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David Aron and Leonard Pogach

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the work of healthcare—from the front line to the front offices—might, for example, be expected to offer specific, expert support and guidance to those they supervise as they design and execute tests of change. The model asserting that better health outcomes, better care delivery and better professional development are inextricably linked (fig 1) recognises that mutual support and stimulation among these three domains invites both sustainability and unending creativity in their efforts.

Drawing everyone actively into the process of testing change, all the time, presumes that everyone will develop a basic understanding of the standards of their work, as well as the skills they need to test changes in that work. Making improvement happen also requires leadership that enables connections between



Figure 2 Formula illustrating the way in which knowledge systems combine to produce improvement.

Table 2 Characteristics of five knowledge systems involved in improvement

Knowledge system	Illustrative features
1. Generalisable scientific evidence	Controls and limits context as a variable; tests hypotheses
2. Particular context awareness	Characterises the particular physical, social and cultural identity of local care settings (eg, their processes, habits and traditions)
3. Performance measurement	Assesses the effect of changes by using study methods that preserve time as a variable, use balanced measures (range of perspectives, dimensions), analyse for patterns
4. Plans for change	Describes the variety of methods available for connecting evidence to particular contexts
5. Execution of planned changes	Provides insight into the strategic, operational and human resource realities of particular settings (drivers) that will make changes happen

the aims of changes and the design and testing of those changes; that pays serious attention to the policies and practices of reward and accountability; and unshakeable belief in the idea that everyone in healthcare really has two jobs when they come to work every day: to do their work and to improve it.

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Authors' affiliations

Paul B Batalden, Center for Evaluative Sciences, Dartmouth Medical School, Hanover, New Hampshire, USA

Frank Davidoff, Institute for Healthcare Improvement, Cambridge, Massachusetts, USA

Correspondence to: Dr P B Batalden, Center for Evaluative Sciences, Dartmouth Medical School, Hanover, NH 03755, USA

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Diabetes

Specialists versus generalists in the era of pay for performance: "A plague o' both your houses!"

David Aron, Leonard Pogach

The focus on comparisons of specialists and generalists is misguided—good diabetes care depends upon a team

The comparison of outcomes among generalists and specialist remains a matter of considerable and sometime acrimonious debate. A number of recent studies, usually using intermediate outcomes, have resulted in differing conclusions as to who provides the "best" care. Confounding factors, including referral biases, shared care, and illness burden remain methodological challenges and both groups continue to argue the point.^{1 2} Methodological shortcomings aside, the paper in this issue by McAlister *et al*³ (see page 6) is novel in that it uses all-cause mortality for patients with new onset diabetes as a criterion by which to compare specialists and generalists. All-cause mortality is perhaps the ultimate summary

outcome, and one that has previously been proposed as a quality measure for assessing quality of outpatient care for systems of care.⁴ The provocative finding of the current study is that specialist care is associated with a survival disadvantage. This survival disadvantage occurred despite the seemingly better performance of specialists in process measures of diabetes quality such as use of statins, antiplatelet agents, and ACE inhibitors, and was robust across several sets of analyses.

The provocative finding of the current study is that specialist care was associated with a survival disadvantage

In the era of public reporting and pay for performance in the UK and US, this paper raises a number of issues for how and whether to assess quality measurement among different clinical groups, using diabetes as the example. First, sample size limitations would preclude the use of mortality comparisons at the individual physician and probably at the system level as well. Furthermore, it is clear from both the current manuscript and prior work that even system level comparisons require high quality data and rigorous risk adjustment.⁴ Additionally, short term mortality rates may not be actionable. Consequently, the use of intermediate outcomes and process measures that have been demonstrated to reduce mortality—or at least reduce the adverse macrovascular and microvascular outcomes that result in shortened life expectancy—will undoubtedly continue to constitute the primary approach to quality assessment in diabetes.

In that regard, certain medications that have been shown in randomised clinical trials to decrease cardiovascular morbidity and mortality, such as angiotensin enzyme converting inhibitors,³ statins⁶ and aspirin,⁷ can and should be able to be successfully prescribed equally well by generalists and subspecialists for most patients. However, the situation with intermediate outcomes of glycaemia, blood pressure, and cholesterol is more

complex, and highlights differences in the primary care/subspecialist perspectives in what strength of evidence is necessary for a performance measure.

Two US-based coalitions that endorse previously developed measures, the National Quality Forum⁸ and the Ambulatory Care Quality Alliance,⁹ both currently recommend measurement of poor A1c (>9%), systolic blood pressure <140 mmHg, and two LDL-C levels, <130 mg/dl and <100 mg/dl as outcomes by which to compare all providers of health care—from clinicians (specialists and generalists alike) to systems of care. These measures are consistent with recommendations by the National Diabetes Quality Improvement Alliance, a private sector–Federal US coalition that develops diabetes measures and which includes both specialists and generalists.¹⁰ Lower thresholds were included as quality improvement measures not appropriate for public reporting, reflecting concerns over risk adjustment and generalisability of randomised clinical trials to all persons with diabetes. On the other hand, the National Committee for Quality Assurance, the major accreditor of health-care plans in the US, has recently adopted US-based subspecialty-based clinical practice recommendations of <7%A1c, and <130 mmHg systolic blood pressure thresholds¹¹ in addition to the higher targets, and eliminated the LDL-C 130 mg/dl in lieu of a single LDL-C threshold, 100 mg/dl, for all persons with diabetes between 18–75 years of age, without exclusion criteria or risk adjustment.¹² Although these measures are to be used to assess plan quality, they clearly will drive individual physician practices—for better or worse. What might be the impact of these lower targets on morbidity and mortality in persons with diabetes, and upon comparison of primary care and specialist physicians?

PERFORMANCE MEASUREMENT MAY HAVE UNINTENDED CONSEQUENCES

There is compelling evidence that treatment of each risk factor is causally linked to reductions in morbidity and mortality, and thus particularly well suited as an intermediate outcome measure.^{7 13 14} However, all of these trials and analyses indicate that in contrast to relative risk reduction, which is linear over a wide range, absolute risk reduction is log-linear. In other words, the number of adverse outcomes prevented decreases with identical reductions of each of the risk factors starting from a lower baseline: for example, from 8% to 7% A1c compared to 9% to 8% A1c. Furthermore, we note that the extent to which treatment to the optimal

levels recommended by professional societies and adopted by the NCQA are linked to outcome reduction is matter of scientific debate: the American Diabetes Association notes that the 130 mmHg systolic blood pressure recommendation is based upon “conflicting evidence with the weight of evidence supporting the recommendation”¹¹ while the impact of lowering lipids to less than <130 mg/dl for most persons with diabetes, if they are already taking a statin, has recently been questioned.¹⁵ It is because of this uncertainty that the impact of aggressive glycaemic and blood pressure lowering in type 2 diabetes is under active investigation in the National Institutes of Diabetes and Digestive and Kidney Diseases and the Veterans Health Administration sponsored clinical trials. Consequently, because we do not yet have definitive answers to these key questions, multiple major guidelines in the US (American Geriatrics Society, Veterans Health Administration/Department of Defense) have indicated that patient level factors need to guide individual glycaemic control targets that are closer to “optimal values”.^{16 17} Such a choice reflects not only the potential benefits of intensive treatment, but also the potential risks. Hypoglycaemia is more frequent when lower A1c targets are approached; there is a dose-related effect of statins on myalgias; and many individuals would need 4–5 medications to achieve a systolic blood pressure of <130 mm. Polypharmacy increases the likelihood of adverse drug effects, and could impact adherence. Thus, life expectancy and comorbid conditions as well as patient preferences must be considered. In other words, are subspecialty guideline recommendations for optimal targets actually appropriate as a target for all persons with diabetes?

More importantly, what might be the unintended consequences of the private sector and/or government in any industrialised nation adopting optimal threshold measures as standards by which to access provider quality and determine pay for performance? First, it must be recognised that achieving such targets for the majority of patients is not easy. Although that alone should not be the determining factor in setting a target, we note that less than 40% of individuals with diabetes could achieve target values <7% when a third oral agent¹⁸ or insulin is added,¹⁹ even in clinical randomised trials. In the largest study of hypertension (ALLHAT) which was conducted in 623 clinics, only about two thirds of patients achieved the target goal of 140 mmHg systolic although the majority were on multiple antihypertensive agents.²⁰ Achieving these levels in clinical practice, as opposed to clinical trials, may be even

more difficult, even in the context of formal quality improvement efforts.^{21 22}

The most disturbing message of this paper is the exceptionally low usage of statins, aspirin and ACE inhibitors by generalists and specialists alike

We suggest that if it is difficult to achieve optimal targets even in the context of clinical trials and structured interventions in systems of care with electronic health records and if the stakes are high enough, individual providers and even systems may consider “gaming the system” to maximise their apparent performance. This could include not only patient selection, but also focusing on those patients already close to the target with selective referral of more difficult patients to subspecialists. We have previously proposed the use of continuous and weighted measures that reward progress towards a goal, rather than the achievement of an arbitrary threshold value, as a performance measurement strategy that may obviate some of these difficulties.²³ Such a continuous measure is both a better assessment of clinical benefit (based upon absolute risk reduction) and a more accurate reflection of achieved improvement in population health. Furthermore, this approach would provide incentives to healthcare units (plans and/or providers) and focus improvement strategies upon risk factor control at higher levels than levels marginally above the “optimal” target.

In a sense, however, this is all beside the point. We are committing a Type 3 error—answering the wrong question. The correct question should be: How best to decrease premature morbidity and mortality? Indeed, the most disturbing message of this paper is the exceptionally low usage of statins, aspirin and ACE inhibitors by generalists and specialists alike. Each of these medications has been shown to reduce the incidence of new cardiovascular events in persons with diabetes. However, and unfortunately, this finding is consistent with the substandard level of diabetes care in the general US population in 2000.²⁴ How to achieve better care is the appropriate answer. We suggest that the system in which a provider practices is key, a point that has important implications as pay-for-performance programmes are implemented. Why compare physicians of different specialties—or even more generically, provider type—when good diabetes care depends upon a team? The universal use of the electronic health record to systematise care, which consists of data acquisition and feedback, coupled with performance measures and

widespread quality improvement efforts, improves care; the Veterans Healthcare System is the prime example in the US.²⁵ This is not to suggest that quality improvement is easy. It will take the concerted effort of all involved.

In Romeo and Juliet, Romeo's dear friend Mercutio is a casualty of the bitter feud between the Montagues and Capulets. As he dies, Mercutio damns both families (Act 3, Scene i): "I am hurt. A plague o' both your houses! I am sped." That should be the take home message of this manuscript: many persons with diabetes are having the quality and length of their life diminished not because of fate, but because provision of diabetes care is substandard in practice. Rather than feuding over who can recommend lower (and sometimes inappropriate individual level) thresholds that provide less population health benefit, or who is better, both groups need to cooperate in improving care. Both must recognise not only that the addition of several relatively safe and well-tolerated medications and progress towards lower goals will likely prevent death in many of their patients, but that effective collaboration and systems improvement will achieve the goal that all good providers seek, and that public health demands.

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Authors' affiliations

D Aron, Louis Stokes Cleveland Department of Veterans Affairs Medical Center, Cleveland and Case Western Reserve University, Cleveland, Ohio, USA

L Pogach, New Jersey Veterans Health Administration Healthcare System, East Orange and University of Medicine and Dentistry of New Jersey, New Jersey Medical School, New Jersey, USA

Correspondence to: Dr D Aron, Education Office (14W), Louis Stokes Cleveland VA Medical

Center, 10701 East Boulevard, Cleveland, OH 44106, USA; david.aron@va.gov

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