2017 Reporting Period) for Internal Medicine

| Subcompetency | Description of Subcompetency | # (% ) residents not reaching L4 at graduation | # rated ≤ 2.5 | Sensitivity | Specificity | PPV | NPV | OR with CI (99.886CI) |
|---------------|--------------------------------|-----------------------------------------------|--------------|------------|------------|-----|-----|----------------------|
| PC01          | Gathers and synthesizes essential and accurate information to define each patient's clinical problem(s) | 367/7399 (5.0%) | 277 | 17.6% | 96.6% | 21.2% | 95.4% | 5.65* (2.49,12.79) |
| PC02          | Develops and achieves comprehensive management plan for each patient | 445/7399 (6.0%) | 305 | 18.7% | 96.3% | 25.0% | 94.5% | 5.74* (3.28,10.03) |
| PC03          | Manages patients with progressive responsibility and independence | 429/7399 (5.8%) | 350 | 18.8% | 95.9% | 21.8% | 94.8% | 5.04* (2.80,9.06) |
| PC04          | Skill in performing procedures | 1090/7399 (14.7%) | 884 | 22.2% | 89.9% | 25.6% | 86.7% | 2.24* (1.66,3.03) |
| PC05          | Requests and provides consultative care | 483/7399 (6.5%) | 485 | 17.9% | 94.6% | 20.0% | 93.9% | 3.88* (2.22,6.79) |
| MK01          | Clinical knowledge | 851/7399 (11.5%) | 525 | 24.6% | 94.5% | 36.4% | 89.9% | 5.07* (3.42,7.50) |
| MK02          | Knowledge of diagnostic testing and procedures | 720/7399 (9.7%) | 484 | 21.2% | 94.5% | 28.1% | 91.3% | 4.07* (2.62,6.33) |
| SBP01         | Works effectively within an interprofessional team | 416/7399 (5.6%) | 266 | 14.6% | 97.0% | 23.1% | 94.7% | 5.33* (2.94,9.66) |
| SBP02         | Recognizes system error and advocates for system improvement | 715/7399 (9.7%) | 561 | 15.7% | 93.7% | 21.8% | 90.4% | 2.63* (1.66,4.17) |
| SBP03         | Identifies forces that impact the cost of healthcare, and advocates for, | 666/7399 (9.0%) | 483 | 13.1% | 94.4% | 18.7% | 91.1% | 2.35* (1.30,4.24) |
| Subcompetency | Description of Subcompetency                                                                 | # (% of residents not reaching L4 at graduation) | # rated ≤ 2.5 | Sensitivity | Specificity | PPV        | NPV        | OR with CI (99.886CI) |
|---------------|---------------------------------------------------------------------------------------------|--------------------------------------------------|---------------|-------------|------------|------------|------------|---------------------|
|               | and practices cost-effective care                                                           | 384/7399 (5.2%)                                  | 256           | 15.1%      | 96.9%      | 19.7%      | 95.1%      | 4.76* (2.38,9.52)    |
| SBP04         | Transitions patients effectively within and across health delivery systems                  | 591/7399 (8.0%)                                  | 362           | 14.2%      | 95.8%      | 23.1%      | 92.3%      | 3.61* (2.13,6.14)    |
| PBLI01        | Monitors practice with a goal for improvement                                              | 846/7399 (11.4%)                                 | 785           | 20.8%      | 91.8%      | 25.7%      | 89.8%      | 3.03* (1.85,4.98)    |
| PBLI02        | Learns and improves via performance audit                                                   | 554/7399 (7.5%)                                  | 281           | 14.0%      | 96.7%      | 25.9%      | 92.8%      | 4.47* (2.65,7.56)    |
| PBLI03        | Learns and improves via feedback                                                            | 508/7399 (6.9%)                                  | 300           | 14.9%      | 96.6%      | 23.7%      | 93.1%      | 4.21* (2.59,6.82)    |
| PBLI04        | Learns and improves at the point of care                                                    | 387/7399 (5.2%)                                  | 244           | 14.9%      | 97.2%      | 23.8%      | 95.1%      | 6.03* (3.45,10.53)   |
| PROF01        | Has professional and respectful interactions with patients, caregivers and members of the interprofessional team | 627/7399 (8.5%)                                  | 417           | 19.7%      | 95.4%      | 28.1%      | 92.3%      | 4.71* (2.94,7.56)    |
| PROF02        | Accepts responsibility and follows through on tasks                                          | 416/7399 (5.6%)                                  | 309           | 9.8%       | 96.3%      | 14.7%      | 94.4%      | 2.90* (1.17,7.17)    |
| PROF03        | Responds to each patient's unique characteristics and needs                                | 436/7399 (5.9%)                                  | 246           | 13.0%      | 97.0%      | 22.8%      | 94.2%      | 4.78* (2.61,8.74)    |
| PROF04        | Exhibits integrity and ethical behavior in professional conduct                           | 372/7399 (5.0%)                                  | 243           | 15.9%      | 97.1%      | 23.8%      | 95.4%      | 6.41* (3.46,11.87)   |
| Subcompetency | Description of Subcompetency | # (%) residents not reaching L4 at graduation | # rated ≤ 2.5 | Sensitivity | Specificity | PPV | NPV | OR with CI (99.886 CI) |
|---------------|-------------------------------|-----------------------------------------------|----------------|-------------|------------|-----|-----|-----------------------|
| ICS02         | Communicates effectively in interprofessional teams | 412/7399 (5.6%) | 261 | 16.8% | 97.0% | 26.3% | 94.8% | 6.54* (3.81, 11.20) |
| ICS03         | Appropriate utilization and completion of health records | 434/7399 (5.9%) | 283 | 12.2% | 96.4% | 17.7% | 94.4% | 3.60* (1.67, 7.76) |

*Significant at p < 0.00114 [0.05/(22*2)].
Supplemental Digital Appendix 4
Positive Predictive Value Matrix for All Subcompetencies by Milestone Rating Threshold and Milestone Review Occasion Across Post-Graduate Years by Specialty

Legend: This supplemental digital appendix provides the positive predictive value (PPV) matrices of all subcompetencies by each specialty for each milestone rating threshold and milestone rating occasion by post graduate year (PGY).

Supplemental Digital Appendix 4A
Positive Predictive Value Matrix for All Subcompetencies by Milestone Rating Threshold and Milestone Review Occasion Across Post-Graduate Years for Emergency Medicine

| Subcompetency | Milestone Rating Threshold | PGY 1 | PGY 2 | PGY 3 |
|---------------|----------------------------|-------|-------|-------|
|               |                            | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               |                            | % Probability of Not Attaining Level 4 by Graduation* |
| PC01          | ≤ Lev5.0                   |       |       |       |       |       |
| PC01          | ≤ Lev4.5                   |       |       |       |       |       |
| PC01          | ≤ Lev4.0                   |       |       |       |       |       |
| PC01          | ≤ Lev3.5                   |       |       |       |       |       |
| PC01          | ≤ Lev3.0                   |       |       |       |       |       |
| PC01          | ≤ Lev2.5                   | 15.9% | 16.4% | 23.7% | 44.9% | 63.1% |
| PC01          | ≤ Lev2.0                   | 16.5% | 20.0% | 39.2% | 50.7% |       |
| PC01          | ≤ Lev1.5                   | 20.6% | 35.3% | 53.1% | 47.1% |       |
| PC01          | ≤ Lev1.0                   | 35.4% | 52.4% | 34.4% |       |       |
| PC01          | = Lev0.0                   | 46.1% |       |       |       |       |
| PC02          | ≤ Lev5.0                   |       |       |       |       |       |
| PC02          | ≤ Lev4.5                   |       |       |       |       |       |
| PC02          | ≤ Lev4.0                   |       |       |       |       |       |
| PC02          | ≤ Lev3.5                   |       |       |       |       |       |
| PC02          | ≤ Lev3.0                   |       |       |       |       |       |
| PC02          | ≤ Lev2.5                   | 16.8% | 18.0% | 21.4% | 49.8% |       |
| PC02          | ≤ Lev2.0                   | 16.8% | 18.3% | 25.0% | 47.1% | 53.3% |
Supplemental digital content for Holmboe ES, Yamazaki K, Nasca TJ, Hamstra SJ. Using longitudinal milestones data and learning analytics to facilitate the professional development of residents: Early lessons from three specialties. Acad Med.

| Subcompetency | Milestone Rating Threshold | PGY 1 | PGY 2 | PGY 3 |
|---------------|----------------------------|-------|-------|-------|
|               |                            | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
| PC02          | ≤ Lev2.0                   | 17.5%   | 22.1%  | 37.2%  | 43.9%  | 45.7%  |
| PC02          | ≤ Lev1.5                   | 21.0%   | 31.5%  | 42.6%  | 50.4%  |
| PC02          | ≤ Lev1.0                   | 33.7%   | 60.1%  | 55.5%  |        |
| PC02          | = Lev0.0                   | 68.6%   |        |        |        |
| PC03          | ≤ Lev5.0                   |        |        |        |        |        |
| PC03          | ≤ Lev4.5                   |        |        |        |        |        |
| PC03          | ≤ Lev4.0                   |        |        |        |        |        |
| PC03          | ≤ Lev3.5                   |        |        |        |        |        |
| PC03          | ≤ Lev3.0                   |        |        |        |        |        |
| PC03          | ≤ Lev2.5                   |        |        |        |        |        |
| PC03          | ≤ Lev2.0                   |        |        |        |        |        |
| PC03          | ≤ Lev1.5                   |        |        |        |        |
| PC03          | ≤ Lev1.0                   |        |        |        |
| PC03          | = Lev0.0                   |        |        |        |
| PC04          | ≤ Lev5.0                   |        |        |        |        |
| PC04          | ≤ Lev4.5                   |        |        |        |        |
| PC04          | ≤ Lev4.0                   |        |        |        |        |
| PC04          | ≤ Lev3.5                   |        |        |        |        |
| PC04          | ≤ Lev3.0                   |        |        |        |        |
| PC04          | ≤ Lev2.5                   |        |        |        |        |
| PC04          | ≤ Lev2.0                   |        |        |        |        |
| PC04          | ≤ Lev1.5                   |        |        |        |
| PC04          | ≤ Lev1.0                   |        |        |
| PC04          | = Lev0.0                   |        |        |

*% Probability of Not Attaining Level 4 by Graduation

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| Subcompetency | Milestone Rating Threshold | PGY 1 mid-Year 1 | Year-End 1 | PGY 2 mid-Year 2 | Year-End 2 | PGY 3 mid-Year 3 |
|---------------|-----------------------------|------------------|------------|------------------|------------|------------------|
| PC05          | ≤ Lev5.0                    |                  |            |                  |            |                  |
| PC05          | ≤ Lev4.5                    |                  |            |                  |            |                  |
| PC05          | ≤ Lev4.0                    |                  |            |                  |            |                  |
| PC05          | ≤ Lev3.5                    |                  |            |                  |            |                  |
| PC05          | ≤ Lev3.0                    | 23.9%            |            | 25.5%            |            | 49.7%            |
| PC05          | ≤ Lev2.5                    | 22.7%            | 23.3%      | 28.1%            | 49.0%      | 64.5%            |
| PC05          | ≤ Lev2.0                    | 23.0%            | 24.8%      | 41.9%            | 55.0%      | 69.3%            |
| PC05          | ≤ Lev1.5                    | 24.6%            | 36.6%      | 47.3%            | 61.0%      | 80.1%            |
| PC05          | ≤ Lev1.0                    | 31.8%            | 47.4%      | 65.6%            | 61.6%      |                  |
| PC05          | = Lev0.0                    | 47.4%            | 61.3%      | 37.0%            |            | 47.1%            |
| PC06          | ≤ Lev5.0                    |                  |            |                  |            |                  |
| PC06          | ≤ Lev4.5                    |                  |            |                  |            |                  |
| PC06          | ≤ Lev4.0                    |                  |            |                  |            |                  |
| PC06          | ≤ Lev3.5                    |                  |            |                  |            |                  |
| PC06          | ≤ Lev3.0                    |                  |            |                  |            |                  |
| PC06          | ≤ Lev2.5                    |                  |            |                  |            |                  |
| PC06          | ≤ Lev2.0                    |                  |            |                  |            |                  |
| PC06          | ≤ Lev1.5                    |                  |            |                  |            |                  |
| PC06          | ≤ Lev1.0                    |                  |            |                  |            |                  |
| PC06          | = Lev0.0                    |                  |            |                  |            |                  |
| PC07          | ≤ Lev5.0                    |                  |            |                  |            |                  |
| PC07          | ≤ Lev4.5                    |                  |            |                  |            |                  |
| PC07          | ≤ Lev4.0                    |                  |            |                  |            |                  |
| PC07          | ≤ Lev3.5                    |                  |            |                  |            |                  |
| PC07          | ≤ Lev3.0                    |                  |            |                  |            |                  |

*% Probability of Not Attaining Level 4 by Graduation*
| Subcompetency | Milestone Rating Threshold | PGY 1 (Mid-Year) | PGY 1 (Year-End) | PGY 2 (Mid-Year) | PGY 2 (Year-End) | PGY 3 (Mid-Year) |
|---------------|---------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|               |                           | % Probability of Not Attaining Level 4 by Graduation*       |                  |                  |                  |                  |
| PC07          | ≤ Lev2.5                  | 16.4%           | 17.9%           | 24.1%           | 43.0%           | 60.4%           |
| PC07          | ≤ Lev2.0                  | 16.8%           | 21.6%           | 37.6%           | 51.9%           | 47.7%           |
| PC07          | ≤ Lev1.5                  | 19.4%           | 39.4%           | 52.3%           | 41.5%           |                  |
| PC07          | ≤ Lev1.0                  | 31.1%           | 50.7%           | 39.8%           |                 |                 |
| PC07          | = Lev0.0                  | 30.4%           | 48.4%           |                 |                 |                 |
| PC08          | ≤ Lev5.0                  |                 |                 |                 |                 |                 |
| PC08          | ≤ Lev4.5                  |                 |                 |                 |                 |                 |
| PC08          | ≤ Lev4.0                  |                 |                 |                 |                 |                 |
| PC08          | ≤ Lev3.5                  |                 |                 |                  | 20.3%           | 28.6%           |
| PC08          | ≤ Lev3.0                  |                 |                 | 18.9%           | 20.1%           | 25.3%           |
| PC08          | ≤ Lev2.5                  |                 |                 | 19.3%           | 20.2%           | 28.2%           |
| PC08          | ≤ Lev2.0                  |                 |                 | 19.7%           | 24.5%           | 45.7%           |
| PC08          | ≤ Lev1.5                  |                 |                 | 23.8%           | 42.4%           | 50.3%           |
| PC08          | ≤ Lev1.0                  |                 |                 | 41.9%           | 50.9%           | 38.8%           |
| PC08          | = Lev0.0                  |                 |                 | 43.5%           |                 |                 |
| PC09          | ≤ Lev5.0                  |                 |                 |                 |                 |                 |
| PC09          | ≤ Lev4.5                  |                 |                 |                 |                 |                 |
| PC09          | ≤ Lev4.0                  |                 |                 |                 |                 |                 |
| PC09          | ≤ Lev3.5                  |                 |                 | 17.1%           | 17.9%           | 25.6%           |
| PC09          | ≤ Lev3.0                  |                 |                 | 17.1%           | 18.0%           | 22.0%           |
| PC09          | ≤ Lev2.5                  | 17.4%           | 17.7%           | 23.6%           | 43.0%           | 54.8%           |
| PC09          | ≤ Lev2.0                  | 17.4%           | 19.4%           | 32.1%           | 46.8%           | 42.4%           |
| PC09          | ≤ Lev1.5                  | 19.1%           | 31.6%           | 38.2%           | 56.3%           | 15.3%           |
| PC09          | ≤ Lev1.0                  | 29.6%           | 37.2%           | 34.6%           | 20.8%           |                 |
| PC09          | = Lev0.0                  | 34.4%           |                 |                 |                 | 15.8%           |
Supplemental digital content for Holmboe ES, Yamazaki K, Nasca TJ, Hamstra SJ. Using longitudinal milestones data and learning analytics to facilitate the professional development of residents: Early lessons from three specialties. Acad Med.

| Subcompetency | Milestone Rating Threshold | PGY 1 | PGY2 | PGY3 |
|---------------|----------------------------|-------|------|------|
|               |                            | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               |                            | % Probability of Not Attaining Level 4 by Graduation* |       |       |       |
| PC10          | ≤ Lev5.0                   |         |       |       |       |       |
| PC10          | ≤ Lev4.5                   |         |       |       |       |       |
| PC10          | ≤ Lev4.0                   |         |       |       |       |       |
| PC10          | ≤ Lev3.5                   | 12.6%   | 13.0% | 20.1% |       |       |
| PC10          | ≤ Lev3.0                   | 13.4%   | 16.3% | 41.4% |       |       |
| PC10          | ≤ Lev2.5                   | 13.1%   | 17.9% | 32.2% | 49.3% |       |
| PC10          | ≤ Lev2.0                   | 12.7%   | 14.1% | 26.2% | 37.1% | 54.2% |
| PC10          | ≤ Lev1.5                   | 13.9%   | 21.6% | 24.2% | 37.7% |       |
| PC10          | ≤ Lev1.0                   | 20.7%   | 24.1% | 40.2% | 51.2% |       |
| PC10          | = Lev0.0                   | 23.2%   | 30.4% |       |       |       |
| PC11          | ≤ Lev5.0                   |         |       |       |       |       |
| PC11          | ≤ Lev4.5                   |         |       |       |       |       |
| PC11          | ≤ Lev4.0                   |         |       |       |       |       |
| PC11          | ≤ Lev3.5                   | 17.7%   |       | 18.3% | 24.8% |       |
| PC11          | ≤ Lev3.0                   | 17.7%   | 18.5% | 19.6% | 42.3% |       |
| PC11          | ≤ Lev2.5                   | 17.6%   | 17.7% | 20.6% | 36.4% | 58.2% |
| PC11          | ≤ Lev2.0                   | 17.6%   | 19.5% | 28.5% | 44.0% | 60.0% |
| PC11          | ≤ Lev1.5                   | 19.3%   | 30.4% | 43.0% | 36.0% | 72.1% |
| PC11          | ≤ Lev1.0                   | 28.1%   | 43.4% | 42.9% | 54.5% | 82.6% |
| PC11          | = Lev0.0                   | 35.6%   | 24.2% | 5.1%  | 39.4% | 38.1% |
| PC12          | ≤ Lev5.0                   |         |       |       |       |       |
| PC12          | ≤ Lev4.5                   |         |       |       |       |       |
| PC12          | ≤ Lev4.0                   |         |       |       |       | 19.4% |
| PC12          | ≤ Lev3.5                   | 19.7%   | 21.2% | 25.0% | 36.1% |       |

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| Subcompetency | Milestone Rating Threshold | PGY 1 Mid-Year 1 | Year-End 1 | PGY 2 Mid-Year 2 | Year-End 2 | PGY 3 Mid-Year 3 |
|---------------|---------------------------|------------------|------------|------------------|------------|------------------|
|               |                           |                  |            |                  |            |                  |
| PC12          | ≤ Lev3.0                  | 20.1%            | 23.1%      | 30.2%            | 53.6%      |
| PC12          | ≤ Lev2.5                  | 19.1%            | 22.4%      | 30.6%            | 42.6%      | 58.7%            |
| PC12          | ≤ Lev2.0                  | 19.3%            | 23.2%      | 33.3%            | 49.4%      | 78.2%            |
| PC12          | ≤ Lev1.5                  | 20.4%            | 29.0%      | 36.2%            | 57.3%      |
| PC12          | ≤ Lev1.0                  | 26.5%            | 28.3%      | 36.5%            |            |
| PC12          | = Lev0.0                  | 35.1%            | 47.0%      | 52.0%            |            |
| PC13          | ≤ Lev5.0                  |                  |            |                  |            |                  |
| PC13          | ≤ Lev4.5                  |                  |            |                  |            |                  |
| PC13          | ≤ Lev4.0                  |                  |            |                  |            | 24.6%            |
| PC13          | ≤ Lev3.5                  |                  |            | 24.7%            |            | 29.8%            |
| PC13          | ≤ Lev3.0                  |                  |            | 24.4%            | 24.9%      | 26.4%            | 48.4%            |
| PC13          | ≤ Lev2.5                  | 24.6%            | 25.3%      | 27.8%            | 42.6%      | 55.5%            |
| PC13          | ≤ Lev2.0                  | 24.8%            | 26.3%      | 39.1%            | 47.8%      | 62.4%            |
| PC13          | ≤ Lev1.5                  | 27.4%            | 35.2%      | 49.5%            | 42.1%      | 51.3%            |
| PC13          | ≤ Lev1.0                  | 33.2%            | 52.3%      | 39.7%            |            |
| PC13          | = Lev0.0                  | 33.6%            | 54.0%      |                  |            |
| PC14          | ≤ Lev5.0                  |                  |            |                  |            |                  |
| PC14          | ≤ Lev4.5                  |                  |            |                  |            |                  |
| PC14          | ≤ Lev4.0                  |                  |            |                  |            | 14.1%            |
| PC14          | ≤ Lev3.5                  |                  |            |                  |            | 16.7%            | 26.3%            |
| PC14          | ≤ Lev3.0                  |                  |            |                  |            | 14.3%            | 16.0%            | 19.0%            | 44.6%            |
| PC14          | ≤ Lev2.5                  | 14.2%            | 14.9%      | 19.5%            | 31.3%      | 50.0%            |
| PC14          | ≤ Lev2.0                  | 14.2%            | 15.9%      | 25.1%            | 35.1%      | 56.8%            |
| PC14          | ≤ Lev1.5                  | 15.9%            | 22.5%      | 39.0%            | 39.8%      | 52.6%            |
| PC14          | ≤ Lev1.0                  | 19.6%            | 24.8%      | 49.2%            | 46.6%      |

*% Probability of Not Attaining Level 4 by Graduation*
| Subcompetency | Milestone Rating Threshold | PGY 1 |         |         |         |
|---------------|---------------------------|-------|---------|---------|---------|
|               |                           | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               |                           | % Probability of Not Attaining Level 4 by Graduation* |
| PC14          | = Lev0.0                  | 33.1% | 55.0%   | 38.9%   | 29.6%   |
| MK01          | ≤ Lev5.0                  |       |         |         |         |
| MK01          | ≤ Lev4.5                  |       |         |         |         |
| MK01          | ≤ Lev4.0                  |       |         |         |         |
| MK01          | ≤ Lev3.5                  |       |         |         |         |
| MK01          | ≤ Lev3.0                  |       |         |         |         |
| MK01          | ≤ Lev2.5                  |       |         |         |         |
| MK01          | ≤ Lev2.0                  |       |         |         |         |
| MK01          | ≤ Lev1.5                  |       |         |         |         |
| MK01          | ≤ Lev1.0                  |       |         |         |         |
|               | = Lev0.0                  |       |         |         |         |
| SBP01         | ≤ Lev5.0                  |       |         |         |         |
| SBP01         | ≤ Lev4.5                  |       |         |         |         |
| SBP01         | ≤ Lev4.0                  |       |         |         |         |
| SBP01         | ≤ Lev3.5                  |       |         |         |         |
| SBP01         | ≤ Lev3.0                  |       |         |         |         |
| SBP01         | ≤ Lev2.5                  |       |         |         |         |
| SBP01         | ≤ Lev2.0                  |       |         |         |         |
| SBP01         | ≤ Lev1.5                  |       |         |         |         |
| SBP01         | ≤ Lev1.0                  |       |         |         |         |
| SBP01         | = Lev0.0                  |       |         |         |         |
| SBP02         | ≤ Lev5.0                  |       |         |         |         |
| Subcompetency | Milestone Rating Threshold | PGY 1 | PGY 2 | PGY 3 |
|---------------|---------------------------|-------|-------|-------|
|               |                           | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               |                           | % Probability of Not Attaining Level 4 by Graduation* |
| SBP02         | ≤ Lev4.5                  |       |       |       |       |
| SBP02         | ≤ Lev4.0                  |       |       |       |       |
| SBP02         | ≤ Lev3.5                  |       | 23.2% | 24.4% | 26.1% | 29.2% |
| SBP02         | ≤ Lev3.0                  |       | 23.4% | 24.4% | 26.1% | 53.5% |
| SBP02         | ≤ Lev2.5                  | 23.4% | 24.5% | 26.8% | 41.9% | 59.2% |
| SBP02         | ≤ Lev2.0                  | 23.5% | 26.6% | 41.3% | 45.3% |
| SBP02         | ≤ Lev1.5                  | 24.8% | 42.0% | 46.0% | 67.4% |
| SBP02         | ≤ Lev1.0                  | 33.8% | 39.2% | 47.7% |
| SBP02         | = Lev0.0                  | 28.3% |       |       |       |
| SBP03         | ≤ Lev5.0                  |       |       |       |       |
| SBP03         | ≤ Lev4.5                  |       |       |       |       |
| SBP03         | ≤ Lev4.0                  |       |       |       |       |
| SBP03         | ≤ Lev3.5                  |       | 19.6% | 20.2% | 26.7% |
| SBP03         | ≤ Lev3.0                  |       | 19.6% | 20.7% | 22.7% | 46.0% |
| SBP03         | ≤ Lev2.5                  | 19.4% | 20.2% | 23.4% | 43.0% | 54.9% |
| SBP03         | ≤ Lev2.0                  | 19.3% | 22.6% | 33.6% | 49.1% | 65.9% |
| SBP03         | ≤ Lev1.5                  | 22.0% | 34.6% | 44.5% | 55.8% | 31.1% |
| SBP03         | ≤ Lev1.0                  | 28.6% | 42.0% | 54.7% | 53.8% |
| SBP03         | = Lev0.0                  | 41.9% | 21.6% | 53.8% |
| PBLI01        | ≤ Lev5.0                  |       |       |       |       |
| PBLI01        | ≤ Lev4.5                  |       |       |       |       |
| PBLI01        | ≤ Lev4.0                  |       | 25.6% | 26.2% |
| PBLI01        | ≤ Lev3.5                  |       | 26.2% | 31.9% |
| Subcompetency | Milestone Rating Threshold | PGY 1 | PGY 2 | PGY 3 |
|---------------|-----------------------------|-------|-------|-------|
|               | % Probability of Not Attaining Level 4 by Graduation* | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
| PBLI01        | ≤ Lev3.0                    | 25.7% | 26.3% | 29.2% | 49.3% |
| PBLI01        | ≤ Lev2.5                    | 25.6% | 26.1% | 31.9% | 49.4% | 63.7% |
| PBLI01        | ≤ Lev2.0                    | 25.9% | 29.5% | 39.3% | 50.5% | 48.8% |
| PBLI01        | ≤ Lev1.5                    | 27.6% | 37.6% | 50.9% | 56.8% | 37.6% |
| PBLI01        | ≤ Lev1.0                    | 34.6% | 43.3% | 58.5% | 51.7% |
| PBLI01        | = Lev0.0                    | 37.5% |       |       |       | 41.0% |
| PROF01        | ≤ Lev5.0                    |       |       |       |       |       |
| PROF01        | ≤ Lev4.5                    |       |       |       |       |       |
| PROF01        | ≤ Lev4.0                    |       |       |       |       |       |
| PROF01        | ≤ Lev3.5                    |       |       |       |       | 31.4% |
| PROF01        | ≤ Lev3.0                    | 19.9% | 21.2% | 25.9% | 52.7% |
| PROF01        | ≤ Lev2.5                    | 20.4% | 22.8% | 28.6% | 49.2% | 71.2% |
| PROF01        | ≤ Lev2.0                    | 20.7% | 26.7% | 40.7% | 53.5% | 70.1% |
| PROF01        | ≤ Lev1.5                    | 27.0% | 40.4% | 55.2% | 60.4% | 66.8% |
| PROF01        | ≤ Lev1.0                    | 39.0% | 49.8% |       |       |       |
| PROF01        | = Lev0.0                    | 27.1% | 24.6% |       |       |       |
| PROF02        | ≤ Lev5.0                    |       |       |       |       |       |
| PROF02        | ≤ Lev4.5                    |       |       |       |       | 27.7% |
| PROF02        | ≤ Lev4.0                    |       |       |       |       | 27.9% | 28.6% |
| PROF02        | ≤ Lev3.5                    |       |       |       |       | 28.2% | 28.1% | 28.8% | 38.0% |
| PROF02        | ≤ Lev3.0                    |       |       |       |       | 28.8% | 29.2% | 33.8% | 57.4% |
| PROF02        | ≤ Lev2.5                    |       |       |       |       | 28.7% | 30.9% | 36.7% | 52.7% | 71.7% |
| PROF02        | ≤ Lev2.0                    |       |       |       |       | 29.1% | 32.9% | 44.8% | 50.6% | 63.3% |
Supplemental digital content for Holmboe ES, Yamazaki K, Nasca TJ, Hamstra SJ. Using longitudinal milestones data and learning analytics to facilitate the professional development of residents: Early lessons from three specialties. Acad Med.

| Subcompetency | Milestone Rating Threshold | PGY 1 | PGY2 | PGY3 |
|---------------|-----------------------------|-------|------|------|
| PROF02        | ≤ Lev1.5                    | 33.6% | 46.8%| 69.2%|
| PROF02        | ≤ Lev1.0                    | 37.7% | 51.2%| 73.9%|
| PROF02        | = Lev0.0                    | 54.9% | 85.8%| 66.2%|
| ICS01         | ≤ Lev5.0                    |       |      |      |
| ICS01         | ≤ Lev4.5                    |       |      |      |
| ICS01         | ≤ Lev4.0                    |       |      |      |
| ICS01         | ≤ Lev3.5                    |       |      | 25.7%|
| ICS01         | ≤ Lev3.0                    | 16.4% | 17.4%| 52.3%|
| ICS01         | ≤ Lev2.5                    | 16.8% | 18.1%| 71.2%|
| ICS01         | ≤ Lev2.0                    | 17.1% | 20.5%| 63.8%|
| ICS01         | ≤ Lev1.5                    | 19.6% | 33.5%| 48.7%|
| ICS01         | ≤ Lev1.0                    | 30.5% | 48.7%| 70.3%|
| ICS01         | = Lev0.0                    | 32.2% | 29.0%| 34.3%|
| ICS02         | ≤ Lev5.0                    |       |      |      |
| ICS02         | ≤ Lev4.5                    |       |      |      |
| ICS02         | ≤ Lev4.0                    |       |      |      |
| ICS02         | ≤ Lev3.5                    |       |      | 32.8%|
| ICS02         | ≤ Lev3.0                    |       | 23.5%| 58.4%|
| ICS02         | ≤ Lev2.5                    |       | 22.7%| 91.5%|
| ICS02         | ≤ Lev2.0                    |       | 23.6%| 70.6%|
| ICS02         | ≤ Lev1.5                    |       | 25.9%| 86.5%|
| ICS02         | ≤ Lev1.0                    |       | 36.1%| 55.3%|
| ICS02         | = Lev0.0                    |       | 41.8%|      |
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*Probability (%) of a resident not reaching Level 4 at the time of graduation based on the Milestones rating by the time of assessment (Academic Years 2015-18). Please refer to supplemental digital appendix 1 or the online milestones document for the description of each emergency medicine subcompetency: https://www.acgme.org/Portals/0/PDFs/Milestones/EmergencyMedicineMilestones.pdf?ver=2015-11-06-120531-877

Supplemental Digital Appendix 4B
Positive Predictive Value Matrix for All Subcompetencies by Milestone Rating Threshold and Milestone Review Occasion Across Post-Graduate Years for Family Medicine

| Subcompetency | Milestone Rating Threshold | PGY1 | PGY2 | PGY3 |
|---------------|-----------------------------|------|------|------|
|               |                             | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
| PC01          | ≤ Lev5.0                    |            |        |      |      |          |
| PC01          | ≤ Lev4.5                    |            |        |      |      |          |
| PC01          | ≤ Lev4.0                    |            |        |      |      |          |
| PC01          | ≤ Lev3.5                    | 18.3%      |        |      |      |          |
| PC01          | ≤ Lev3.0                    | 18.3%      | 18.7%  |      |      |          |
| PC01          | ≤ Lev2.5                    | 18.5%      | 19.6%  | 26.7%|      |          |
| PC01          | ≤ Lev2.0                    | 19.0%      | 23.1%  | 39.9%| 52.3%|          |
| PC01          | ≤ Lev1.5                    | 21.2%      | 33.8%  | 43.1%| 53.1%|          |
| PC01          | ≤ Lev1.0                    | 26.6%      | 37.4%  | 46.9%|      |          |
| PC01          | = Lev0.0                    | 36.0%      | 19.8%  |      |      |          |
| PC02          | ≤ Lev5.0                    |            |        |      |      |          |
| PC02          | ≤ Lev4.5                    |            |        |      |      |          |
| PC02          | ≤ Lev4.0                    |            |        |      |      |          |
| PC02          | ≤ Lev3.5                    | 20.9%      | 21.0%  | 21.3%| 22.6%| 32.7%    |
| PC02          | ≤ Lev3.0                    | 21.0%      | 21.0%  | 23.0%| 27.4%| 54.1%    |
| PC02          | ≤ Lev2.5                    | 21.1%      | 21.8%  | 28.8%| 45.2%| 68.8%    |
| PC02          | ≤ Lev2.0                    | 21.5%      | 24.3%  | 39.7%| 51.3%| 70.0%    |

Probabilities are not shown in the original text, so the values have been calculated based on the provided data.
Supplemental digital content for Holmboe ES, Yamazaki K, Nasca TJ, Hamstra SJ. Using longitudinal milestones data and learning analytics to facilitate the professional development of residents: Early lessons from three specialties. Acad Med.

| Subcompetency | Milestone Rating Threshold | PGY1 | PGY2 | PGY3 |
|---------------|----------------------------|------|------|------|
|               |                            | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               |                            | % Probability of Not Attaining Level 4 by Graduation* |
| PC02          | ≤ Lev1.5                   | 23.6% | 34.3% | 47.0% | 70.5% |
| PC02          | ≤ Lev1.0                   | 29.3% | 44.3% | 63.0% |
| PC02          | = Lev0.0                   | 39.0% | 43.2% | 45.4% |
| PC03          | ≤ Lev5.0                   |       |       |       |       |
| PC03          | ≤ Lev4.5                   |       |       |       |       |
| PC03          | ≤ Lev4.0                   |       |       |       |       |
| PC03          | ≤ Lev3.5                   | 32.6% | 32.9% | 33.5% | 42.6% |
| PC03          | ≤ Lev3.0                   | 32.6% | 32.9% | 34.3% | 38.0% | 60.5% |
| PC03          | ≤ Lev2.5                   | 32.8% | 33.4% | 38.8% | 52.9% | 71.5% |
| PC03          | ≤ Lev2.0                   | 33.4% | 36.4% | 48.7% | 55.7% |
| PC03          | ≤ Lev1.5                   | 35.8% | 48.1% | 56.2% | 43.2% |
| PC03          | ≤ Lev1.0                   | 42.2% | 52.0% | 75.6% |
| PC03          | = Lev0.0                   | 45.4% | 84.8% |
| PC04          | ≤ Lev5.0                   |       |       |       |       |
| PC04          | ≤ Lev4.5                   |       |       |       |       |
| PC04          | ≤ Lev4.0                   |       |       |       |       |
| PC04          | ≤ Lev3.5                   | 22.5% | 23.0% | 24.6% | 34.5% |
| PC04          | ≤ Lev3.0                   | 22.5% | 22.7% | 24.7% | 30.3% | 56.4% |
| PC04          | ≤ Lev2.5                   | 22.6% | 23.3% | 30.9% | 49.1% | 70.8% |
| PC04          | ≤ Lev2.0                   | 23.1% | 26.2% | 41.1% | 53.6% |
| PC04          | ≤ Lev1.5                   | 25.0% | 33.6% | 46.3% | 44.2% |
| PC04          | ≤ Lev1.0                   | 29.2% | 39.8% | 60.3% |
| PC04          | = Lev0.0                   | 36.9% | 48.6% |

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| Subcompetency | Milestone Rating Threshold | PGY1 | PGY2 | PGY3 |
|----------------|---------------------------|------|------|------|
|                |                           | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
| PC05           | ≤ Lev 5.0                 |           |      |      |      |
| PC05           | ≤ Lev 4.5                 |           |      |      |      |
| PC05           | ≤ Lev 4.0                 |           | 29.6% | 29.6% | 29.6% | 29.7% |
| PC05           | ≤ Lev 3.5                 |           | 29.6% | 29.6% | 29.8% | 30.4% | 37.4% |
| PC05           | ≤ Lev 3.0                 |           | 29.6% | 29.8% | 31.2% | 35.6% | 54.8% |
| PC05           | ≤ Lev 2.5                 |           | 29.9% | 30.7% | 36.4% | 49.5% | 67.0% |
| PC05           | ≤ Lev 2.0                 |           | 30.3% | 32.9% | 45.7% | 57.3% | 69.6% |
| PC05           | ≤ Lev 1.5                 |           | 32.7% | 39.4% | 52.7% | 56.6% |
| PC05           | ≤ Lev 1.0                 |           | 34.7% | 44.0% | 50.9% | 38.3% |
| PC05           | = Lev 0.0                 |           | 40.0% | 43.4% | 57.8% | 27.8% |
| MK01           | ≤ Lev 5.0                 |           |      |      |      |
| MK01           | ≤ Lev 4.5                 |           |      |      |      |
| MK01           | ≤ Lev 4.0                 |           |      |      |      |
| MK01           | ≤ Lev 3.5                 |           | 18.4% | 18.6% | 19.5% | 27.4% |
| MK01           | ≤ Lev 3.0                 |           | 18.4% | 18.5% | 20.0% | 22.7% | 36.1% |
| MK01           | ≤ Lev 2.5                 |           | 18.8% | 19.7% | 24.2% | 31.6% | 37.4% |
| MK01           | ≤ Lev 2.0                 |           | 19.0% | 21.6% | 27.7% | 34.2% | 41.4% |
| MK01           | ≤ Lev 1.5                 |           | 20.9% | 29.5% | 37.2% | 37.8% | 49.5% |
| MK01           | ≤ Lev 1.0                 |           | 25.3% | 32.7% | 33.4% | 37.5% | 36.1% |
| MK01           | = Lev 0.0                 |           | 35.1% | 38.6% | 15.2% |
| MK02           | ≤ Lev 5.0                 |           |      |      |      |
| MK02           | ≤ Lev 4.5                 |           |      |      |      |
| MK02           | ≤ Lev 4.0                 |           |      |      |      |

* % Probability of Not Attaining Level 4 by Graduation

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| Subcompetency | Milestone Rating Threshold | PGY1 |        |        |        |
|---------------|---------------------------|------|--------|--------|--------|
|               |                           | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               |                           | % Probability of Not Attaining Level 4 by Graduation* |        |        |        |
| MK02          | ≤ Lev3.5                  | 29.3% | 29.6%  | 30.6%  | 39.2%  |
| MK02          | ≤ Lev3.0                  | 29.5% | 29.7%  | 32.4%  | 37.1%  | 62.1%  |
| MK02          | ≤ Lev2.5                  | 29.8% | 31.3%  | 38.7%  | 53.1%  | 70.7%  |
| MK02          | ≤ Lev2.0                  | 30.8% | 34.7%  | 46.6%  | 60.0%  | 73.2%  |
| MK02          | ≤ Lev1.5                  | 33.8% | 45.0%  | 50.9%  | 63.2%  | 88.2%  |
| MK02          | = Lev0.0                  | 53.7% | 66.3%  | 66.6%  |        |
| SBP01         | ≤ Lev5.0                  |        |        |        |        |
| SBP01         | ≤ Lev4.5                  |        |        |        | 26.8%  |
| SBP01         | ≤ Lev4.0                  |        |        |        | 27.4%  |
| SBP01         | ≤ Lev3.5                  | 26.5% | 26.8%  | 28.2%  | 36.5%  |
| SBP01         | ≤ Lev3.0                  | 26.6% | 26.7%  | 28.2%  | 32.2%  | 52.7%  |
| SBP01         | ≤ Lev2.5                  | 26.9% | 28.0%  | 35.0%  | 49.2%  | 69.2%  |
| SBP01         | ≤ Lev2.0                  | 27.5% | 30.1%  | 41.2%  | 53.5%  | 66.1%  |
| SBP01         | ≤ Lev1.5                  | 28.6% | 35.1%  | 48.7%  | 43.9%  | 35.9%  |
| SBP01         | ≤ Lev1.0                  | 31.9% | 39.2%  | 48.0%  | 57.2%  |
| SBP01         | = Lev0.0                  | 32.8% | 76.9%  |        |
| SBP02         | ≤ Lev5.0                  |        |        |        |        |
| SBP02         | ≤ Lev4.5                  |        |        |        | 38.9%  |
| SBP02         | ≤ Lev4.0                  |        |        |        | 39.7%  |
| SBP02         | ≤ Lev3.5                  | 38.7% | 38.7%  | 39.0%  | 40.1%  | 47.7%  |
| SBP02         | ≤ Lev3.0                  | 38.8% | 38.9%  | 40.2%  | 43.8%  | 63.5%  |
| SBP02         | ≤ Lev2.5                  | 39.0% | 39.6%  | 44.5%  | 56.4%  | 73.4%  |
| Subcompetency | Milestone Rating Threshold | PGY1 | PGY2 | PGY3 |
|---------------|---------------------------|------|------|------|
|               |                           | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               |                           | % Probability of Not Attaining Level 4 by Graduation* | | | |
| SBP02         | ≤ Lev2.0                  | 39.5% | 41.2% | 53.7% | 60.1% | 73.6% |
| SBP02         | ≤ Lev1.5                  | 41.7% | 52.2% | 58.0% | 57.2% | 71.1% |
| SBP02         | ≤ Lev1.0                  | 47.2% | 58.7% | 54.7% | | |
| SBP02         | = Lev0.0                  | 55.0% | 53.6% | | | |
| SBP03         | ≤ Lev5.0                  | | | | | |
| SBP03         | ≤ Lev4.5                  | | | | | 45.9% |
| SBP03         | ≤ Lev4.0                  | | | | | 46.9% |
| SBP03         | ≤ Lev3.5                  | 45.5% | 46.1% | 47.7% | | 55.3% |
| SBP03         | ≤ Lev3.0                  | 45.5% | 45.9% | 47.9% | 51.9% | 70.4% |
| SBP03         | ≤ Lev2.5                  | 45.9% | 47.2% | 53.0% | 67.1% | 78.0% |
| SBP03         | ≤ Lev2.0                  | 46.6% | 50.9% | 59.3% | 69.6% | 74.8% |
| SBP03         | ≤ Lev1.5                  | 50.1% | 59.6% | 67.5% | 70.7% | | |
| SBP03         | ≤ Lev1.0                  | 53.8% | 63.2% | 52.9% | | |
| SBP03         | = Lev0.0                  | 54.3% | 83.6% | | | |
| SBP04         | ≤ Lev5.0                  | | | | | |
| SBP04         | ≤ Lev4.5                  | | | | | 17.5% |
| SBP04         | ≤ Lev4.0                  | | | | | 17.7% |
| SBP04         | ≤ Lev3.5                  | 17.5% | 17.6% | 18.3% | 20.3% | 31.5% |
| SBP04         | ≤ Lev3.0                  | 17.6% | 17.8% | 19.6% | 24.8% | 50.1% |
| SBP04         | ≤ Lev2.5                  | 17.9% | 18.8% | 25.5% | 40.3% | 65.3% |
| SBP04         | ≤ Lev2.0                  | 18.1% | 21.8% | 35.1% | 39.9% | 63.8% |
| SBP04         | ≤ Lev1.5                  | 20.3% | 30.5% | 48.6% | 27.2% | | |
| SBP04         | ≤ Lev1.0                  | 25.2% | 31.9% | 54.6% | 57.9% | |
Supplemental digital content for Holmboe ES, Yamazaki K, Nasca TJ, Hamstra SJ. Using longitudinal milestones data and learning analytics to facilitate the professional development of residents: Early lessons from three specialties. Acad Med.

| Subcompetency | Milestone Rating Threshold | PGY1 | PGY2 | PGY3 |
|---------------|----------------------------|------|------|------|
|               |                            | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               |                            | % Probability of Not Attaining Level 4 by Graduation* |
| SBP04         | = Lev0.0                   | 25.3% | 18.8% | 81.5% |
| PBLI01        | ≤ Lev5.0                   |       |       |       |
| PBLI01        | ≤ Lev4.5                   |       |       |       |
| PBLI01        | ≤ Lev4.0                   |       |       |       |
| PBLI01        | ≤ Lev3.5                   | 32.7% | 33.1% | 34.1% | 42.5% |
| PBLI01        | ≤ Lev3.0                   | 32.8% | 32.9% | 34.2% | 37.7% | 58.0% |
| PBLI01        | ≤ Lev2.5                   | 33.0% | 33.6% | 38.8% | 51.7% | 67.4% |
| PBLI01        | ≤ Lev2.0                   | 33.5% | 35.7% | 48.1% | 61.8% | 69.2% |
| PBLI01        | ≤ Lev1.5                   | 35.0% | 42.2% | 54.2% | 60.7% | 72.0% |
| PBLI01        | ≤ Lev1.0                   | 38.3% | 49.0% | 61.0% | 56.5% | 71.3% |
| PBLI01        | = Lev0.0                   | 42.0% | 48.9% | 36.1% |
| PBLI02        | ≤ Lev5.0                   |       |       |       |
| PBLI02        | ≤ Lev4.5                   |       |       |       |
| PBLI02        | ≤ Lev4.0                   |       |       |       |
| PBLI02        | ≤ Lev3.5                   | 29.1% | 29.3% | 30.8% | 38.9% |
| PBLI02        | ≤ Lev3.0                   | 29.2% | 29.7% | 32.1% | 37.7% | 57.0% |
| PBLI02        | ≤ Lev2.5                   | 29.8% | 31.2% | 38.1% | 51.6% | 66.3% |
| PBLI02        | ≤ Lev2.0                   | 30.4% | 34.6% | 48.2% | 53.5% | 60.8% |
| PBLI02        | ≤ Lev1.5                   | 33.8% | 43.6% | 51.5% | 58.1% | 80.4% |
| PBLI02        | ≤ Lev1.0                   | 40.4% | 53.3% | 65.1% | 52.1% |
| PBLI02        | = Lev0.0                   | 49.5% | 69.1% | 80.5% |

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| Subcompetency | Milestone Rating Threshold | PGY1 |       |       |       |       |       |
|---------------|-----------------------------|------|-------|-------|-------|-------|-------|
|               |                             | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               | % Probability of Not Attaining Level 4 by Graduation* |
| PBLI03        | ≤ Lev5.0                    |       |       |       |       |       |
| PBLI03        | ≤ Lev4.5                    | 53.6% | 53.6% | 53.9% | 54.9% | 62.0% |
| PBLI03        | ≤ Lev4.0                    |       |       |       |       | 53.7% |
| PBLI03        | ≤ Lev3.5                    |       |       |       | 55.0% | 58.1% |
| PBLI03        | ≤ Lev3.0                    |       |       | 53.7% | 53.8% | 73.4% |
| PBLI03        | ≤ Lev2.5                    |       |       | 53.9% | 55.0% | 67.4% |
| PBLI03        | ≤ Lev2.0                    | 54.4% | 56.8% | 65.6% | 72.5% | 72.9% |
| PBLI03        | ≤ Lev1.5                    | 55.6% | 64.4% | 67.4% | 69.8% | 60.9% |
| PBLI03        | ≤ Lev1.0                    | 58.7% | 65.8% | 64.2% | 75.4% | 60.6% |
| PBLI03        | = Lev0.0                    | 71.4% | 63.2% |       |       |       |
| PROF01        | ≤ Lev5.0                    |       |       |       |       |       |
| PROF01        | ≤ Lev4.5                    | 21.1% | 21.8% | 23.3% | 25.4% | 38.8% |
| PROF01        | ≤ Lev4.0                    |       |       |       |       | 23.4% |
| PROF01        | ≤ Lev3.5                    | 21.4% | 22.3% | 24.7% | 31.6% | 55.7% |
| PROF01        | ≤ Lev3.0                    |       |       | 21.4% | 22.3% | 49.7% |
| PROF01        | ≤ Lev2.5                    | 22.2% | 23.8% | 32.1% | 49.7% | 72.6% |
| PROF01        | ≤ Lev2.0                    | 22.5% | 27.1% | 45.4% | 60.8% | 81.0% |
| PROF01        | ≤ Lev1.5                    | 23.7% | 37.2% | 53.5% | 62.2% | 84.7% |
| PROF01        | ≤ Lev1.0                    | 30.4% | 53.3% | 53.3% | 73.2% | 88.5% |
| PROF01        | = Lev0.0                    | 45.3% | 54.6% | 40.0% | 46.6% |       |

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| Subcompetency | Milestone Rating Threshold | PGY1 |       |       |       |       |
|---------------|---------------------------|------|-------|-------|-------|-------|
|               |                           | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
| PROF02        | ≤ Lev5.0                  |       |       |       |       |       |
| PROF02        | ≤ Lev4.5                  |       |       |       |       |       |
| PROF02        | ≤ Lev4.0                  | 33.5%| 33.8% | 33.7% | 34.3% | 36.7% |
| PROF02        | ≤ Lev3.5                  | 33.6%| 33.8% | 35.0% | 37.8% | 51.0% |
| PROF02        | ≤ Lev3.0                  | 34.0%| 34.4% | 37.8% | 44.6% | 71.8% |
| PROF02        | ≤ Lev2.5                  | 34.2%| 36.4% | 44.1% | 62.0% | 82.6% |
| PROF02        | ≤ Lev2.0                  | 35.6%| 40.6% | 56.9% | 73.9% | 87.1% |
| PROF02        | ≤ Lev1.5                  | 40.1%| 57.4% | 65.6% | 75.1% | 81.9% |
| PROF02        | ≤ Lev1.0                  | 50.4%| 65.6% | 64.7% | 69.6% | 82.9% |
| PROF02        | = Lev0.0                  | 62.9%| 71.8% | 82.3% | 87.7% |       |
| PROF03        | ≤ Lev5.0                  |       |       |       |       |       |
| PROF03        | ≤ Lev4.5                  |       |       |       |       |       |
| PROF03        | ≤ Lev4.0                  |       |       |       |       |       |
| PROF03        | ≤ Lev3.5                  | 19.4%| 19.3% | 20.6% | 22.8% | 33.6% |
| PROF03        | ≤ Lev3.0                  | 19.4%| 19.7% | 22.2% | 27.8% | 53.2% |
| PROF03        | ≤ Lev2.5                  | 20.1%| 21.1% | 28.8% | 46.3% | 68.8% |
| PROF03        | ≤ Lev2.0                  | 20.6%| 25.1% | 37.3% | 50.4% | 66.2% |
| PROF03        | ≤ Lev1.5                  | 23.8%| 35.9% | 40.2% | 54.3% | 71.8% |
| PROF03        | ≤ Lev1.0                  | 30.4%| 43.4% | 23.2% |       |       |
| PROF03        | = Lev0.0                  | 38.6%| 36.0% |       |       |       |
| PROF04        | ≤ Lev5.0                  |       |       |       |       |       |

* % Probability of Not Attaining Level 4 by Graduation

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| Subcompetency | Milestone Rating Threshold | PGY1 | PGY2 | PGY3 |
|---------------|----------------------------|------|------|------|
|               |                            | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               |                            |                  |            |            |            |            |
| PROF04        | ≤ Lev4.5                   | 24.2%           | 24.2%      | 24.6%      |
| PROF04        | ≤ Lev4.0                   | 24.2%           | 24.3%      | 24.5%      | 26.4%      |
| PROF04        | ≤ Lev3.5                   | 24.4%           | 24.6%      | 25.7%      | 28.2%      | 40.5%      |
| PROF04        | ≤ Lev3.0                   | 24.4%           | 24.7%      | 26.9%      | 33.1%      | 55.8%      |
| PROF04        | ≤ Lev2.5                   | 24.9%           | 26.5%      | 32.7%      | 50.3%      | 70.7%      |
| PROF04        | ≤ Lev2.0                   | 25.8%           | 30.5%      | 42.6%      | 62.7%      | 74.0%      |
| PROF04        | ≤ Lev1.5                   | 29.5%           | 44.0%      | 54.7%      | 59.6%      | 74.3%      |
| PROF04        | ≤ Lev1.0                   | 33.2%           | 56.6%      | 59.0%      | 59.6%      |
| PROF04        | = Lev0.0                   | 33.3%           | 55.3%      | 51.2%      |
| ICS01         | ≤ Lev5.0                   |                |            |            |            |            |
| ICS01         | ≤ Lev4.5                   |                |            |            |            | 16.2%      |
| ICS01         | ≤ Lev4.0                   |                |            |            |            | 17.2%      |
| ICS01         | ≤ Lev3.5                   | 15.8%          | 16.0%      | 17.3%      | 19.3%      | 31.1%      |
| ICS01         | ≤ Lev3.0                   | 15.9%          | 16.6%      | 19.5%      | 25.0%      | 51.0%      |
| ICS01         | ≤ Lev2.5                   | 16.5%          | 18.5%      | 26.1%      | 43.6%      | 66.9%      |
| ICS01         | ≤ Lev2.0                   | 17.8%          | 22.0%      | 35.7%      | 42.2%      |
| ICS01         | ≤ Lev1.5                   | 22.1%          | 34.8%      | 43.9%      | 42.7%      |
| ICS01         | ≤ Lev1.0                   | 29.2%          | 43.2%      | 54.5%      |
| ICS01         | = Lev0.0                   | 42.6%          |            |            |
| ICS02         | ≤ Lev5.0                   |                |            |            |            |
| ICS02         | ≤ Lev4.5                   |                |            |            |            | 19.1%      |

*Probability of Not Attaining Level 4 by Graduation*
### Subcompetency

| Milestone Rating Threshold | PGY1 Mid-Year 1 | PGY1 Year-End 1 | PGY2 Mid-Year 2 | PGY2 Year-End 2 | PGY3 Mid-Year 3 |
|---------------------------|----------------|----------------|----------------|----------------|----------------|
| 1CS02 ≤ Lev4.0            |                |                |                |                |                |
| 1CS02 ≤ Lev3.5            | 19.0%          | 19.0%          | 19.7%          | 21.2%          | 32.3%          |
| 1CS02 ≤ Lev3.0            | 18.9%          | 19.4%          | 21.9%          | 27.7%          | 55.6%          |
| 1CS02 ≤ Lev2.5            | 19.2%          | 20.6%          | 27.7%          | 46.0%          | 70.0%          |
| 1CS02 ≤ Lev2.0            | 20.2%          | 23.3%          | 38.3%          | 45.7%          | 72.0%          |
| 1CS02 ≤ Lev1.5            | 21.9%          | 33.8%          | 46.2%          | 43.2%          | 64.3%          |
| 1CS02 ≤ Lev1.0            | 28.1%          | 39.1%          | 30.9%          | 62.8%          |                |
| 1CS02 = Lev0.0            | 46.5%          | 33.1%          |                |                |                |
| 1CS03 ≤ Lev5.0            |                |                |                |                |                |
| 1CS03 ≤ Lev4.5            |                |                |                |                |                |
| 1CS03 ≤ Lev4.0            |                |                |                |                |                |
| 1CS03 ≤ Lev3.5            | 26.7%          | 26.7%          | 27.3%          | 29.5%          | 41.7%          |
| 1CS03 ≤ Lev3.0            | 26.8%          | 27.5%          | 29.4%          | 36.8%          | 60.8%          |
| 1CS03 ≤ Lev2.5            | 27.7%          | 30.0%          | 38.1%          | 52.7%          | 73.7%          |
| 1CS03 ≤ Lev2.0            | 29.0%          | 34.0%          | 46.6%          | 57.2%          | 87.4%          |
| 1CS03 ≤ Lev1.5            | 30.8%          | 44.3%          | 50.9%          | 75.0%          | 77.7%          |
| 1CS03 ≤ Lev1.0            | 38.6%          | 42.1%          | 43.0%          |                |                |
| 1CS03 = Lev0.0            | 52.4%          | 24.9%          |                |                |                |
| 1CS04 ≤ Lev5.0            |                |                |                |                |                |
| 1CS04 ≤ Lev4.5            |                |                |                |                |                |
| 1CS04 ≤ Lev4.0            |                |                |                |                |                |

ICS02 ≤ Level 4 by Graduation:

- Level 4.0: 19.0%
- Level 3.5: 19.0%
- Level 3.0: 20.5%
- Level 2.5: 32.3%
- Level 2.0: 45.6%
- Level 1.5: 55.6%
- Level 1.0: 64.3%
- Level 0.0: 72.0%

ICS03 ≤ Level 4 by Graduation:

- Level 5.0: 26.7%
- Level 4.5: 26.7%
- Level 4.0: 28.5%
- Level 3.5: 41.7%
- Level 3.0: 60.8%
- Level 2.5: 73.7%
- Level 2.0: 87.4%
- Level 1.5: 77.7%
- Level 1.0: 77.7%
- Level 0.0: 72.0%

ICS04 ≤ Level 4 by Graduation:

- Level 5.0: 23.2%
- Level 4.5: 23.2%
- Level 4.0: 24.9%
### Supplemental Digital Appendix 4C

**Positive Predictive Value Matrix for All Subcompetencies by Milestone Rating Threshold and Milestone Review Occasion Across Post-Graduate Years for Internal Medicine**

| Subcompetency | Milestone Rating Threshold | PGY1 | PGY2 | PGY3 |
|---------------|----------------------------|------|------|------|
|               |                            | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               | % Probability of Not Attaining Level 4 by Graduation* |
| PC01          | ≤ Lev5.0                   | 5.3% |     | 5.3% | 5.3% | 5.3% |
| PC01          | ≤ Lev4.5                   | 5.3% |     | 5.3% | 5.3% | 5.3% |
| PC01          | ≤ Lev4.0                   | 5.3% | 5.3% | 5.3% | 5.3% | 5.3% |
| PC01          | ≤ Lev3.5                   | 5.3% | 5.3% | 5.3% | 5.3% | 5.3% |
| PC01          | ≤ Lev3.0                   | 5.5% | 6.2% | 7.9% | 11.2% | 23.7% |
| PC01          | ≤ Lev2.5                   | 7.3% | 9.7% | 15.6% | 21.2% | 46.3% |

*Probability (%) of a resident not reaching Level 4 at the time of graduation based on the Milestones rating by the time of assessment (Academic Years 2015-18). Please refer to supplemental digital appendix 1 or the online milestones document for the description of each family medicine subcompetency: https://www.acgme.org/Portals/0/PDFs/Milestones/FamilyMedicineMilestones.pdf?ver=2017-01-20-103353-463
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| Subcompetency | Milestone Rating Threshold | PGY1          |        | PGY2          |        | PGY3          |        |
|---------------|---------------------------|---------------|--------|---------------|--------|---------------|--------|
|               |                           | Mid-Year 1    | Year-End 1 | Mid-Year 2    | Year-End 2 | Mid-Year 3    |        |
|               |                           | % Probability of Not Attaining Level 4 by Graduation* |
| PC01          | ≤ Lev2.0                  | 9.9%          | 14.6%  | 25.6%         | 30.1%   | 29.9%         |        |
| PC01          | ≤ Lev1.5                  | 15.5%         | 22.9%  | 27.2%         | 11.4%   |               |        |
| PC01          | ≤ Lev1.0                  | 19.1%         | 8.9%   |               | 19.7%   |               |        |
| PC01          | = Lev0.0                  | 6.2%          | 16.0%  |               | 19.7%   |               |        |
| PC02          | ≤ Lev5.0                  |               |        |               |        |               |        |
| PC02          | ≤ Lev4.5                  | 6.4%          | 6.4%   | 6.5%          | 6.5%    |               |        |
| PC02          | ≤ Lev4.0                  | 6.4%          | 6.5%   | 6.5%          | 6.5%    | 6.9%          |        |
| PC02          | ≤ Lev3.5                  | 6.5%          | 6.5%   | 6.8%          | 7.5%    | 12.0%         |        |
| PC02          | ≤ Lev3.0                  | 6.7%          | 7.4%   | 9.0%          | 12.1%   | 26.6%         |        |
| PC02          | ≤ Lev2.5                  | 8.4%          | 10.7%  | 14.7%         | 25.0%   | 40.5%         |        |
| PC02          | ≤ Lev2.0                  | 10.8%         | 15.1%  | 20.3%         | 33.5%   | 22.0%         |        |
| PC02          | ≤ Lev1.5                  | 14.1%         | 17.7%  | 28.0%         | 16.5%   |               |        |
| PC02          | ≤ Lev1.0                  | 12.7%         | 8.8%   |               | 36.2%   |               |        |
| PC02          | = Lev0.0                  | 12.6%         |        |               | 36.2%   |               |        |
| PC03          | ≤ Lev5.0                  |               |        |               |        |               |        |
| PC03          | ≤ Lev4.5                  | 6.0%          | 6.1%   | 6.1%          | 6.1%    |               |        |
| PC03          | ≤ Lev4.0                  | 6.0%          | 6.0%   | 6.1%          | 6.1%    | 6.4%          |        |
| PC03          | ≤ Lev3.5                  | 6.1%          | 6.1%   | 6.6%          | 7.0%    | 11.7%         |        |
| PC03          | ≤ Lev3.0                  | 6.3%          | 6.9%   | 8.4%          | 11.0%   | 25.0%         |        |
| PC03          | ≤ Lev2.5                  | 7.5%          | 10.3%  | 15.6%         | 21.8%   | 29.9%         |        |
| PC03          | ≤ Lev2.0                  | 9.9%          | 15.5%  | 17.0%         | 21.6%   | 18.0%         |        |
| PC03          | ≤ Lev1.5                  | 12.4%         | 21.7%  | 21.4%         | 8.4%    | 6.6%          |        |
| PC03          | ≤ Lev1.0                  | 12.2%         | 25.3%  | 12.0%         |         | 6.7%          |        |
| PC03          | = Lev0.0                  | 9.9%          | 27.1%  | 5.9%          |         | 6.7%          |        |
| PC04          | ≤ Lev5.0                  |               |        |               |        |               |        |
### Subcompetency Milestone Rating Threshold

| Subcompetency | Milestone Rating Threshold | PGY1 | PGY2 | PGY3 |
|---------------|---------------------------|------|------|------|
|               |                           | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               | % Probability of Not Attaining Level 4 by Graduation* |
| PC04          | ≤ Lev4.5                  | 14.9% | 14.9% | 15.0% | 15.1% |
| PC04          | ≤ Lev4.0                  | 15.0% | 15.0% | 15.1% | 15.7% |
| PC04          | ≤ Lev3.5                  | 15.0% | 15.1% | 15.7% | 16.4% | 21.4% |
| PC04          | ≤ Lev3.0                  | 15.2% | 15.8% | 17.3% | 19.9% | 29.0% |
| PC04          | ≤ Lev2.5                  | 15.9% | 17.4% | 21.8% | 25.6% | 30.7% |
| PC04          | ≤ Lev2.0                  | 16.6% | 19.8% | 24.1% | 26.7% | 27.5% |
| PC04          | ≤ Lev1.5                  | 17.8% | 20.2% | 24.8% | 22.6% | 24.0% |
| PC04          | ≤ Lev1.0                  | 17.1% | 19.8% | 23.2% | 22.4% | 23.6% |
| PC04          | ≥ Lev0.0                  | 17.2% | 19.2% | 22.5% | 19.0% | 23.0% |
| PC05          | ≤ Lev5.0                  |       |       |       |       |       |
| PC05          | ≤ Lev4.5                  | 6.9%  | 6.9%  | 6.9%  | 7.0%  |
| PC05          | ≤ Lev4.0                  | 6.9%  | 7.0%  | 7.0%  | 7.0%  | 7.5%  |
| PC05          | ≤ Lev3.5                  | 7.0%  | 7.1%  | 7.4%  | 8.0%  | 12.3% |
| PC05          | ≤ Lev3.0                  | 7.1%  | 7.5%  | 9.0%  | 11.1% | 21.6% |
| PC05          | ≤ Lev2.5                  | 8.0%  | 9.8%  | 12.6% | 20.0% | 26.1% |
| PC05          | ≤ Lev2.0                  | 8.5%  | 11.2% | 18.0% | 19.1% | 15.2% |
| PC05          | ≤ Lev1.5                  | 9.6%  | 11.6% | 16.1% | 13.0% | 14.9% |
| PC05          | ≤ Lev1.0                  | 9.3%  | 9.7%  | 15.6% | 12.4% | 15.0% |
| PC05          | ≥ Lev0.0                  | 9.6%  | 9.9%  | 15.6% | 12.6% | 15.0% |
| MK01          | ≤ Lev5.0                  |       |       |       |       |       |
| MK01          | ≤ Lev4.5                  | 12.1% | 12.1% | 12.1% | 12.2% |
| MK01          | ≤ Lev4.0                  | 12.1% | 12.3% | 12.3% | 12.3% | 13.0% |
| MK01          | ≤ Lev3.5                  | 12.2% | 12.3% | 13.2% | 14.5% | 21.0% |
| MK01          | ≤ Lev3.0                  | 12.9% | 14.0% | 17.4% | 22.8% | 43.4% |
Supplemental digital content for Holmboe ES, Yamazaki K, Nasca TJ, Hamstra SJ. Using longitudinal milestones data and learning analytics to facilitate the professional development of residents: Early lessons from three specialties. Acad Med.

| Subcompetency | Milestone Rating Threshold | PGY1 | PGY2 | PGY3 |
|---------------|---------------------------|------|------|------|
|               |                           | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               |                           | % Probability of Not Attaining Level 4 by Graduation* |
| MK01          | ≤ Lev2.5                  | 16.7%   | 21.6% | 30.1% | 36.4% | 57.9% |
| MK01          | ≤ Lev2.0                  | 21.2%   | 28.0% | 30.9% | 39.8% | 58.9% |
| MK01          | ≤ Lev1.5                  | 24.9%   | 36.5% | 37.5% | 39.6% | 48.5% |
| MK01          | ≤ Lev1.0                  | 24.7%   | 19.7% | 34.4% | 34.2% | 45.4% |
| MK01          | = Lev0.0                  | 5.5%    | 61.4% | 31.2% | 27.1% |
| MK02          | ≤ Lev5.0                  |         |       |       |       |       |
| MK02          | ≤ Lev4.5                  | 10.2%   | 10.2% | 10.2% | 10.2% | 10.3% |
| MK02          | ≤ Lev4.0                  | 10.2%   | 10.2% | 10.3% | 10.3% | 10.7% |
| MK02          | ≤ Lev3.5                  | 10.2%   | 10.3% | 10.7% | 11.8% | 17.1% |
| MK02          | ≤ Lev3.0                  | 10.5%   | 11.2% | 13.6% | 17.2% | 30.8% |
| MK02          | ≤ Lev2.5                  | 13.1%   | 15.3% | 21.3% | 28.1% | 41.4% |
| MK02          | ≤ Lev2.0                  | 14.4%   | 21.4% | 29.0% | 35.3% | 50.5% |
| MK02          | ≤ Lev1.5                  | 19.9%   | 24.0% | 26.8% | 37.1% | 35.4% |
| MK02          | ≤ Lev1.0                  | 15.4%   | 15.8% | 16.9% | 22.7% | 33.0% |
| MK02          | = Lev0.0                  | 12.2%   | 13.8% | 49.6% | 22.7% | 34.0% |
| SBP01         | ≤ Lev5.0                  |         |       |       |       |       |
| SBP01         | ≤ Lev4.5                  | 6.1%    | 6.1%  | 6.1%  | 6.1%  | 6.2%  |
| SBP01         | ≤ Lev4.0                  | 6.1%    | 6.1%  | 6.2%  | 6.4%  | 7.0%  |
| SBP01         | ≤ Lev3.5                  | 6.2%    | 6.5%  | 7.1%  | 8.1%  | 13.5% |
| SBP01         | ≤ Lev3.0                  | 6.8%    | 8.0%  | 9.2%  | 12.8% | 26.4% |
| SBP01         | ≤ Lev2.5                  | 9.2%    | 10.6% | 15.1% | 23.1% | 36.6% |
| SBP01         | ≤ Lev2.0                  | 9.2%    | 14.4% | 23.3% | 21.5% | 15.3% |
| SBP01         | ≤ Lev1.5                  | 12.0%   | 18.7% | 13.1% | 13.1% | 11.2% |
| SBP01         | ≤ Lev1.0                  | 10.1%   | 17.0% | 6.3%  | 3.6%  | 8.9%  |

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| Subcompetency | Milestone Rating Threshold | PGY1 |   |   |   |   |
|---------------|-----------------------------|------|---|---|---|---|
|               |                             | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
| SBP01         | = Lev0.0                    | 9.6%   | 15.6%       | 7.1%       | 3.7%       | 8.9%       |
| SBP02         | ≤ Lev5.0                    |        |             |            |            |            |
| SBP02         | ≤ Lev4.5                    | 10.6%  | 10.6%       | 10.7%      | 10.7%      | 10.7%      |
| SBP02         | ≤ Lev4.0                    | 10.7%  | 10.6%       | 10.7%      | 10.9%      | 11.3%      |
| SBP02         | ≤ Lev3.5                    | 10.6%  | 10.9%       | 11.1%      | 12.0%      | 17.7%      |
| SBP02         | ≤ Lev3.0                    | 11.0%  | 11.7%       | 13.1%      | 15.8%      | 28.9%      |
| SBP02         | ≤ Lev2.5                    | 12.1%  | 13.9%       | 17.4%      | 21.8%      | 28.3%      |
| SBP02         | ≤ Lev2.0                    | 11.7%  | 14.4%       | 18.9%      | 16.4%      | 23.6%      |
| SBP02         | ≤ Lev1.5                    | 11.8%  | 14.8%       | 17.4%      | 11.6%      | 22.2%      |
| SBP02         | ≤ Lev1.0                    | 11.3%  | 14.8%       | 14.6%      | 10.4%      | 22.8%      |
| SBP02         | = Lev0.0                    | 11.1%  | 15.4%       | 14.6%      | 10.4%      | 22.8%      |
| SBP03         | ≤ Lev5.0                    | 9.6%   | 9.7%        | 9.7%       | 9.7%       | 9.7%       |
| SBP03         | ≤ Lev4.5                    | 9.6%   | 9.7%        | 9.7%       | 9.7%       | 9.7%       |
| SBP03         | ≤ Lev4.0                    | 9.7%   | 9.7%        | 10.1%      | 10.8%      | 14.7%      |
| SBP03         | ≤ Lev3.5                    | 9.7%   | 9.7%        | 10.7%      | 14.4%      | 24.3%      |
| SBP03         | ≤ Lev3.0                    | 10.0%  | 10.0%       | 11.7%      | 14.4%      | 24.3%      |
| SBP03         | ≤ Lev2.5                    | 11.2%  | 12.6%       | 16.5%      | 18.7%      | 28.9%      |
| SBP03         | ≤ Lev2.0                    | 11.7%  | 15.0%       | 20.5%      | 13.7%      | 20.6%      |
| SBP03         | ≤ Lev1.5                    | 12.5%  | 17.3%       | 17.2%      | 5.0%       | 10.8%      |
| SBP03         | ≤ Lev1.0                    | 12.0%  | 16.2%       | 15.8%      | 5.0%       | 11.8%      |
| SBP03         | = Lev0.0                    | 11.4%  | 16.2%       | 15.8%      | 5.0%       | 11.8%      |
| SBP04         | ≤ Lev5.0                    |       |             |            |            |            |
| SBP04         | ≤ Lev4.5                    |       |             |            |            |            |

* Probability of Not Attaining Level 4 by Graduation

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| Subcompetency | Milestone Rating Threshold | PGY1 |          | PGY2 |          | PGY3 |          |
|---------------|---------------------------|------|----------|------|----------|------|----------|
|               |                           | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               |                           | % Probability of Not Attaining Level 4 by Graduation* | | | | |
| SBP04         | ≤ Lev4.0                  | 5.7% | 5.7%     | 5.7% | 5.7%     | 6.1% |
| SBP04         | ≤ Lev3.5                  | 5.7% | 5.8%     | 6.0% | 6.9%     | 11.2%|
| SBP04         | ≤ Lev3.0                  | 6.2% | 6.5%     | 8.0% | 10.7%    | 23.1%|
| SBP04         | ≤ Lev2.5                  | 7.7% | 9.9%     | 11.7%| 19.7%    | 29.0%|
| SBP04         | ≤ Lev2.0                  | 8.4% | 12.7%    | 20.6%| 13.9%    | 5.1% |
| SBP04         | ≤ Lev1.5                  | 7.9% | 8.1%     | 22.2%| 15.5%    |       |
| SBP04         | ≤ Lev1.0                  | 5.1% | 7.0%     | 16.1%| 14.2%    |       |
| SBP04         | = Lev0.0                  | 5.7% | 5.9%     | 17.0%| 14.2%    |       |
| PBLI01        | ≤ Lev5.0                  |      |          |      |          | 8.6% |
| PBLI01        | ≤ Lev4.5                  | 8.5% |          | 8.6% | 8.6%     | 8.6% |
| PBLI01        | ≤ Lev4.0                  | 8.6% | 8.6%     | 8.7% | 8.8%     | 9.1% |
| PBLI01        | ≤ Lev3.5                  | 8.7% | 8.9%     | 9.4% | 10.6%    | 15.9%|
| PBLI01        | ≤ Lev3.0                  | 9.2% | 10.2%    | 11.9%| 14.7%    | 29.9%|
| PBLI01        | ≤ Lev2.5                  | 10.8%| 12.4%    | 16.4%| 23.1%    | 32.2%|
| PBLI01        | ≤ Lev2.0                  | 11.1%| 15.0%    | 17.5%| 21.6%    | 21.3%|
| PBLI01        | ≤ Lev1.5                  | 10.9%| 16.9%    | 14.7%| 16.4%    | 24.2%|
| PBLI01        | ≤ Lev1.0                  | 9.6% | 10.8%    | 12.4%| 14.6%    | 20.4%|
| PBLI01        | = Lev0.0                  | 9.9% | 10.6%    | 11.7%| 14.6%    | 19.4%|
| PBLI02        | ≤ Lev5.0                  |      |          |      |          | 12.0%|
| PBLI02        | ≤ Lev4.5                  | 12.0%| 12.0%    | 12.0%| 12.0%    | 12.0%|
| PBLI02        | ≤ Lev4.0                  | 12.0%| 12.1%    | 12.1%| 12.2%    | 12.6%|
| PBLI02        | ≤ Lev3.5                  | 12.0%| 12.3%    | 12.8%| 13.6%    | 18.9%|
| PBLI02        | ≤ Lev3.0                  | 12.1%| 12.6%    | 14.6%| 17.4%    | 29.2%|
| PBLI02        | ≤ Lev2.5                  | 12.9%| 14.6%    | 18.7%| 25.7%    | 31.8%|

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| Subcompetency | Milestone Rating Threshold | PGY1 | PGY2 | PGY3 |
|---------------|---------------------------|------|------|------|
|               |                           | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
| PBLI02        | ≤ Lev 2.0                 | 13.1% | 17.4% | 22.5% | 29.0% | 31.8% |
| PBLI02        | ≤ Lev 1.5                 | 14.3% | 18.0% | 20.7% | 20.5% | 32.1% |
| PBLI02        | ≤ Lev 1.0                 | 13.3% | 16.2% | 18.9% | 19.9% | 31.0% |
| PBLI02        | = Lev 0.0                 | 13.3% | 15.7% | 18.9% | 19.4% | 30.7% |
| PBLI03        | ≤ Lev 5.0                 |       |       |       |       |       |
| PBLI03        | ≤ Lev 4.5                 | 8.1%  | 8.1%  | 8.1%  | 8.1%  | 8.1%  |
| PBLI03        | ≤ Lev 4.0                 | 8.1%  | 8.1%  | 8.2%  | 8.2%  | 8.7%  |
| PBLI03        | ≤ Lev 3.5                 | 8.3%  | 8.5%  | 9.2%  | 10.1% | 15.9% |
| PBLI03        | ≤ Lev 3.0                 | 9.0%  | 9.7%  | 12.1% | 14.4% | 27.3% |
| PBLI03        | ≤ Lev 2.5                 | 11.6% | 12.1% | 18.3% | 25.9% | 37.1% |
| PBLI03        | ≤ Lev 2.0                 | 11.7% | 16.4% | 25.6% | 30.0% | 29.2% |
| PBLI03        | ≤ Lev 1.5                 | 13.7% | 26.2% | 23.3% | 26.2% | 22.1% |
| PBLI03        | ≤ Lev 1.0                 | 11.4% | 13.7% | 20.1% | 27.7% | 18.9% |
| PBLI03        | = Lev 0.0                 | 12.2% | 18.6% | 21.0% | 26.5% | 20.0% |
| PBLI04        | ≤ Lev 5.0                 |       |       |       |       |       |
| PBLI04        | ≤ Lev 4.5                 |       |       |       |       |       |
| PBLI04        | ≤ Lev 4.0                 |       |       |       |       |       |
| PBLI04        | ≤ Lev 3.5                 |       |       |       |       |       |
| PBLI04        | ≤ Lev 3.0                 |       |       |       |       |       |
| PBLI04        | ≤ Lev 2.5                 |       |       |       |       |       |
| PBLI04        | ≤ Lev 2.0                 |       |       |       |       |       |
| PBLI04        | ≤ Lev 1.5                 |       |       |       |       |       |
| PBLI04        | ≤ Lev 1.0                 |       |       |       |       |       |
| PBLI04        | = Lev 0.0                 |       |       |       |       |       |
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| Subcompetency | Milestone Rating Threshold | PGY1 Mid-Year 1 | Year-End 1 | PGY2 Mid-Year 2 | Year-End 2 | PGY3 Mid-Year 3 |
|----------------|---------------------------|----------------|------------|----------------|------------|----------------|
| PROF01         | ≤ Lev5.0                   |                |            |                |            |                |
| PROF01         | ≤ Lev4.5                   | 5.6%           | 5.6%       | 5.7%           | 5.8%       |
| PROF01         | ≤ Lev4.0                   | 5.6%           | 5.7%       | 5.8%           | 6.0%       | 6.7%           |
| PROF01         | ≤ Lev3.5                   | 5.9%           | 6.3%       | 6.7%           | 8.4%       | 15.1%          |
| PROF01         | ≤ Lev3.0                   | 6.6%           | 7.9%       | 9.0%           | 13.8%      | 30.3%          |
| PROF01         | ≤ Lev2.5                   | 8.1%           | 10.6%      | 14.5%          | 23.8%      | 46.9%          |
| PROF01         | ≤ Lev2.0                   | 8.9%           | 12.2%      | 19.9%          | 22.2%      | 71.2%          |
| PROF01         | ≤ Lev1.5                   | 9.7%           | 16.8%      | 23.9%          | 24.4%      | 73.2%          |
| PROF01         | ≤ Lev1.0                   | 10.3%          | 23.4%      | 13.3%          | 17.6%      | 64.6%          |
| PROF01         | = Lev0.0                   | 9.0%           | 27.3%      | 7.4%           | 14.4%      | 58.8%          |
| PROF02         | ≤ Lev5.0                   |                |            |                |            |                |
| PROF02         | ≤ Lev4.5                   | 9.0%           | 9.1%       | 9.1%           | 9.1%       | 9.2%           |
| PROF02         | ≤ Lev4.0                   | 9.1%           | 9.1%       | 9.2%           | 9.5%       | 10.4%          |
| PROF02         | ≤ Lev3.5                   | 9.4%           | 9.8%       | 10.7%          | 12.1%      | 19.2%          |
| PROF02         | ≤ Lev3.0                   | 10.3%          | 11.5%      | 14.3%          | 19.0%      | 33.9%          |
| PROF02         | ≤ Lev2.5                   | 12.8%          | 16.1%      | 21.8%          | 28.1%      | 44.9%          |
| PROF02         | ≤ Lev2.0                   | 15.1%          | 20.1%      | 28.4%          | 37.0%      | 37.9%          |
| PROF02         | ≤ Lev1.5                   | 19.5%          | 25.2%      | 23.7%          | 26.1%      | 29.7%          |
| PROF02         | ≤ Lev1.0                   | 19.5%          | 10.9%      | 15.5%          | 5.2%       | 27.3%          |
| PROF02         | = Lev0.0                   | 19.0%          | 12.3%      | 10.0%          | 8.2%       | 9.3%           |
| PROF03         | ≤ Lev5.0                   |                |            |                |            |                |
| PROF03         | ≤ Lev4.5                   | 6.1%           | 6.1%       | 6.1%           | 6.3%       |
| PROF03         | ≤ Lev4.0                   | 6.2%           | 6.1%       | 6.2%           | 6.4%       | 6.9%           |

*Probability of Not Attaining Level 4 by Graduation

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| Subcompetency | Milestone Rating Threshold | PGY1 | PGY2 | PGY3 |
|---------------|---------------------------|------|------|------|
|               |                           | Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 |
|               |                           | % Probability of Not Attaining Level 4 by Graduation* |
| PROF03        | ≤ Lev3.5                  | 6.3% | 6.5% | 6.9% | 7.7% | 13.2% |
| PROF03        | ≤ Lev3.0                  | 6.7% | 7.5% | 8.8% | 10.8% | 24.8% |
| PROF03        | ≤ Lev2.5                  | 8.1% | 9.9% | 11.2% | 14.7% | 21.7% |
| PROF03        | ≤ Lev2.0                  | 8.4% | 11.3% | 9.3% | 7.5% | 13.8% |
| PROF03        | ≤ Lev1.5                  | 8.1% | 8.4% | 3.2% | 6.6% | 9.6% |
| PROF03        | ≤ Lev1.0                  | 7.4% | 3.3% | 3.1% | 12.7% | 6.1% |
| PROF03        | = Lev0.0                  | 7.4% | 2.1% | 3.1% | 12.7% | 4.3% |
| PROF04        | ≤ Lev5.0                  |      |      |      |      |      |
| PROF04        | ≤ Lev4.5                  | 6.5% | 6.5% | 6.5% | 6.6% | 6.7% |
| PROF04        | ≤ Lev4.0                  | 6.5% | 6.6% | 6.6% | 6.8% | 7.4% |
| PROF04        | ≤ Lev3.5                  | 6.8% | 7.1% | 7.9% | 8.9% | 15.6% |
| PROF04        | ≤ Lev3.0                  | 7.5% | 8.3% | 9.6% | 12.9% | 31.0% |
| PROF04        | ≤ Lev2.5                  | 8.4% | 12.3% | 14.9% | 22.8% | 46.9% |
| PROF04        | ≤ Lev2.0                  | 9.4% | 14.3% | 20.0% | 21.5% | 46.7% |
| PROF04        | ≤ Lev1.5                  | 11.3% | 15.6% | 23.6% | 16.9% | 32.9% |
| PROF04        | ≤ Lev1.0                  | 8.2% | 10.2% | 11.8% | 11.0% | 30.6% |
| PROF04        | = Lev0.0                  | 7.2% | 10.3% | 2.4% | 7.2% |
| ICS01         | ≤ Lev5.0                  |      |      |      |      |      |
| ICS01         | ≤ Lev4.5                  | 5.3% | 5.3% | 5.3% | 5.3% | 5.4% |
| ICS01         | ≤ Lev4.0                  | 5.3% | 5.3% | 5.4% | 5.5% | 5.9% |
| ICS01         | ≤ Lev3.5                  | 5.4% | 5.7% | 6.3% | 7.5% | 13.2% |
| ICS01         | ≤ Lev3.0                  | 6.1% | 7.0% | 9.2% | 12.0% | 25.8% |
| ICS01         | ≤ Lev2.5                  | 7.4% | 9.3% | 13.9% | 23.8% | 22.1% |
| ICS01         | ≤ Lev2.0                  | 7.7% | 11.6% | 14.3% | 19.8% | 15.7% |
### Subcompetency Milestone Rating Threshold | PGY1 Mid-Year 1 | Year-End 1 | Mid-Year 2 | Year-End 2 | Mid-Year 3 | % Probability of Not Attaining Level 4 by Graduation*
--- | --- | --- | --- | --- | --- | ---
ICS01 | ≤ Lev1.5 | 10.3% | 13.6% | 3.4% | 14.8% | 8.0%
ICS01 | ≤ Lev1.0 | 5.2% | | 6.7% | 2.7%
ICS01 | = Lev0.0 | 4.5% | | 6.7% | 2.7%
ICS02 | ≤ Lev5.0 | 6.0% | | 6.0% | 6.1%
ICS02 | ≤ Lev4.5 | 6.0% | 6.1% | 6.0% | 6.2% | 7.0%
ICS02 | ≤ Lev4.0 | 6.0% | 6.1% | 6.0% | 6.2%
ICS02 | ≤ Lev3.5 | 6.2% | 6.4% | 7.1% | 8.4% | 14.5%
ICS02 | ≤ Lev3.0 | 7.0% | 8.3% | 9.5% | 13.4%
ICS02 | ≤ Lev2.5 | 8.4% | 10.7% | 13.5% | 26.3% | 32.4%
ICS02 | ≤ Lev2.0 | 9.6% | 15.7% | 25.0% | 31.0% | 32.4%
ICS02 | ≤ Lev1.5 | 10.9% | 15.6% | 27.3% | 41.4% | 31.0%
ICS02 | ≤ Lev1.0 | 6.2% | 12.9% | 17.7% | 19.3% | 25.6%
ICS02 | = Lev0.0 | 3.5% | 11.7% | 10.7% | 13.7% | 21.5%
ICS03 | ≤ Lev5.0 | | | | | |
ICS03 | ≤ Lev4.5 | 6.1% | | 6.1% | 6.1% | 6.2%
ICS03 | ≤ Lev4.0 | 6.1% | 6.2% | 6.2% | 6.3% | 6.6%
ICS03 | ≤ Lev3.5 | 6.3% | 6.4% | 6.9% | 8.0% | 13.4%
ICS03 | ≤ Lev3.0 | 7.0% | 7.8% | 9.2% | 11.1% | 23.7%
ICS03 | ≤ Lev2.5 | 8.2% | 10.3% | 12.6% | 17.7% | 26.8%
ICS03 | ≤ Lev2.0 | 9.1% | 11.9% | 15.6% | 17.3% | 21.2%
ICS03 | ≤ Lev1.5 | 9.4% | 19.9% | 7.1% | 16.3% | 20.0%
ICS03 | ≤ Lev1.0 | 6.5% | 5.3% | 5.3% | 10.1% | 20.3%
ICS03 | = Lev0.0 | 2.6% | 13.3% | 5.3% | 9.3% | 19.4%
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*Probability (%) of a resident not reaching Level 4 at the time of graduation based on the Milestones rating by the time of assessment (Academic Years 2015-18). Please refer to supplemental digital appendix 1 or the online milestones document for the description of each internal medicine subcompetency: https://www.acgme.org/Portals/0/PDFs/Milestones/InternalMedicineMilestones.pdf?ver=2017-07-28-090326-787

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