Systems approach to population health promotion and chronic disease prevention in Manitoba

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Overview

1. Introductory remarks
2. Surveillance and evaluation
   - Focus on interpretation, making sense and use
3. Experience in Ontario
   - Organizational learning mechanisms in comprehensive tobacco control
   - Ontario Risk Behaviour Surveillance
4. Planning models
5. Knowledge exchange
6. Concluding remarks
Introductory remarks

• Manitoba is a leader in applying systems thinking to population health promotion and chronic disease prevention

• Systems approach (complex adaptive systems)
  – Recognizes complexity and local variation
  – Holistic and multi-level
  – Self-directed and controlled
  – Requisite variety
  – Social emergence
  – Feedback (data/information)
  – Adaptive and learning processes
Introductory remarks (continued)

• Vision to create and sustain effective, comprehensive, integrated strategy sustainable within Manitoba
  – Government, regional health authorities, voluntary health agencies working together (Collaborative approach)
  – Realistic and developmental, building year over year

• Surveillance is integral to the intervention approach
Introductory remarks (continued)

• Comprehensive Community Health Assessments
  – Includes vital statistics, morbidity statistics, system use and performance
  – Youth surveillance

• Adult risk factor surveillance?
  – Going beyond existing data – CCHS
  – Learning from previous experience:
    • heart health survey – Gelsky, Hook, Harvey and many others
    • three (3) regions’ experiences
  – Need for timely, locally relevant data, generated for and used in local planning
Surveillance – what is it?

- **Surveillance is an essential component for the planning, implementation, and assessment of chronic disease prevention and control.**
- It is an ongoing collection of data, the integration, analysis, and *interpretation* of data, and the dissemination of information to **those who need to know**.
- Chronic disease surveillance provides *relevant information for action*.

Public Health Agency of Canada (2006)
Surveillance system could monitor

- Social determinants, risk factors (behavioural, physical, physiological), health outcome
- Interventions, capacity of organizations and systems
- Knowledge/evidence – scientific literature, practice-based evidence emerging in Manitoba
Evaluation – what is evaluation?

- Some illustrative definitions to demonstrate key concepts, not a dirty word
  - Social project (Cronbach, 1980)
  - Organizational learning mechanism (Preskill & Torres, 1999) and instrument to enhance capacity for learning (Thoenig, 2000)
  - Part of the intervention (Patton, 1997)
  - Applied science grounded in critical, scientific realist philosophy (Pawson & Tilley, 1997)
  - Sense-making within democratic society, instrumental to social betterment (Mark and Henry, 2000)
Purposes of evaluation

• Summative – accountability for delivery/outcomes, judgement/justification
• Formative – learning orientation, improvement of interventions
• Knowledge – enlightenment, scientific contribution
Emerging blueprint of a knowledge integration system for prevention
Riley & Harvey, Mar 2006

Policy and Program Evaluation

Implementation of Policies and Programs

Surveillance

Knowledge Translation and Exchange

PRACTICE-BASED EVIDENCE

Strategic and Investigator Driven Research

Best Practices Identification and Dissemination

EVIDENCE-BASED PRACTICE

PRACTICE-BASED EVIDENCE
Sample Framework #2

1. Renew research, evaluation & surveillance priorities
2. Fund relevant evaluations
3. Synthesize research & surveillance evidence
4. Disseminate relevant evidence
5. Evaluate
6. Synthesize practice-based evidence
7. Disseminate relevant evidence

Intervene
- natural experiments
- practitioner-initiated
- research-initiated

Plan

Fund relevant research & surveillance

Cameron & Riley, 2007
Utilization-focused evaluation

- “…intended use by intended users…”
- “…done for and with specific intended primary users for specific, intended uses”
- “Use concerns how real people in the real world apply evaluations evaluation findings and experience the evaluation process.”
- “Begins with premise that evaluations should be judged by their utility and actual use”

Patton (2008)
Evaluation and surveillance for *practice-based learning*

- Action-oriented
- Societal project for social betterment
- Taking place in organizations, communities and systems, locally and regionally
- **Having effect through learning and making sense**
- Contributing to rigorous thought and methods
- Testing reality using systematic methods
- Integral part of interventions
- Requires data at organizational, system, community level
Conducting useful surveillance and evaluation

➢ Social betterment as a purpose of evaluation (Mark, Henry and Julnes 2000)
  – “means improved social conditions, reduction of social problems, or alleviation of human distress”
  – Achieved through evaluation use
**Figure 1. Evaluation Logic Model**


*Selected elements drawn from Cousins (2003)*
Figure 2. Schematic Theory of Evaluation Influence

Surveillance and evaluation use

Four main kinds of use:
- Instrumental use – decision-making, behavioural/action
- Conceptual use – enlightenment, demystification, attitudinal change, understanding
- Symbolic use – political, legitimatising, persuasive
- Process use – learning and change during the evaluation process, before results/reports

Other forms of use
- Knowledge creep and decision accretion
- Imposed use – sanctioning of programs (based on scientific justification)
Methodological considerations

- Error in all measures and samples
- Reliability and validity of instruments
  - Reproducibly measure, measure what is intended?
- Bias and precision of statistical parameter estimates
  - Direction of the error, how large, consistency of bias over time
  - Dispersion/variance in estimates, how much precision is really needed
  - Are very large samples possible in small real world locations?
  - Is so, at what cost and for what benefit?
Methodological considerations (continued)

• Relevance
  – Potentially useful to decision makers and others
  – Must consider context of decisions and practice
  – Considerable local variation important for program planning (e.g. high risk groups, cultural differences)

• Inferential statistics not needed in all instances
  – Census taken, generalization not needed, assumptions violated
  – Complementary sources of data (e.g. CCHS, CTUMS) and triangulation
Methodological considerations (continued)

• Basis of comparison?
  – Normative, baseline, objective/other standard referenced comparisons
  – Common/core set of questions/indicators are critical
  – Comparisons across regions and between regions and province or other jurisdictions?
  – Tracking changes over time? (absolute, relative changes)

• Setting objectives?
  – Multiple data points?
  – Projections?
Ontario Tobacco Strategy – SFO Strategy

• Three organizational learning mechanisms
  – Planning infrastructure – central/regional
    • Steering committees, Scientific advisory and tobacco strategy advisory
  – Knowledge exchange and capacity building
    • PTCC, YATI, SHAF, TEACH
    • Practice-based evidence, communities of practice, networks
  – Research, evaluation, and monitoring
    • Ontario Tobacco Research Unit
Figure 5: Current Smoking (Past 30 Days), by Tobacco Control Area Network, Ages 12+, Ontario, 2007/08, %

Note: Vertical lines represent 95% confidence intervals.
Source: CCHS 2007/08.

Schwartz & O’Connor (2009)
Figure 4: Current Smoking (Past 30 Days), by Age and Sex, Ontario, 2007/08, %

Note: Vertical lines represent 95% confidence intervals.
Source: CCHS 2007/08.

Schwartz & O’Connor (2009)
Figure 6: Number of Current Smokers (Past 30 Days), by Tobacco Control Area Network, Ages 12+, Ontario, 2007/08

Note: Numbers presented in the pie chart represent the population estimate of past 30-day current smokers within each TCAN. Source: CCHS 2007/08.

Schwartz & O’Connor (2009)
Ontario Risk Behaviour Surveillance

- BRFSS – US CDC
- RRFSS (http://rrfss.on.ca/)
  - Durham Regional Health Unit, Health Canada funding, CCO, Ministry of Health and Long-Term Care, York University
- ORBSS (http://www.oahpp.ca/resources/projects/orbss/index.html)
  - Ontario Agency for Health Protection and Promotion with local and provincial public health agencies

- Collaboration is critical to development
Health planning and evaluation models

- Evolution of health promotion models
  - individual, setting specific, community, multilevel models
- Systems thinking
- Range of models
  - MATCH
  - PRECEDE/PROCEED
  - RE-AIM
  - Intervention mapping
Making sense of the data

• Transforming data into information and shared social knowledge
• So what? Implications for action?

• Importance of intervention theory
  – causal theory – what are the underlying mechanisms and what is happening here?
  – action theory – what mechanisms / interventions might be applied to affect change? What should we do and why?
  – Implementation theory – how are interventions actually delivered in real world settings?
Prototype of Causal Models and Intervention Models

Problem Theory: Causes → → → → → Effects

Action Theory

Causal Theory

Inputs
(educational, organizational, economic, etc.)

$X$?

Outputs
(behavioral change, health, quality of life, development)

Different models interpret the content of “$X$?” according to different theories (or assumptions) about causation and control.
Integrated strategies

• Health behaviour is social behaviour
• Developed and shaped in social context
• Socio-economic and cultural group differences
• Multi-faceted, multi-level approaches
  – Settings, priority populations, intervention approaches, purposes
Key steps in tobacco control science

- Concerns about the delays in application of science
- Phased approach to tobacco control research and development
  - US NCI / Greenwald and Cullen
  - Scientific investments, ASSIST comprehensive model
- Contexts matters, societies evolve and generalizability of social science is a prime concern
- “Salvitur ambulando … the solution is in the walking—action is necessary” (Cullen, 1984)
Figure A.1  Evolution of Tobacco Control Approaches toward Systems Thinking

- **Public Education**
  - Surgeon General's reports
  - Public service advertising
  - Media campaigns

- **Individual-level Intervention**
  - Smoking cessation tools
  - Physician counseling
  - Telephone quitlines

- **Community-level Intervention**
  - Community-based coalitions
  - Workplace smoking policies
  - NCI COMMIT project

- **Population-level Intervention**
  - Clean air laws
  - Tobacco taxation
  - NCI ASSIST

- **System-level Intervention**
  - Epidemiological models
  - System models, networks, knowledge
  - NCI ISIS project

*Notes:* Quitlines indicate telephone hotlines for smoking cessation. NCI = National Cancer Institute; COMMIT = Community Intervention Trial for Smoking Cessation; ASSIST = American Stop Smoking Intervention Study for Cancer Prevention; ISIS = Initiative on the Study and Implementation of Systems.
Multi-level Approach to Community Health (MATCH)

Phase 1. Select Health Goals

Phase 2. Intervention Planning

2a. Select Intervention Objectives

2b. Select Channels and Mediators

2c. Select Intervention Approaches

Phase 3. Development

Phase 4. Implementation

Phase 5. Evaluation

5a. Conduct Process Evaluation

5b. Conduct Impact Evaluation

5c. Conduct Outcome Evaluation

Influence governments

Community leaders

Healthful policies

Influence communities

Community norm shapers

Healthful communities

Influence organizations

Organization decision makers

Healthful organizations

Influence individuals

Individuals at risk

Healthful behavior

Health status

FIGURE 5-2 Multilevel Approach to Community Health (MATCH). This simplified rendition of Simons-Morton et al.’s model shows steps in aligning interventions with levels of an ecological system and with the objectives associated with each.

Green & Kreuter (2005). Health Planning
Population level effectiveness

• Function of Efficacy, Fidelity, Reach, and Mix of interventions
• RE-AIM (Glasgow and others)
  – Reach, efficacy, adoption, implementation and maintenance considerations
  – Generalizability concerns (per Cronbach)
Population level effectiveness (continued)

• Two principles:
  – Intervention specificity – fit to context, tailoring messages, segmentation of audiences
  – Multiplicity – combination, “no magic bullets”, long term effects

  Green and Kreuter (2005)

• Be wary of the “better mouse trap” approach
  ~ population health promotion takes community and systems change
Social construction of knowledge

- Evaluation use – a complex social process, contributing to organizational sense-making (Julnes and Mark, 1998)
- “… all meaningful reality, precisely as meaningful reality, is socially constructed …” (Crotty, 1998)
- Sustained interactivity provides opportunity for:
  - Social construction of knowledge / shared (sense) meaning making
  - Social construction of reality (i.e. systems, interventions, not fiction)
  - Social learning about evaluation, surveillance, and applied research methods
Over the past 30 years, concern about the application of science persists, but approach to the problem (and the terms used to define it) has evolved

Terminology:
- translational research and research translation
- knowledge translation, transfer, dissemination
- knowledge brokering
- knowledge use
- knowledge exchange
- knowledge mobilization
- knowledge integration

From:
- unidirectional, concerned about characteristics of innovation and how to best promote uptake of them

To:
- engagement of decision makers (policy makers, managers, frontline workers) with researchers in the research, development and application process
Knowledge exchange

• “collaborative problem-solving between researchers and decision makers that happens through linkage and exchange”

Canadian Health Services Research Foundation
Critical factors associated evidence informed decision-making

- Personal factor
- Sustained interactivity

- Working together to define problems, study them, design solutions, test them empirically, develop shared understanding/meaning
- Learning through social process
- Building your own capacity to do so
Social change in social movements through social emergence (complexity theory)

- Emergence – “processes whereby the global behavior of a system results from actions and interactions of agents”
- “Relatively simple higher-level order ‘emerges’ from relatively complex lower level processes”
- Emergence is more likely to occur when many components interact (apparent chaos), systems functions are distributed throughout entire system, system can not be decomposed in any meaningful fashion, and components interact using complex and sophisticated language (Sawyer 2006)
- Interactive, distributed, indivisible, intelligent joint action can have major observable results
Reasons for Optimism

• People affect change, from their positions in organizations and systems
• Complex change emerges in social movements
• Changes are happening
  ~ regular physical activity in schools, youth surveys, KEN, multilevel leadership and collaboration (Manitoba Health, NGOs, PHAC, RHAs, School boards, others)
  ~ adult surveillance ???
• Manitoba continues to make progress year after year
• Canada is watching and wants to learn from your experience