



Health System Key Performance Indicators

By

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This report has been written by me and has not received any previous academic credit at this or any other institution.

Carolyn Marriott

Executive Summary

The Nova Scotia government and the Health Authorities need to ensure accountability so existing health system resources are maximized. To monitor system performance, information is needed about where dollars are spent and why, so that variations in medical practice can be detected and resources used properly. The objective of the project is to develop key performance indicators for the Nova Scotia's two Health Authorities. The Health Authorities report their financial position during the year to the Department of Health and Wellness, however; there lacks a consistent link from the financial forecasts reported to the operational performance of the Health Authorities.

The project involves scanning for existing indicators that may be in use already, and identifying indicators for strategically important programs and initiatives. The learning experience for the author included an overview of the health system and understanding of the new roles of Department of Health and Wellness and the Health Authorities. There is an existing dashboard which is created at the department annually using Canadian Institute of Health Information (CIHI) reported data from Health Authorities. There are reporting deliverables in place for some initiatives which Health Authorities report to the department. There is also Accreditation Canada practice testing and there are CIHI collected indicators. There are many performance mechanisms in place, but there is no centralized documentation of this monitoring. If regular, comprehensive and centralized reporting is established, Nova Scotia-specific data will be available to health system data users to analyze.

Considerations for selection of key performance indicators include ease of calculation for the Health Authorities, easy to understand, and relevant to the users. The best solution is to evaluate existing indicators already being produced and isolate programming areas for which there are no indicators, if any exist. Implementation of the indicators should be coordinated centrally and communicated clearly.

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Introduction

The objective of the project is to develop key performance indicators for the Nova Scotia's two Health Authorities (the Nova Scotia Health Authority and the IWK Health Centre). Key performance indicators are relevant to both medicine and informatics because health systems can serve more patients, and serve them better, if performance is monitored for opportunities for improvement. The outcome of the project, during the internship over the summer 2016, is a database of information to inform the selection of key performance indicators. The author's contribution to the project is scanning for existing indicators that may be in use already, and identifying/initiating the process that will be used to select indicators for clinical areas and strategically important initiatives. The learning experience included an overview of the health system and understanding of the new roles of the Department of Health and Wellness and the Health Authorities. Final decisions regarding key performance indicators and their implementation has a longer timeline, spanning over the fiscal 2016-17 year.

Description of organization

The Nova Scotia Department of Finance and Treasury Board (FTB) endeavors to provide financial leadership, analysis and policies that strengthen Nova Scotia, it delivers a range of corporate fiscal and management services, as well as ensures government plans are coordinated and fiscally responsible, and looks to improve the way the province plans, manages, budgets and invests (Nova Scotia Department of Finance and Treasury Board website, 2015). FTB assigns its staff to portfolios of 'client' governmental entities, including other departments. The author performed the internship in the branch of FTB which provides support to the Department of Health & Wellness (DHW) in its budgeting, forecasting and planning activities. The author's portfolio in particular included DHW's Mental Health and Addictions provincial programs, as well as the two Health Authorities (Nova Scotia Health Authority and the IWK Health Centre).

Description of internship work

The author's internship job title was Health System Financial Analytics. This role involved working with other staff in the FTB branch, staff at the DHW and at the Health Authorities. Responsibilities included information gathering, problem analysis and working in SAP (the Province of Nova Scotia's financial software) and Microsoft Excel spreadsheets. There are multiple projects and tasks going on at FTB at any given time and therefore teamwork and prioritizing skills are also developed continuously.

The internship description is as follows:

1. Collect and manage data sets from information supplied by NSHA and IWK, or system data generated within the department
2. Analysis of health system data, especially service utilization and financial impacts of changes in utilization.
3. Using health system data to make recommendations to management about funding models and funding amounts.

Discussion of how the internship work relates to Health Informatics

The internship was related to Health Informatics because it involves gathering health system information to be used as indicators of performance. DHW is undertaking on a departmental wide initiative to better understand the financial and clinical performance of the health system. There is an existing dashboard which is created by DHW annually using Canadian Institute of Health Information (CIHI) reported data from Health Authorities. The creation of the dash board is efficient and it is distributed to senior leadership at DHW. An assessment of the dashboard is being done, with the goal of expanding monitoring to add more value to the DHW, FTB and the taxpayers in general. The gaps in the existing dash board and the piece meal collection of reporting will become more evident as the project

continues. The existing financial health system data will be looked at to identify more efficient use of the data, such as process improvements and better reporting. If regular, more comprehensive reporting is established, Nova Scotia-specific trending over time can be available to health system data users, including comparisons between the 32 facilities to reveal areas of concern to the department, or to substantiate concern brought to the attention of the department.

The author is a provincial data user of information collected from the IWK Health Centre and the Nova Scotia Health Authority, primarily examining information about mental health and addictions related initiatives across the province, both within the Health Authorities and in other entities but also working on high level Health Authorities projects such as annual business planning. The health system data, including utilization, wait list trends and financial data are used to generate reports that support policy development and monitoring for the provincial government.

Each course in the Master of Health Informatics (MHI) program has been valuable and enhanced the author's understanding of the health system. The author saw real life examples of the academic concepts on a daily basis. Of particular interest with regards to the MHI program is receiving updates and budgeting for the proposed Mental Health and Addictions Client Information System for the Health Authorities, which would help health care providers share patient information to coordinate care, and allow for better provincial reporting to senior leadership and government. While plans for that initiative are still under development, the author has become aware of some of the barriers to getting information technology projects off the ground, as well as different paths implementation could take (interoperable vs integrated, what terminology sets will be used, etc), and these concepts were discussed in the Health Information Flow and Standards course. Another example relates to the Networks and the Web course, since this office maintains a database about funding provided to the Health Authorities and the author was able to understand and edit the queries after taking the Networks and the Web course.

The author received practical experience with respect to performance monitoring, as covered in the Health Outcomes elective course. As explained by Dr. Persaud, the health system must develop databases for monitoring outcomes, this will lead to identifying differences in interventions. These differences will require research to decide which intervention is best, which then will result in a change in guideline or policy. When a change in guidelines or policy is made, education is required, and then feedback data is collected to monitor implementation (Persaud, 2014). Changes in activities of the system contribute to new strategies and initiatives (such as a reallocation of resources to an information technology project). These contributions to strategies and initiatives affect outputs (such as data collection improvements), which then affect outcomes (such as new evidence and new health policies) (Government of Canada, Centre of Excellence for Evaluation 'Supporting Effective Evaluations: A guide to Developing Performance Measurement Strategies'). It will be helpful for the author to continue reviewing how analytics can be integrated into decision making processes to help identify opportunities for improvements.

Critical Analysis of Key Performance Indicators

Situation

DHW would like to improve its accountability mechanisms used for monitoring the two Health Authorities. The Health Authorities report their financial position (forecasted revenue and expenses) during the year to DHW, and also publish financial results annually to the public, and publish other reports on their websites. However, there lacks a consistent link from the financial forecasts reported to the operational performance of the Health Authorities. There is a need to not rely on financial 'funding levels' to communicate to Health Authorities what investments are supported by government, and there is a need to not rely on financial reporting from the Health Authorities to communicate their results to DHW. Better linkages would improve problem identification in the operations, therefore leading to more

effective operations. Information is being collected by meeting with staff persons from the stakeholder entities, and these persons sometimes refer the author as well to the websites of CIHI and Accreditation Canada. Accreditation Canada tests compliance for practice requirements, therefore the information is an indicator of quality processes and not a resulting outcome to a patient. There are up to 180 tests for compliance in the Accreditation Canada program (Accreditation Canada ROP Handbook, 2017).

Background

On April 1, 2015, Nova Scotia launched a new health system structure to merge the nine previous district Health Authorities together as the Nova Scotia Health Authority, and this new health authority partners with the IWK Health Centre to plan and deliver care for Nova Scotians. The merger provides a provincial approach to co-ordinate health resources and expertise (DHW website 'Nova Scotia Health Authority'). Further, on April 1 2016, DHW restructured in order to put more resources into front line care and move more programming responsibilities to the Health Authorities so that the system can focus on priority setting and measuring results (Nova Scotia Department of Health and Wellness website 'Department Redesign to Improve Focus on Health-care Results').

The *Health Authorities Act* establishes the roles and responsibilities of DHW, NSHA and IWK. These roles were explained at two DHW staff meetings for all DHW staff, and the supporting FTB staff attended as well. As indicated in the Nova Scotia Health Authority Business Plan 2015-16, the following are the roles:

- **DHW** is responsible for:
 - providing leadership for the health system by setting the strategic policy direction, priorities and standards for the health system; and
 - ensuring accountability for funding and for the measuring and monitoring of health system performance.
- **NSHA and IWK** are responsible for:

- determining health services priorities, through engagement with the communities they serve; and
- delivering those health services, allocating resources appropriately.

Currently DHW divides the budget for the Health Authorities by seven high level program areas (Acute and Tertiary Care, Addiction Services, Mental Health Services, Public Health Services, Primary Health Care, Continuing Care Coordination and Provincial Programs). Acute and Tertiary Care is further divided into 6 CIHI functional centers (Administration, Operations, Inpatient Services, Ambulatory Care, Diagnostic and Therapeutic Services, Other Acute Care). These are also known as primary accounts for CIHI purposes. This breakdown is shown in **Appendix A**, Department of Health and Wellness Supplementary Information to the Budget 2016-17, page 13.12. The funding totals \$1.78 billion for both Health Authorities combined.

Each of the 12 budget lines seen in Appendix A have been divided into a number of initiatives and clinical areas which could be monitored, and in total there are over 130 initiatives and clinical areas which have been identified. The task is to isolate meaningful key performance indicators for these initiatives and/or clinical areas. In some cases, the funding can be grouped into categories for which one or several KPIs would adequately monitor. This potential grouping of funding is also in scope as part of this project as it continues to move forward.

During the 2015-16 business planning process with the new Nova Scotia Health Authority, a list of 21 key performance indicators were developed and these are listed on page 16 of the NSHA 2015-16 Business Plan and it is also included as **Appendix B**. Financially, it lists Budget Variance (compares operating budget to operating actual cost), Capital Budget Variance (compares capital budget to capital actual cost), and the Administration Ratio (administrative costs as a percentage of operating costs). However these 21 KPIs will not provide the depth of understanding required for DHW to have comfort regarding the over 130 initiatives and clinical areas which are currently identified, so more KPIs are required.

Analysis of Key Performance Indicators Information

Issues

DHW's budget grew from \$3.1B in 2006-07 (Nova Scotia Estimates for the Fiscal Year 2006-07) to \$4.1B in 2016-17 (Department of Health and Wellness Supplementary Information to the Budget 2016-17). Growth of such proportions puts a strain on the province's finances. Government and the Health Authorities need to understand the system cost drivers and system needs to ensure the existing resources are maximized. To monitor system performance, information is needed about where dollars are spent and why, so that variations in medical practice can be detected and resources allocated properly.

Meaningful key performance indicators need to be identified for each budget line. After meeting with DHW staff persons, considerations for selection of key performance indicators include ease of calculation for the Health Authorities, easy to understand, and relevance to the users. The Health Authorities currently report to various entities via many mechanisms. A charting of the reporting has begun, allocating existing indicators to the relevant the DHW funded program. A compendium of indicators will be reviewed and commented on by FTB staff, DHW staff as well as staff at the Health Authorities. The local importance of each indicator can be assessed, and any program areas with no performance indicator already existing in the system can be identified.

The Health Authorities currently report via at least these mechanisms:

- Each division at DHW does some degree of monitoring Health Authorities however the mechanisms are different and there is no central source of information about performance. There are existing reporting requirements for certain programs.
- A dashboard is created by DHW using Health Authority CIHI data and is shared among DHW staff.

- CIHI reporting, such as the CIHI Health System Performance: Indicator List with over 40 indicators.
- Accreditation Canada processes require statistics generated and reported.
- Business Plan accountability frameworks including the 21 indicators in the 2015-16 NSHA business plan

Performance indicators can be structural (such as patients per general practitioner), process (cervical cancer screening exams per annual check up), or outcome (10 year survival rates for cervical cancer), and indicators may vary among the 3 types for a balanced performance program, depending on provincial needs and availability of information (Persaud, 2014).

Stakeholders

DHW and FTB require both clinical and financial information to understand the status of the health system. Financial sustainability is a responsibility of FTB and DHW, and the annual Business Plan of the Health Authorities is submitted to and approved by the Minister of Health and Wellness. There are various funding models which can also play a role in ensuring accountability (fee-for-service, activity-based), however, that is not within the scope of this report.

The Health Authorities submit monthly financial forecasts, however there is very little information in the forecast to inform DHW about their performance other than financial profit or loss position. Health Authorities should be expected to complete the minimal extra effort needed to inform government, without an excessive burden on hospital administration. Increased reporting burdens draws resources from front line care. The relationship the Health Authorities have with DHW has to balance an appropriate level of autonomy with the need for accountability. Collaboration is required to ensure this balance is respected.

Non-governmental health system partners include not-for-profit community groups, physicians in community, and patients. These entities desire the government to be accountable for the health system and expect a certain level of service and support. The system is complex and changes in the Health Authorities affect physicians, patients and other groups. However, improving accountability improves resource allocation, and keeping the reporting minimal will decrease trickle down impacts onto other parties, so this work should not negatively affect those groups.

Possible Solutions

Health Authorities are already using CIHI data for national reporting. It is possible to pick an existing list of indicators, such as CIHI's list of 40 indicators, however this may not meet the needs of the stakeholders. Health Authorities are also already using measures for accreditation, and are also providing some reporting to DHW. The best solution is to evaluate existing indicators already being produced and isolate programming areas for which there are no indicators, if any exist. This is justified as it is the least cost and effort on the part of the Health Authorities.

Considerations for evaluating the quality of the indicators include that the health authorities can submit the indicator update regularly, they find the exercise informative for their own internal monitoring or accreditation, and government is able to understand their submission and use it to inform policy decisions. If the correct indicators are chosen, DHW and FTB will have a higher level of comfort regarding Health Authority operations.

Implementation of the indicators should be coordinated from a central branch in government after careful consultation with FTB and DHW branches involved, and consultation with the Health Authorities. A timeline should be developed for phase out of existing reporting to government and phase in of a more streamlined, but complete monitoring program. The implementation plan needs the support of senior management at FTB and DHW and the Health Authorities. Since health care is a

complex adaptive system, changes can be stalled by many barriers and front line ownership of the organizations' performance is needed to bring about change (Persaud, 2014). Also, resources and information systems are needed to generate the outcomes to monitor.

Conclusions

The need to increase monitoring of the health system is clear. The indicators chosen must take into consideration the efforts expended to track the statistic. There must also be at least one indicator chosen for each major clinical area, and also for each strategically important initiatives. The same indicator may be appropriate for multiple initiatives. There are many sources of information for KPIs so the final outcome of the project will be a streamlined but complete program of monitoring.

Recommendations

Government should proceed with further collection of feedback on key performance indicator from stakeholders so that it is a 'made in Nova Scotia' list and fully relevant to Nova Scotia's needs, by using existing indicators already calculated as much as possible. The chosen indicators should be evaluated by looking at the availability and reliability of the data in practice and the utility in improving the health of Nova Scotians. Implementation of the indicators should be coordinated from a central branch in government after careful consultation with stakeholders and the implementation plan must be communicated clearly to reduce redundancies and generate support among stakeholders.

References

- Accreditation Canada (2017) *Required Organizational Practices Handbook*. Retrieved from <https://accreditation.ca/sites/default/files/rop-handbook-2017.pdf>
- CIHI *Health System Performance: Indicator List*. Retrieved from https://www.cihi.ca/sites/default/files/document/indicator_list_yhs_epub_spring_final.pdf
- Government of Canada, Centre of Excellence for Evaluation *Supporting Effective Evaluations: A guide to Developing Performance Measurement Strategies*. Retrieved from <http://www.tbs-sct.gc.ca/hgw-cgf/oversight-surveillance/ae-ve/cee/dpms-esmr/dpms-esmr09-eng.asp#App1>
- IWK Health Centre *Public Accountability - Annual Business Plans*. Retrieved from <http://www.iwk.nshealth.ca/page/public-accountability>
- Nova Scotia Department of Finance and Treasury Board *About us*. Retrieved from <http://www.novascotia.ca/finance/en/home/aboutus/default.aspx>,
- Nova Scotia Department of Finance and Treasury Board (2016) *Budget 2016-2017 Working together for a stronger Nova Scotia Estimates and Supplementary Detail*. Retrieved from <http://www.novascotia.ca/finance/site-finance/media/finance/budget2016/Estimates-and-Supplementary-Detail.pdf>
- Nova Scotia Department of Finance and Treasury Board *Nova Scotia Estimates for the fiscal year 2006-07*. Retrieved from http://www.novascotia.ca/finance/site-finance/media/finance/2006_estimates.pdf
- Nova Scotia Department of Health and Wellness *Nova Scotia Health Authority (Merger)*. Retrieved from <http://novascotia.ca/dhw/about/nova-scotia-health-authority.asp>
- Nova Scotia Department of Health and Wellness *Department Redesign to Improve Focus on Health-care Results*. Retrieved from <http://novascotia.ca/news/release/?id=20160126002>
- Nova Scotia Health Authority *Business Plan 2015-16*. Retrieved from <http://www.nshealth.ca/files/2015-16-nsha-business-plan>
- Persaud, D. (2014) *Outcomes & Performance Measurement* course slides, Dalhousie University
- Taylor, Dena Bain (2007) *How to Analyze Issues: A Brief Guide*. Retrieved from http://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=10&ved=0ahUKEwiO2Jv9_OnNAhWjy4MKHb1qAbwQFghaMAk&url=http%3A%2F%2Fhswriting.library.utoronto.ca%2Findex.php%2Fhswriting%2Farticle%2Fdownload%2F3333%2F1462&usg=AFQjCNEpa7zofRIxuHDCVTEO4CygEqk5hg

Appendix A - Department of Health and Wellness Supplementary Information to the Budget 2016-17

Health Authorities, page 13.12

<http://www.novascotia.ca/finance/site-finance/media/finance/budget2016/Estimates-and-Supplementary-Detail.pdf>

Health and Wellness

Supplementary Information

Health Authorities

The Nova Scotia Health Authority and the IWK Health Centre govern, manage and provide health services throughout the continuum of care including the provision of public health, primary health care, mental health and addiction, some continuing care and palliative services.

Health Authorities Spending			
<u>Programs and Services (\$ thousands)</u>	<u>2015-2016 Estimate</u>	<u>2015-2016 Forecast</u>	<u>2016-2017 Estimate</u>
Administration	72,850	60,584	74,281
Operations	273,027	273,772	275,881
Inpatient Services	486,581	495,504	489,039
Ambulatory Care	245,322	250,308	245,872
Diagnostic and Therapeutic Services	302,769	304,291	303,504
Other Acute Care Expenditures	88,558	80,933	98,468
Addiction Services	39,701	38,697	41,565
Mental Health Services	138,736	138,621	146,247
Public Health Services	30,914	29,799	34,072
Primary Health Care	17,782	18,350	22,521
Care Coordination	32,484	30,601	32,485
Provincial Programs	---	---	17,418
	<u>1,728,724</u>	<u>1,721,460</u>	<u>1,781,353</u>

Appendix B - Nova Scotia Health Authority Business Plan 2015-16 – Key Performance Indicators

21 key performance indicators, page 16 of the NSHA 2015-16 business plan

<http://www.nshealth.ca/files/2015-16-nsha-business-plan>

KPI #	Strategic Priority	Key Performance Indicator	Safety	Population Focus	Work-life	Client Centered	Continuity of Service	Effectiveness	Accessibility	Efficiency
1	ACCESS	Ambulatory Care Sensitive Conditions					x	x	x	
2	ACCESS	Access to Primary Care					x	x	x	
3	ACCESS	Home Care Wait-time					x	x	x	
4	ACCESS	Long term Care Wait-time					x	x	x	
5	ACCESS	% placements to LTC from hospital					x	x	x	
6	ACCESS	Wait-time for first knee replacement					x	x	x	
7	ACCESS	Wait-time for first hip replacement					x	x	x	
8	ACCESS	Mental Health Wait-time to first (choice) appointment					x	x	x	
9	ACCESS	Emergency Department Length of Stay in ED for admitted patients					x	x	x	
10	SAFE CARE	Hospital Standardized Mortality Ratio	x							
11	SAFE CARE	Unplanned Readmission Rate to Hospital	x							
12	WORK-FORCE	WCB Lost Time (Frequency & Severity)	x		x					x
13	WORK-FORCE	Vacancy Rate (positions posted but not filled)			x					
14	POPULATION	Estimate Chronic Disease Incidence		x						
15	POPULATION	Immunization Rates		x						
16	EXPERIENCE	Client Experience				x	x			
17	STEWARDSHIP	Budget Variance (% & \$)						x		x
18	STEWARDSHIP	Capital Budget Variance						x		x
19	STEWARDSHIP	Administration Ratio						x		x
20	INNOVATION	Rate of Research Projects with Inter-disciplinary Involvement						x		x
21	INNOVATION	Amount of research funds attracted						x		x

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Ms. Deirdre Harvey
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Dr. Abiti and Ms. Harvey,

I confirm I have read the internship report for Carolyn Marriott for the internship May 16 2016 – August 8 2016 at Department of Finance & Treasury Board, supporting Department of Health & Wellness, Halifax, NS. The internship is satisfactory.

Yours sincerely,

Barry Burke, Director of Finance

Signed this _____ day of _____, 2016