

Paper presented at the John Deutsch Institute Conference, "Health Services Restructuring: New Evidence and New Directions", November 17-18, 2005 at Queen's University. The final version is published in a book entitled *Health Services Restructuring: New Evidence and New Directions*, edited by C.M. Beach, R.C. Chaykowski, S. Shortt, F. St-Hilaire, and A. Sweetman, 2006 (Kingston: John Deutsch Institute, Queen's University). Published in cooperation with McGill-Queen's University Press and available at: <http://mqup.mcgill.ca> .

Sextant? Chronometer? Are We Equipped to Chart the Course of Health Services Restructuring?

To be presented at:

Health Services Restructuring: New Evidence and New Directions,
Queen's University at Kingston, Kingston, Ontario November 17-18, 2005

Authors:

Robert C. James, PhD

Manya Sadouski, MD, CCFP

Aechidna Health Informatics, Inc

Winnipeg, MB

[email: Rob@aetiologic.ca](mailto:Rob@aetiologic.ca), [HYPERLINK "mailto:Manya@shaw.ca" Manya@shaw.ca](mailto:Manya@shaw.ca)

We have greatly benefited from conversations with Dr. Brenda Zimmerman, York University, Canada, and Laura Hibbs, National Co-ordinator for Clinical Microsystems within the NHS. Inferences, errors, and conclusions are, of course, our own.

Introduction

This meeting's objective is to focus “on [the] use of evidence and empirical analysis to examine specific structural innovations” and to “identify what works and what doesn’t” in restructuring Canadian health services. Other papers offer insights regarding specific macro-level structural innovations, including pharmacare, homecare, regionalization, and the evolving scope of public and private insurance. This paper focuses on another aspect of the meeting's theme – the generation and analysis of evidence -- a theme which, we hope, spans specific structural innovations and the particularities of policy preferences. We focus our attention on performance measures as a particular class of “evidence”; the US Government Accounting Office defines performance measures as:

“measurable indicators that can be systematically tracked to assess progress made in achieving predetermined goals and using such indicators to assess progress in achieving these goals”¹

Our title suggests an analogy between the sextant and chronometer – central tools for navigation – and one approach to performance measurement embodied within an approach to care delivery systems known as the clinical microsystem. Central problems are shared by both: accurate determination of current position, the estimation of course and speed, and the eventual creation of reference maps. Crucially, both microsystem approaches and these antiquarian navigational devices are used at the “front line” of exploration: by those actually traversing new ground, to safely navigate new territory, to replicate successful paths trodden by others and to provide systematic reports back recording the process and outcomes of exploration.

The title of this paper is thus intended to ask if we have the measurement tools necessary to chart the course of health services restructuring. Are those who direct our explorations familiar with the use of such tools? And perhaps most crucially, “Are we prepared to be guided by these measures in the task of health services restructuring?”

While recognizing that Canada now has several well-publicized performance measurement frameworks and initiatives, our thesis is that much of the measurement and analysis of Canada’s healthcare system, is intended for policy audiences who typically modify and monitor “macro level” initiatives. There does not appear to be an offsetting and complementary process of measurement which evaluates and

optimizes clinical care at the “micro” level – the patient/provider interface. This gap reflects, to some degree, established policy choices which have respected autonomy for private practitioners and the primacy of institutional governance. This policy choice also likely speaks to the assumption that health services restructuring will be conducted through change in macro-level policy levers, and not by changing micro-level operational aspects of care delivery. We argue that the lack of a program of measurement, and management at the patient/provider interface, to complement macro level measurement strategies, represents a threat to successful macro-level restructuring.

We advance this argument in the next three sections: first, we introduce and explore Brian Quinn’s approach to organizational structure in the service sector, with his emphasis on quality and change management, and the subsequent adaptation of Quinn’s models to health services by Nelson *et al* – the “clinical microsystems” approach. This approach seems to provide a means to promote measurement and management at the patient/provider level. The second section introduces evidence for the uptake of the clinical microsystems approach in the international context, and contrasts this with current Canadian performance measurement frameworks. The final section argues for dramatically increasing the use of microsystem approaches to guide Canadian health services restructuring.

Quinn’s Organizational Model for System Change

The scale of national health services restructuring is daunting, and extends beyond the scope of traditional academic health services studies which tend to focus on singular interventions and discrete populations. Key decisions and leadership strategies will likely be informed by theories of large-scale institutional change and management theory. There are many such theories; this paper highlights the work of Brian Quinn and his studies of successful large-scale US for-profit service sector entities.

Quinn’s approach is highlighted here because of its roots in widely distributed customer service organizations, and the growing adaptation of his models in international healthcare reform, under the label of “clinical microsystems”.

Quinn’s classic study of US for-profit service industries sought to study systems that maximized both customization and price advantages². Quinn set out to identify and study a set of leading companies

¹<http://www.ichnet.org/glossary.htm>

²JB Quinn *Intelligent Enterprise*. The Free Press, 1992

that “optimize flexibility at the customer contact point *and* [achieve]integrated cost and quality control.” His study suggests that this is accomplished by:

- (1) seeking the smallest possible core unit at which activity or output can be “replicated” or repeated, (2) developing micro measures that manage processes and functions at this level, ... (p. 103)

It is here, in the focus on the “smallest possible core unit” - subsequently known as the “smallest replicable unit” - and in the related development of micro measures of “processes and functions” that one finds the core of Quinn's approach.

Quinn's models for improving service-industry organization has been adapted by a group at Dartmouth Medical School specifically to address health care settings.^{3 4 5 6 7 8 9 10 11} Dartmouth's efforts here are closely linked, by content and personalities, to the Institute of Medicine's multi-part examination of the US health care system, including publications such as *To Err is Human*¹², and *Crossing the Quality Chasm*¹³. Advocates for the microsystem model clearly see their efforts to reform clinical care as a linch-pin in addressing the deficiencies identified in the IOM reports. As such, the models are explicitly reconciled with the IOM's ten proposed “new rules” for health services.¹⁴

³Nelson EC, Batalden PB, Huber TP, Mohr JJ, Godfrey MM, Headrick LA, Wasson JH. Microsystems in health care: Part 1. Learning from high-performing front-line clinical units. *Jt Comm J Qual Improv.* 2002 Sep;28(9):472-93.

⁴Nelson EC, Batalden PB, Homa K, Godfrey MM, Campbell C, Headrick LA, Huber TP, Mohr JJ, Wasson JH. Microsystems in health care: Part 2. Creating a rich information environment. *Jt Comm J Qual Saf.* 2003 Jan;29(1):5-15.

⁵Godfrey MM, Nelson EC, Wasson JH, Mohr JJ, Batalden PB. Microsystems in health care: Part 3. Planning patient-centered services. *Jt Comm J Qual Saf.* 2003 Apr;29(4):159-70.

⁶Wasson JH, Godfrey MM, Nelson EC, Mohr JJ, Batalden PB. Microsystems in health care: Part 4. Planning patient-centered care. *Jt Comm J Qual Saf.* 2003 May;29(5):227-37.

⁷Batalden PB, Nelson EC, Mohr JJ, Godfrey MM, Huber TP, Kosnik L, Ashling K. Microsystems in health care: Part 5. How leaders are leading. *Jt Comm J Qual Saf.* 2003 Jun;29(6):297-308.

⁸Mohr JJ, Barach P, Cravero JP, Blike GT, Godfrey MM, Batalden PB, Nelson EC: Microsystems in Health Care: Part 6. Designing Patient Safety into the Microsystem. *Jt Comm J Qual Safety.* 29(8):401-408.

⁹Kosnik LK and Espinosa JA. Microsystems in Health Care: Part 7. The Microsystem as a Platform for Merging Strategic Planning and Operations. *Jt Comm J Qual Safety.* 29(9):452-459.

¹⁰Huber TP, Godfrey MM, Nelson EC, Mohr JJ, Campbell C, Batalden PB. Microsystems in health care: Part 8. Developing people and improving work life: what front-line staff told us. *Jt Comm J Qual Saf.* 2003 Oct;29(10):512-22.

¹¹Batalden PB, Nelson EC, Edwards WH, Godfrey MM, Mohr JJ: Microsystems in Health Care: Part 9. Developing Small Clinical Units to Attain Peak Performance. *Jt Comm J Qual Safety.* 29(11):575-585.

¹²Kohn LT, Corrigan J, Donaldson MS (Editors). *To Err is Human: Building a Safer Health System.* National Academy Press, 2000.

¹³Institute of Medicine. *Crossing the Quality Chasm: A New Health System for the 21st Century.* National Academy Press, 2001.

¹⁴Batalden PB, Splaine M: What Will it Take to Lead the Continual Improvement and Innovation of Health Care in the Twenty-first Century? *Quality*

For these authors, three distinct levels of health services organizations can be seen: a **macro** level which is concerned with governance, strategy and leadership. **Meso**-level aspects of health services delivery include those managerial functions which do not interact with patients, but may supervise or support patient-focused activities.

The **micro** level is defined as the “place where patients, families and care team meet” -- the “sharp end” of the health services systems. This level embodies Quinn's “smallest replicable unit” for health care. More formally, clinical microsystems have been defined as:

“ a small group of people who work together on a regular basis - or as needed - to provide care and the individuals who receive that care (who can also be recognized as members of a discrete subpopulation of patients). It has clinical and business aims, linked processes, a shared information environment and produces services and care which can be measured as performance outcomes. These systems evolve over time and are (often) embedded in larger systems/organizations. As any living adaptive system, the microsystem must: (1) do the work, (2) meet staff needs, (3) maintain themselves as a clinical unit.”¹⁵

Microsystems can vary dramatically in the discrete subpopulations that they serve: primary care outpatient clinics and tertiary intensive care units can both be conceptualized as microsystems. As microsystems – following Quinn's approach – the tasks of measurement and the related process of adaptation are central. Other salient components of microsystems include:

- ⊗ a primary function as a clinical care entity,
- ⊗ relative smallness,
- ⊗ focus on, and integration of, a discrete subpopulation of patients,
- ⊗ processes and information flows,
- ⊗ inherent commitment to localized performance measurement and improvement.¹⁶

Consistent with the above discussion, **Error! No bookmark name given.** depicts an “onion diagram”, and situates the clinical microsystem midway through layers from self-management to public policy.

Management in Healthcare, 11(1): 45-54, Fall 2002.

¹⁵Clinical Microsystem Action Guide. [http://clinicalmicrosystem.org/images/PDF Files/CMAG040104.pdf](http://clinicalmicrosystem.org/images/PDF%20Files/CMAG040104.pdf)

¹⁶Nelson EC, Batalden PB, Huber TP, Mohr JJ, Godfrey MM, Headrick LA, Wasson JH. Microsystems in Health Care: Part 1. Learning from High-Performing Front-Line Clinical Units. *Journal of Quality Improvement*, September, 2002

Illustration 1: Layers of Health Services Organization. (Golton, et al 2005) www.bmj.com/Wed13/M4Part1.pdf

Microsystems, System Change and Performance Measurement

Having offered a working definition of a clinical microsystem, it is important to address the implications of the model for our interest in performance measurement and change management in large health systems.

Quinn's approach might be formalized to suggest that an attribute (A) of a large “macro-system” (M) can be seen as the summation of how that attribute is realized across a set of related microsystems m_1 - m_n .

Thus, one might propose that:

A variety of attributes can be assessed under this framework, including quality, safety, patient-centeredness.

This simplistic approach can be extended; Quinn's theory of the “smallest replicable unit” includes a third characteristic not noted above -- namely the importance of the “mixing [of] these micro units in a variety of combinations that match localized or individual customers' needs” . For the clinical microsystem this translates into the preservation of the attribute when patients and their information are transferred across microsystems. This characteristic of microsystems captures issues such as continuity of care, and appropriate transfer of care amongst generalists, specialists, in-patients and out-patients. To incorporate this additional attribute, a slightly more complex representation can be proposed:

where A is some attribute of interest, M is the macrosystem, m is a microsystem, and C (the communication of the attribute) is a function which measures how well the attribute is transferred when patients and their information pass from one microsystem (m) to some other (not m, denoted “~m”) microsystem. This simple model provides a framework for performance measurement focused on the clinical microsystem.

The selection of desirable attributes for Canada's health system reform is likely to be informed by policy preferences, and political priorities, and lies outside of the scope of this paper. The Canadian Institute for Health Information (CIHI) has articulated, and the International Standards Organization has adopted, an eight-domain framework¹⁷ (nine domains if you include equity) for evaluating health services. The Institute of Medicine (IOM) has articulated its own six domain framework¹⁸; there are overlaps between the Canadian/ISO model and that advanced by the IOM. Nelson and colleagues at the Institute for Healthcare Improvement have begun efforts to map the six domain IOM model to implementable clinical microsystem measures¹⁹.

At its core, Quinn's conceptual framework, and its adaptation for health care, argues that management and measurement must occur primarily at the microsystem level. Governance entities are expected to define the direction of change, and to prioritize and resource the pursuit of key system attributes, but measurement is rooted in the microsystem.

Microsystem Performance measurement in an international context

The notion of optimizing the functioning of small clinical teams as the key strategy to optimizing larger

¹⁷CIHI eight domains include “Acceptability, Accessibility, Appropriateness, Competence, Continuity, Effectiveness, Efficiency and Safety”. Equity is an additional and overriding feature across health status, non-medical and health services domains. The IOM suggests a more parsimonious six domains: Safe, Effective, Patient-centered, Timely, Efficient and Equitable.

¹⁸International Organization for Standardization. (2004). Health Informatics – Health Indicators Conceptual Framework, ISO/TS 21667:2004 .

¹⁹Nelson EC, Nolan K, Nolan T, Long D, Jarman B. *IHI's Health System Measures Kit: Version 1.0*. <http://cms.dartmouth.edu/conferences/WholeSystemsMeasures.pdf>.

system functioning is clearly taking root in the UK, and in places such as Jonkoping County, Sweden.²⁰

A diverse set of agencies in the United States are also adopting this approach. A current list of recent microsystems projects is maintained by Nelson and colleagues at Dartmouth via the website www.clinicalmicrosystem.org.

In the UK, the microsystems approach has evolved from a small set of demonstration projects in 2003/4 into the key model for clinical team system change advocated by NHS innovation agencies.^{21 22}

In Sweden, Jonkoping County Council has adopted the microsystems model as the strategic model for a broad program of health services reform.²³

Evaluating the impact of microsystems-based innovation, from the UK, Sweden or other locations, is admittedly problematic. Extant reports tend to rely on pre-post designs, often use modest sample sizes, and other aspects of the “Plan-Do-Study-Act” model proposed by Langley and Nolan²⁴, have been endorsed by Rand²⁵ and the Institute for Healthcare Improvement (IHI)²⁶. Evaluations of microsystems based interventions tend to be focused on specific localized interventions rather than on the “microsystems” paradigm as a whole. More systematic evaluation programs would yield more robust evidence, as would comparisons of clinical microsystems approaches compared to other managerial strategies.

Performance measurement in the Canadian context

Miller and Zelmer have provided a detailed overview of performance measurement in Canada, and included important US and international examples.²⁷ Interested readers are referred to this recent

²⁰<http://www.qulturum.com/LitiumInformation/site/page.asp?page=4&IncPage=42&Destination=29>

²¹See presentations by Golton I, Hibbs L, Robinson L, Wilcock P. Building improvement for patients, staff and organisations using the using the principles of clinical microsystems. 10th European Forum on Quality Improvement in Health Care. London, April, 2005. See Parts 1-4
http://www.bmj.com/Forum%20presentations/document_view.

²²Department of Health, Working in systems: Process and systems thinking. London. 2005 See
http://www.modern.nhs.uk/improvementguides/global_home.htm for a large set of improvement leadership guides.

²³<http://www.qulturum.com/litiuminformation/site/page.asp?Page=4&IncPage=42&Destination=29>

²⁴C. Langley, K. Nolan, T. Nolan, C. Norman, and L. Provost, The Improvement Guide: A Practical Approach to Improving Organizational Performance. San Francisco: Jossey-Bass Publishers, 1996.

²⁵Will Nicholas, Donna O. Farley, Mary E. Vaiana, Shan Cretin. Putting Practice Guidelines to Work in the Department of Defense Medical System: A Guide for Action Rand. <http://www.rand.org/publications/MR/MR1267/index.html>

²⁶See www.ihl.org/IHI/Topics/Improvement/ImprovementMethods/HowToImprove/testingchanges.htm

²⁷Morris K, Zelmer J Public Reporting of Performance Measures in Health Care. Canadian Policy Research Network, February 2005. 36 pp. Accessed as:

discussion, and to the OECD's 2001 analysis of Canadian performance indicators. At both the national and provincial/territorial level, there is a clear commitment to move beyond the narrow scope of performance measurements that had previously characterized Canadian health system performance measurement in the past.²⁸ These reports and the work of Canada's key health policy research centres have focused on macro-level changes in health systems - insurance coverage, health status and health services variation within and between jurisdictions, etc. There is not a complementary body of work which describes the functioning of clinical entities - be they single physicians in ambulatory care, teams, or hospital wards. The knowledge base resulting from existing policy studies and performance assessment exercises is therefore asymmetric.

The potential for microsystem measures in Canadian healthcare restructuring

This paper asks whether the task of restructuring the Canadian healthcare system has the “navigational aids” necessary to allow reform to document pathfinding - enabling us to retrace our steps when we encounter dead ends, and to describe our journeys to others with timeliness and accuracy. Such is the promise of performance measurement. Our thesis is that current Canadian performance measurements activities are overly focused on measures and measurement process that occur at the macro level - and these are measured and responded to at a great distance from the actual delivery of clinical care. We are concerned that this sort of measurement, distant (in time, place, and agency) from where care happens, will not serve as a reasonable guide for activating clinical teams or for guiding change.

We suggest that as we move into a period of vigorous restructuring of Canadian health services,

<http://www.cprm.org/en/doc.cfm?doc=1176>

it makes sense to use and test the widest variety of sextants and chronometers available to us, as aids to situating ourselves within the multi-dimensional landscape of health services restructuring, and mapping the course of exploration. There is no question that Canada's current macro level performance measurements fills important gaps in the range of performance measurement. However, as a sole set of descriptors of system performance and as agents for change, these metrics seem likely to frustrate a complete description of the Canadian health system through this period of change and innovation.

There is an opportunity for third-party policy agencies, such as the Health Council of Canada, and comparable provincial /territorial/regional agencies, to encourage and promote clinical microsystems redesign, and to support measurement and performance improvement within microsystems. There is now a large body of evidence (admittedly not all of the highest methodological standards) arising from US, UK and other implementations of the clinical microsystems framework, suggesting that this approach may bring about positive changes in patient, and team performance, in relevant domains. An important Canadian contribution could be to establish more rigorous evaluative paradigms while still encouraging localized adaptation and innovation.

The critical question before us then, is whether there is leadership to rigorously test, and spread, the use of microsystems thinking and measurement to aid in the restructuring of Canadian health services.

Leadership, not technology, is the critical obstacle head.

Are we equipped with the sextant and chronometer we chart the restructuring of Canadian health services? Perhaps, but we argue that Canada is at best only partially prepared – with a set of macro level measures that do not give insights into microsystem performance. A complementary set of microsystems measures and microsystems approaches to change and quality improvement are likely to prove equally necessary. It will be difficult to successfully restructure without insights into the function of clinical microsystems and without meaningful national engagement of the need to understand and optimize health care delivery at this level.

²⁸*Measuring up : improving health system performance in OECD countries.* Paris : Organisation for Economic Co-operation and Development, c2002.