

Using Quality Improvement to Tackle Unwarranted Practice Variation

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As health care in the United States moves from quantity to quality, unwarranted practice variation has become a natural target for those wishing to improve care. Variation in provider practice should arise from personalizing care decisions on the basis of each patient's condition and personal preferences. "Unwarranted" variation refers to variation beyond what would be expected based on patient or population differences¹; it is due to non-evidence-based, inappropriate, and/or inefficient health care. Unwarranted variation in pediatrics has been demonstrated since the early 1900s, when Sir Allison Glover² compared pediatric tonsillectomy rates in geographically and demographically similar areas of England. He showed a >10-fold variation in rates and concluded, "A study of the geographical distribution [of tonsillectomy] in children discloses no correlation between any other factor, such as over-crowding, poverty, bad housing, or climate. In fact it defies any explanation, save that of variation of medical opinion on the indications."²

Despite broad dissemination of evidence-based guidelines for asthma management,³ unwarranted variation persists in care and outcomes for children treated in emergency departments and/or hospitalized for asthma. Studies have demonstrated wide variation in rates of diagnostic testing (eg, complete blood counts), interventions (eg, intravenous [IV] magnesium sulfate), transfer to ICUs, hospital readmissions, length of stay, and costs, even after correction for patient characteristics.⁴⁻⁷ This variation is largely due to the challenges of integrating guidelines into care, which may take up to 17 years.⁸

In this issue of *Hospital Pediatrics*, Khurana Hershey et al⁹ demonstrate that variation in asthma care continues to exist, reinforcing findings in earlier studies. They used the Ohio Pediatric Asthma Registry, a comprehensive statewide prospective study linking clinical, demographic, environmental, and health outcomes data from the 6 major children's hospitals in Ohio. The authors report wide variation in hospital-level rates of what they term "nonstandard" practices (eg, inpatient ipratropium, IV steroids, chest radiographs, antibiotics). Rates of these practices ranged from 20% to 93% across the 6 hospitals.

The authors also explored associations between provider practices and time until "physiologic readiness for discharge (PRD)," measured as hours from admission to first 4-hour albuterol spacing or discharge. They found that several practices were associated with shorter PRD (use of spot pulse oximetry) and longer PRD (continuous albuterol, IV steroids, antibiotics, chest radiographs). However, as the authors acknowledge, their analyses have a limitation. The authors had no ability to account for potential differences across hospitals in the severity of patients' asthma exacerbations because of the lack of standardized assessment tools. Consequently, their conclusions about

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relationships between practices and PRD may be due to confounding (eg, more severe patients get continuous albuterol and need longer hospital stays). This limits our ability to apply their findings to improve asthma care.

Nonetheless, the practice variation they demonstrate across 6 hospitals in a small geographic region is substantial and likely represents unwarranted variation. As a field, how are we to address unwarranted variation? Two national strategies attempt to incentivize providers and organizations to provide better care. Public performance reporting provides a reputational incentive to motivate practice change, and pay-for-performance provides a financial incentive. With >15 years of studies on these strategies, the public release of performance data does not appear to effectively alter consumer, health care provider, or organizational behavior.¹⁰ Paradoxically, public reporting may even encourage changes in documentation and coding without actual improvements in patient care.¹¹ A recent systematic review of pay-for-performance reveals scant benefit.¹² Additionally, pay-for-performance may exacerbate health care disparities by rewarding physicians who see healthier and wealthier patients, a problem termed the “reverse Robin Hood effect.”¹³

Is quality improvement (QI) up to the challenge of addressing unwarranted variation? The pediatric hospital medicine core competencies include continuous QI, cost-effective care, and evidence-based medicine. Indeed, exuberant espousal of these competencies defines us as a field. So, how have we leveraged this fervor? Single-center¹⁴ and multi-site¹⁵ QI projects across both academic and community hospital settings have demonstrated reductions in unwarranted variation and improvements in asthma care. The Value in Inpatient Pediatrics network combines centralized expertise in QI with the inherent motivation of pediatric hospitalists, many of whom practice in small community settings where resources are scarce and generally apportioned to the more lucrative adult services.¹⁶ The network has improved

unwarranted variation on the national scale for several common conditions, including bronchiolitis and community-acquired pneumonia.^{17,18}

QI shows promise for tackling unwarranted variation, but our current approaches most often focus on small-scale, local interventions and favor action over evidence.¹⁹ As the field looks forward and becomes better resourced for conducting QI, we should endeavor to improve our expertise and approaches to fully realize QI's potential for reducing unwarranted variation and achieving large-scale improvements in care for our patients. We propose 3 strategies for improving QI to achieve these goals.

IMPROVING QI STRATEGY 1: APPLY MORE RIGOROUS STUDY DESIGN

Most pediatric inpatient QI studies to date have used simple before-and-after studies. This approach can lead us to falsely attribute improvement to a QI intervention when in fact (1) it would have occurred without any QI intervention (because of secular trends in care), or (2) it is actually because of other factors, such as a less-severe mix of patients being cared for after the QI intervention began (case-mix differences). Simple before-and-after studies are sometimes adequate to justify local QI efforts, but they are rarely sufficient to support widespread initiatives because of the risks of expending tremendous resources without obtaining a benefit (and possibly introducing new problems).^{19,20} Cluster-randomized trials represent a rigorous way to study QI interventions, but other designs include stepped-wedge randomized trials, before-and-after designs with concurrent control groups, and time-series designs.¹⁹

IMPROVING QI STRATEGY 2: DETAIL IMPLEMENTATION STRATEGIES

For QI interventions to have more widespread benefits for children, potential adopters need adequate guidance on exactly how to implement interventions

successfully. Implementation science can be used to provide frameworks and guidance on how to design and evaluate QI interventions to facilitate more successful uptake.²¹ Authors of QI reports and studies should better describe how they designed and implemented their interventions, what barriers they faced and how they were overcome, and which components of their intervention were most important in improving care.

IMPROVING QI STRATEGY 3: DETERMINE HOW TO SUSTAIN CHANGE

After initial gains are achieved with a QI intervention, improvements are often lost as attention shifts to other priorities and staff revert to the “old way” of doing things. Few pediatric QI interventions have examined outcomes >6 months after implementation.²² Although there are general frameworks for sustaining the benefits of QI interventions,²³ it is still unclear which strategies are most feasible and effective. Understanding this will require sustained data collection and monitoring.

Local QI interventions to standardize care are only a first step in addressing unwarranted practice variation. The next important steps are improving our QI strategies and reach. To achieve widespread improvements in child health, we must scale up QI interventions that prove effective. We urge QI leaders to develop further expertise to apply rigorous study designs (eg, include control units and sites), expand their efforts to include more settings (eg, an academic center and affiliated community hospitals), detail the implementation strategies used, and monitor outcomes for longer durations of time. By leveraging our field's passion for QI in these ways, we can realize true gains in providing the highest quality care for children within and beyond our hospital walls.

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