

itation system (NAS) in 2013. This changed the accreditation paradigm from an episodic “biopsy” model to annual data collection and accreditation decisions. The NAS also introduced the educational milestones—progressive, competency-based, developmental outcomes. The EM Milestones are organized within 23 subcompetencies, each with 5 levels of achievement. All EM residency programs must assess resident performance along these milestones and report the results to the ACGME semiannually. Milestone-based assessment is a substantial change in how faculty assess residents. Data collection, milestone scoring, and milestone reporting present formidable challenges.

Intervention

We developed a web-based individualized resident evaluation (WIRE) tool to make milestone-based assessments intuitive and quick for faculty to use, as well as provide robust performance data to the clinical competency committee (CCC). WIRE is a device-independent web application. Faculty are asked to complete 1 WIRE assessment per resident per EM shift. WIRE presents faculty with a checklist of 8 behaviors a resident may have exhibited during the shift. Each behavior maps to a milestone; faculty can report whether the resident demonstrated the behavior successfully (eg, correctly recognized abnormal vitals) or incorrectly (eg, failed to recognize abnormal vitals). At their discretion, faculty evaluators may request additional checklists or document optional feedback comments.

The WIRE tool is automatically customized to the resident’s competency level, year of training, and type of patients being seen. For example:

- If the CCC previously determined that a resident has successfully met level 3 for subcompetency PC2, PC2 level 1 milestones are rarely displayed.
- If a first-year resident is doing well on subcompetency ICS1, that resident will be assessed only on higher-level ICS1 milestones and simultaneously on level 1 and level 2 milestones for the other subcompetencies.
- Residents working in low-acuity areas are not assessed on milestones under “PC1: Emergency Stabilization.”

Use of electronic, individualized assessments has multiple advantages over static end-of-shift assessment forms. The WIRE tool focuses on behaviors important for the development of individual residents, rather than on a subset of frequently encountered milestones. This increases the recording of



WIRED for Milestones

Setting and Problem

Emergency medicine (EM) was a Phase I specialty that implemented the Accreditation Council for Graduate Medical Education (ACGME) next accred-

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TABLE

Web-Based Individualized Resident Evaluation (WIRE) Implementation Data

	Mean $\pm$ SD	Median	Interquartile Range
WIREs per resident	93 $\pm$ 55	79	39–132
Milestone observations per WIRE	3.9 $\pm$ 2.5	4	2–5
Milestone observations per resident	353 $\pm$ 207	294	160–512
WIREs per faculty	152 $\pm$ 83	142.5	113–203
Time to complete a WIRE, mins	3.8 $\pm$ 2.9	3	2–5

observations on a broader range of milestones. WIRE also presents milestones in an assorted checklist, not in a horizontal display of all level 1 to level 5 milestones. This alleviates problems with stringent versus lenient (“hawk-dove”) assessors or faculty selecting midway scores.

In addition, the CCC is presented with a dashboard that synthesizes hundreds of assessments per resident into color-coded bar graphs for each milestone (green reflects successful demonstration of the behavior; red represents incorrect performance). This dashboard is organized in the EM milestones document format, and the CCC can quickly determine a resident’s milestone achievement level on each subcompetency by inspecting the graphs. An increase in red bars for low-level milestones would prompt the CCC to carefully review all assessment data for the given resident, and consider a decrease in the level reported for that subcompetency. Finally, the CCC can quickly identify milestones that are rarely demonstrated by any resident. This may indicate gaps in the program that require development of alternative curricula.

Outcomes to Date

Prior to deployment, 15 minutes were spent orienting all faculty on the use of WIRE. Between July 1, 2013, and June 30, 2015, a total of 42 faculty members assessed 69 residents using WIRE. A total of 6393 WIRE assessments were submitted, recording 24 378 observations for 167 distinct milestones (TABLE). Faculty provided feedback comments in 4261 WIREs (67%); of these, 2172 (51%) were discussed with the residents. In an April 2014 survey, 53% (19 of 36) of faculty were “very satisfied” using WIRE to assess residents, and 39% (14 of 36) were “somewhat satisfied.”

WIRE is free for EM residencies interested in beta-testing the software. It can be adapted to other specialties that use the ACGME milestone framework, and is best suited for specialties where residents are assessed frequently. Alternative workflows are being developed for nonshift-based specialties.

WIRE provides an intuitive, quick method to assess residents using the milestone framework. It can be

adopted with minimal training, provides robust assessment data to CCCs, and enables specific and timely resident feedback.

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