Residency Training: Developing a program of quality and safety to train resident neurologists for the future

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ABSTRACT

Attention to quality and safety metrics is increasingly important for all physicians in practice due to mandates by governmental organizations, insurers, the public, and accreditation bodies. Neurology resident trainees need to acquire these skills, but little research in and outside of neurology provides guidance as to how to teach these important concepts. In the setting of new requirements mandating that training programs address these topics, we propose a number of strategies that can be implemented immediately in neurology residency training programs and call for increased investigation and sharing of best practices in order to adequately prepare neurology residents for the current and future environment of practice.

Quality care is defined by the Institute of Medicine as “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.” Many practicing physicians have traditionally viewed “quality care” as a more nebulous concept (“I know it when I see it”) that is difficult to recognize and challenging to apply to their own practice.

Measurement of quality usually involves examining structures, processes, and outcomes. Structures (e.g., having a neurologist examine any patient presenting with acute stroke) are easy to measure but are time and resource intensive to implement. Processes (e.g., prescribing an antiplatelet medication on discharge for secondary stroke prevention) have been the focus of the majority of quality research and policy to date. Outcome measurement, although desirable, has been fraught with difficulties including obtaining consistent longitudinal measurements in systems with multiple tiers of health service coverage as well as patient-specific variables (e.g., medication adherence) that are beyond the control of the individual physician. Much of the quality literature has been criticized by some for concentrating on these more easily measured structures and processes as opposed to clinically meaningful outcomes, a vital issue to address in future studies.

Neurologists will be increasingly expected to demonstrate that their care is of high quality, not only by hospitals justifying the expense of physician support, but also by insurers, governmental agencies, and a public increasingly engaged in a discussion emphasizing the delivery of high-quality care.

In the late 1990s, hospitals in the United States began to track core measures thought to represent quality care. This reporting is increasingly accessible to the public, even down to physician-specific details. Neurologists certainly will be asked in the near future to measure non-neurologic aspects of patient care that hospitals are required to report. Examples include rates of appropriate deep vein thrombosis prophylaxis and hospital-acquired infections. Focusing on these non-neurologic metrics is foreign to many neurologists, and adoption and dissemination of these good practices will be an important goal for our field. Physicians are increasingly rewarded and incentivized for good quality care, through these reporting metrics and even financial incentives such as “pay for performance” packages. Ultimately, neurologists of the future will need to be attentive to neurologic quality metrics that are only beginning to be defined.

Patient safety has also become a major focus for regulatory agencies, clinicians, and the public, stemming from the now decade-old Institute of Medicine report “To Err is Human.” National patient safety goals are transforming medicine, with hospitals reporting and tracking “never events” and so-called “preventable con-

Supplemental data at www.neurology.org

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References e1–e9 are available on the Neurology® Web site at www.neurology.org.
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tions,” each of which carries financial and regulatory penalties. Building a “culture of safety” has become the mantra in medicine with analogies to the airline industry.

Quality and safety issues have become a major part of each practicing clinician’s daily routine and these influences are destined to expand. Despite the need to teach trainees these principles and prepare them for this new practice environment, there remains a dearth of relevant research on the topic within neurology. The Accreditation Council for Graduate Medical Education’s (ACGME) required core competencies of practice-based learning and improvement and systems-based practice hinge on trainees using quality and safety concepts to improve their own patient care and that delivered by the health care system. The ACGME milestones project will add depth to core competencies by establishing specific behaviors and accomplishments that are necessary for each trainee to reach proficiency in each competency.

Trainees not only need to learn these skills, but they will need to be maintained, relearned, and refined throughout their career to maintain board certification. The American Board of Psychiatry and Neurology’s Maintenance of Certification Program emphasizes these concepts through performance in practice (PIP) requirements wherein physicians need to participate in quality improvement (QI) programs throughout their 10-year recertification cycle.

Systematic reviews of teaching QI and safety reveal that only a few studies to date describe interventions that target residents. The results of teaching these topics to medical students and other health professions mainly have demonstrated improved knowledge regarding quality issues when a group is tested after a didactic intervention. What is lacking is proof that these interventions have meaningful clinical benefits. While some studies show improvement in a process, these benefits tend to wane over time and do not become ingrained as permanent solutions, especially in the world of residency education where thoughtful quality interventions may not be sustained when the resident “champion” graduates. This is a major challenge for resident QI projects and raises the stakes for systematic and effective involvement of residency program directors.

In the context of these challenges, we propose ideas by which neurology training programs can begin to teach quality and safety to residents within the limited confines of a training environment that is increasingly time challenged due to duty hours constraints and mandates to expose residents to an ever-widening set of clinical, administrative, and research experiences (table).

**MAKE TEACHING QUALITY AND SAFETY A REQUIREMENT** The ACGME common program requirements, which apply to all training programs regardless of specialty, were updated in 2011 to include language requiring programs to analyze clinical practice using QI methods and to initiate changes with the goal of improving patient care. Residency programs are also required to have their trainees identify systems errors and implement solutions. Participating in QI and safety programs is now a requirement for our trainees and necessary for residency and fellowship programs to maintain accreditation.

Internal medicine residents have been required by the ACGME to participate in a continuous QI process as part of their continuity clinics since 2009. This requirement has led to a number of successes and challenges that can inform neurology programs. The American Board of Internal Medicine’s Practice Improvement Modules (PIM) have been used as a tool to teach QI principles to residents. For example, one PIM instructs residents on evidence-based preventive medicine topics such as when to order screening colonoscopies; residents can examine their own clinical behaviors before and after this module. A similar approach in neurology could be successful in the setting of the American Academy of Neurology’s (AAN) recent publication of outpatient guidelines for quality care in various subspecialties.

Ultimately, a successful program for teaching quality and safety will need to establish interventions that make a demonstrable difference to patient care outcomes and are sustainable over time. The University of Chicago’s internal medicine program recently focused on developing this sustainability through the use of multiple cycles of a “plan, do, study, act” structure both early and late in the training program.

**INCENTIVIZING QI GOALS** In some institutions, resident incentives are used to encourage program-wide QI. At UCSF, the GME resident counsel sets institution-wide goals for the residents (e.g., all residents will improve their collective handwashing rate to 85%). In addition, individual residency programs propose yearly quality improvement goals (e.g., the neurology residents will increase dysphagia screening rates in stroke patients to 90%). Each proposal is vetted through a campus-wide quality group and these measures are tracked monthly with GME administrative support, giving real-time feedback to the residents as to their progress. Residents are given a financial bonus at the end of the year only if the goal is met.

These programs encourage residents to work together toward a common goal with close supervision.
from program directors and local QI experts. However, one potential limitation is that some incentives chosen may be mere “low hanging fruit” selected to maximize the likelihood of success. Many goals set only address national mandates (e.g., handwashing rates) without measuring local patient outcomes that result (e.g., reduction in nosocomial infection rates). Additionally, financial incentives may only be useful to spark the initial change in behavior and may indirectly discourage sustainability; residents may no longer put effort into quality and safety processes once the financial incentive to do so has expired.

**USE MORBIDITY AND MORTALITY CONFERENCES AS A QUALITY AND SAFETY TOOL** The morbidity and mortality (M+M) conference can serve as another method to engage residents in patient safety issues. Rather than using the conference to embarrass or “call out” mistakes, M+M conferences can be used in a blame-free manner to explore errors and “near misses” while developing systems-based methods to avoid similar future mishaps. A culture of discovery and sharing of errors is needed for these conferences to run effectively; too often senior clinicians focus conference presentations on fantastic diagnoses rather than exposing and learning from their own errors. Leadership in open disclosure and improvement goes a long way in setting the example for our young trainees.

Placing residents in leadership roles on departmental M+M committees also allows for the development of these important skills. In the medicine department at the Mayo Clinic, residents are assigned to an M+M conference in advance to perform a “systems audit,” identifying areas with adverse events, identify a systems issue that led to the adverse outcome, conduct a root-cause analysis, interview stakeholders, propose solutions, and calculate costs⁸⁶

**Table** Quality improvement examples in medicine and potential outcomes relevant to neurology training programs

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<thead>
<tr>
<th>Description</th>
<th>Assessment used</th>
<th>Neurology-relevant outcomes</th>
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<tr>
<td>TOPS project: multidisciplinary teamwork training sessions and formation of unit-based safety teams including solicitation of daily patient goals³⁸</td>
<td>Standardized surveys of patient safety culture</td>
<td>Improvement in safety culture on neuroscience-based floors with residents taking the lead as part of multidisciplinary teams</td>
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<td>Trial of a self-directed curriculum in quality of care for internal medicine residents in an outpatient clinic including readings, weekly self-reflection with faculty members, and medical record audits³⁸</td>
<td>Self-reported behavioral changes as well as patient quality of care metrics such as improvement in hemoglobin A1c and LDL levels</td>
<td>Improvement in neurology-specific quality of care metrics such as those recently proposed in AAN outpatient quality guidelines for epilepsy and Parkinson disease</td>
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<td>Patient safety education program with monthly conferences in a family medicine residency program focusing on ambulatory adverse medical events⁷⁸</td>
<td>Medical event reporting attitudes and reporting behavior before and after intervention</td>
<td>Neurology residents using a similar program could increase their reporting of untoward events and “near misses” to departmental QI and M+M committees in both outpatient and inpatient settings</td>
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<td>Used ABIM clinical preventative services practice improvement module (PIM) to incorporate longitudinal QI curriculum and projects into required ambulatory rotations among residents⁶⁶</td>
<td>Multiple resident-based QI projects resulted from this PIM, each with distinct assessments; one example assessed the frequency of inaccurate medication lists in the ambulatory medical record</td>
<td>Neurology-specific projects could focus on performance in practice modules used for maintenance of certification; accurate medication lists could be targeted in a similar project given the multiple drug-drug interactions with neurologic medications such as antiepileptic drugs</td>
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<td>Residents perform a “systems audit” for upcoming M+M conferences; upon completion of the audit, residents can critically review a case with an adverse event, identify a systems issue that led to the adverse outcome, conduct a root-cause analysis, interview stakeholders, propose solutions, and calculate costs⁸⁶</td>
<td>Resident awareness of systems issues, resident views of the educational value of M+M conferences, and actual institutional improvements that resulted from the systems audits</td>
<td>Neurology programs could focus on M+M cases related to IPa administration or other neurologic emergency treatments in the hospital leading to systems improvements (e.g., decreased door to tPA time)</td>
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<td>Fellows in internal medicine subspecialties were taught root cause analysis (RCA) processes via didactic sessions and practiced conducting an RCA involving an adverse medication event⁶⁶</td>
<td>Faculty assessment of RCA competency as part of an objective structured clinical examination</td>
<td>Neurology residents or fellows could learn RCA skills and apply them to formal review of adverse events in outpatient and inpatient settings</td>
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Abbreviations: AAN = American Academy of Neurology; ABIM = American Board of Internal Medicine; LDL = low-density lipoprotein; M+M = morbidity and mortality; tPA = tissue plasminogen activator; QI = quality improvement.
some institutions, periodic “patient safety rounds,” where current inpatients are discussed with an eye exclusively on safety issues, can help address problems in real time, avoiding potential errors, and changing systems to provide safer care.

**USING ROOT CAUSE ANALYSES** Root cause analyses (RCAs) are another useful construct for trainees to learn about safety issues and develop systems-based solutions in the face of medical errors. Mandated by the Joint Commission, RCAs are advantageous because they are by nature interdisciplinary and focus on the “why” and “how” of errors rather than “who.” At the end of the process, structural changes are suggested to avoid similar mishaps going forward; these changes are usually not physician-specific, allowing trainees a window into the complex health care environment that allows for safe care within a multidisciplinary team. Ideas for success include resident-run departmental RCAs and placing residents on hospital-wide RCA committees.

**BUILDING A CULTURE OF SAFETY** Although safety and quality metrics are often viewed as overlapping with a blurred divide, the field of safety offers a number of unique learning opportunities. The concept of building a “culture of safety” is a broad one that involves teamwork and communication among diverse providers. Many of the already mentioned interventions help to achieve this goal. Residents can play a crucial role in developing this culture and be given the opportunity to play a leadership role, interacting with nursing, pharmacy, case managers, and even patients to achieve a common goal. The TOPS project is one such published multidisciplinary, inpatient unit-based system that engages residents in developing and maintaining a culture of safety and could be used on neuroscience-focused hospital floors.

**RESEARCH AND DISSEMINATION OF BEST PRACTICES** Given the impetus for teaching safety and quality education in neurology, residency programs need to recognize these issues as a major focus of training. Research within neurology is sorely needed and essential to the development of specialty-specific tools. Sharing best practices among programs is important as with any relatively new area of focus in education. Ultimately our trainees need to be prepared for a life in practice that continually examines QI and safety, a task in which the AAN will become an organizational hub. We must quickly develop the means to impart these skills during training or face a group of graduates ill-prepared for this aspect of the real world of neurologic practice.

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**REFERENCES**


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