

**The Emergence of Quality Improvement and Patient Safety Training in Postgraduate Medical Education: An Updated Systematic Review of QI and Patient Safety Curricula -  
*Presented by: Brian Wong, MD***

Wong B, Hollenberg E, Etchells E, Kuper A, Levinson W, Shojania K. The Emergence of Quality Improvement (QI) and Patient Safety Training in Postgraduate Medical Education: An Updated Systematic Review of QI and Patient Safety Curricula. *Am J Med Qual* 27 (3) (suppl 2): 20S-23S, May-June 2012.

Introduction: Trainees need to learn quality improvement and patient safety (QI&PS) concepts and skills. (1, 2). We sought to summarize the literature describing and evaluating QI&PS curricula and identify emerging trends by updating a recently published systematic review (3). This work was part of a nationwide environmental scan commissioned by the Association of Faculties of Medicine in Canada for the Future of Medical Education in Canada Postgraduate project (4).

Methods: Using the identical search strategy, inclusion and exclusion criteria, and article review process as previously described (3), we sought QI&PS curricula targeting postgraduate trainees that were newly published since the original review between January 2009 to October 2010. Two study authors independently abstracted eligible studies for curricular descriptors, methodological features, and learning outcomes, which were classified using Kirkpatrick's framework for evaluating training (5). We summarized results qualitatively, paying particular attention to emerging trends arising from the newly identified studies.

Results: Our updated search identified 699 additional articles, 16 of which met criteria for inclusion (6-21). Combined with studies identified in the original systematic review, there are now 40 published QI&PS curricula that target postgraduate trainees, 30 of which report an evaluative component. Table 1 summarizes emerging trends in QI&PS training. Although QI&PS curricula remain primarily based in internal medicine (18 studies, 45%) or mixed training programs (11 studies, 28%), other disciplines (family medicine, surgery, pediatrics) are starting to include formal training as well. Curricula continue to be clinically based, and focus on a range of QI&PS topics such as continuous quality improvement, systems thinking, and medical

error. Experiential learning through resident-led QI projects remains common (23 studies, 58%), with a notable shift towards team-based projects (16 of 23 studies, 70%). Some team-based projects include inter-professional team members (5 studies, 13%) or resident teams that carry out projects sequentially by taking over projects from previous groups (2 studies, 5%).

**TABLE 1: Emerging Trends in Quality Improvement and Patient Safety Training highlighted by New Studies identified in the Updated Systematic Review\***

Characteristic	Findings from the Original Systematic Review (January 2000 – December 2008)	Emerging Trends highlighted by the Updated Systematic Review (January 2009 – October 2010)
Learners	<ul style="list-style-type: none"> <li>• Curricula primarily targeted learners from Internal Medicine and Family Medicine postgraduate training programs</li> <li>• A minority of published curricula targeted preventive medicine, surgery and pediatric residents</li> </ul>	<ul style="list-style-type: none"> <li>• Internal medicine training programs continue to represent the majority of residencies with published curricula</li> <li>• Although still a minority of studies, a greater number of curricula targeted pediatrics and psychiatry trainees</li> <li>• There were no new published curricula in Family Medicine training programs in the updated review</li> </ul>
Educational setting	<ul style="list-style-type: none"> <li>• Most curricula are delivered in a clinical setting (either the inpatient hospital, ambulatory or mixed clinical settings) with some time spent in the classroom</li> <li>• Pure classroom and distance learning was uncommon</li> </ul>	<ul style="list-style-type: none"> <li>• Educational settings in the updated review were largely similar, with curricula being delivered primarily in the clinical setting</li> <li>• Pure classroom and distance learning remains uncommon</li> </ul>
Teaching methods	<ul style="list-style-type: none"> <li>• Most curricula used experiential learning methods, with resident participation in QI projects</li> <li>• QI project work was carried out independently or in teams primarily consisting of physicians</li> <li>• Other methods used include didactic lectures, re-designed morbidity and mortality rounds</li> </ul>	<ul style="list-style-type: none"> <li>• Continued use of experiential learning methods, with the dominant experience still centered around a QI project</li> <li>• The majority of QI project work was carried out in teams (either concurrently, or sequentially where the project was handed off from one resident to another)</li> </ul>

Characteristic	Findings from the Original Systematic Review (January 2000 – December 2008)	Emerging Trends highlighted by the Updated Systematic Review (January 2009 – October 2010)
	with a systems focus, web-based modules and project presentations	<ul style="list-style-type: none"> <li>• Greater emphasis on inter-professional team members for QI project work</li> <li>• Emerging use of reflective practice and portfolios as novel methods for teaching QI and patient safety</li> </ul>
Educational content	<ul style="list-style-type: none"> <li>• Most commonly taught healthcare quality topics were continuous quality improvement, quality of care epidemiology, and process mapping</li> <li>• Most commonly taught patient safety topics include systems thinking, medical errors/adverse events, and root cause analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Healthcare quality and patient safety topics similar to those identified in the original systematic review</li> </ul>
Learning outcomes	<ul style="list-style-type: none"> <li>• Curricula are well-accepted by trainees</li> <li>• Learner knowledge, both self assessed and tested, consistently increased as a result of the educational interventions</li> <li>• Resident participation in experiential QI projects contributed to clinical process changes</li> <li>• Limited impact on learner behavior change or improved patient health outcomes</li> </ul>	<ul style="list-style-type: none"> <li>• Impact on learner knowledge acquisition and changes to clinical processes of care similar in studies identified in the updated systematic review</li> <li>• Evidence supporting behavior change and improvements in patient health outcomes remains limited</li> </ul>
Study designs	<ul style="list-style-type: none"> <li>• Relied heavily on before-after study designs, only a minority of which included a control group</li> <li>• A minority of studies used rigorous methods such as a randomized controlled design</li> </ul>	<ul style="list-style-type: none"> <li>• Majority of studies still used before-after study designs</li> <li>• Emerging use of rigorous qualitative methods (focus group interviews, thematic analyses) to evaluate curricular impacts on learning outcomes</li> </ul>
Strength of findings	<ul style="list-style-type: none"> <li>• Most studies lack methodological rigor (e.g., lack</li> </ul>	<ul style="list-style-type: none"> <li>• Newly identified studies in the updated systematic review</li> </ul>

Characteristic	Findings from the Original Systematic Review (January 2000 – December 2008)	Emerging Trends highlighted by the Updated Systematic Review (January 2009 – October 2010)
	of a control group, use of unvalidated tools) and have low response and follow-up rates	suffer from similar methodological concerns

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1. QI, quality improvement.

The updated search identified 13 additional studies with an evaluative component. Impact on learning outcomes remains largely unchanged. Trainees continue to rate curricula highly. Twenty-one studies (70%) reported knowledge acquisition outcomes, and found that educational interventions increase both self-assessed and tested knowledge. Nine of the 18 studies that assessed the impact on clinical processes reported measurable improvements in clinical processes. The few studies that assessed program impact on behavior change (2 studies, 5%) or on clinical outcomes (2 studies, 5%) failed to demonstrate a major effect.

Discussion: There has been an explosion of literature focused on QI&PS training for postgraduate trainees. Sixteen new studies were identified in less than 2 years, with rapid expansion into a number of different training disciplines. Despite the increase in studies and innovative approaches to experiential learning and teaching design, it remains unclear if QI&PS knowledge gains translate into meaningful changes in behavior since very few studies measured this outcome, and the ones that did indicated no change. Furthermore, study design and methodology limitations (eg, small sample size, lack of control-group) limit the degree to which changes in clinical process and patient outcomes are attributable to the curriculum. Efforts to target these higher-level educational outcomes warrant further attention.

Future research should also focus on implementation issues that continue to pose significant challenges. To address this gap, we are currently undertaking a qualitative study and interviewing the lead authors of studies included in this updated systematic review to establish key factors that promote successful implementation of QI&PS training in postgraduate medical education.

#### Acknowledgement/Attribution

The authors acknowledge the support of the University of British Columbia, the University of Toronto and McGill University in this study. The FMEC PG Environmental Scan was funded by Health Canada and managed by a consortium of the Association of Faculties of Medicine of Canada (AFMC), the College of Family Physicians of Canada (CFPC), le Collège des médecins du Québec (CMQ) and the Royal College of Physicians and Surgeons of Canada (RCPSC), with the AFMC acting as the project secretaria