

Quality Improvement in Public Health: Models and Methodologies for Practice Based Research Networks

William Riley, Ph.D.
Associate Dean
University of Minnesota School of Public Health



3 Moving the field forward

We need research that penetrates and elucidates the "black box" of public health agencies and systems



Source: Glen P. Mays, PhD, PHSSR Current State of the Field, 2008

School of Public Health



2 Overview of Presentation Objectives

1. Define five elements of Quality Improvement in a Health Department
2. Explain examples of how QI process mapping is applied in Health Departments
3. Identify two approaches to Time Series Analysis and the associated methodological issues
4. Contrast Scientific Method with Science of Improvement
5. Describe three characteristics of Science of Improvement
6. Discuss implications for accreditation and transformative change in health departments

School of Public Health



4 The main question: How can we penetrate the black box?

What is Quality Improvement?

- Identify waste caused by failures and defects which directly affect quality and cost
- Big QI and small qi
- Top down and bottom up

School of Public Health

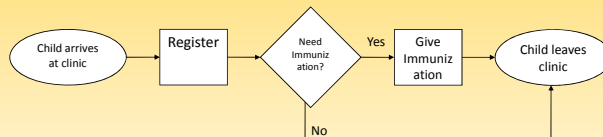


5 The next question:
How can we improve processes?

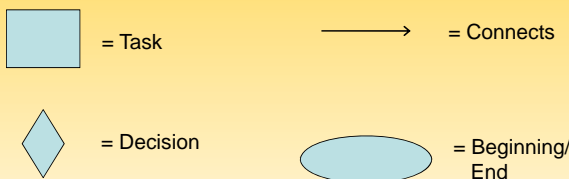
What is a Process?

1. Series of steps to produce output (product or service)
2. Almost always cross functional
3. Organization is only as effective as its processes
4. It is repetitive
5. Flow, Pull

7 **Basic Process Map for Childhood Immunization Clinic**

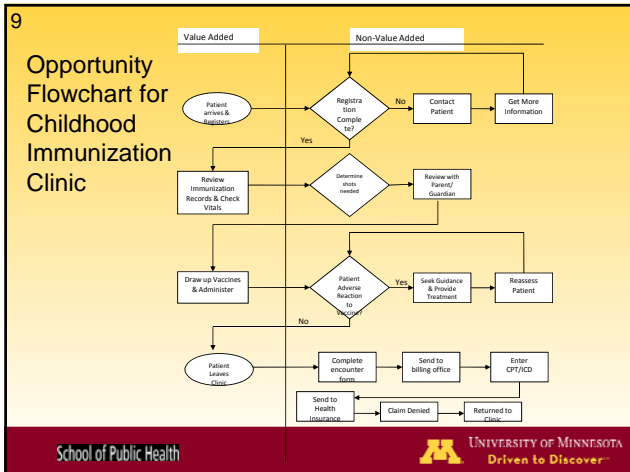


6 **Basic Symbols for a Process Map**



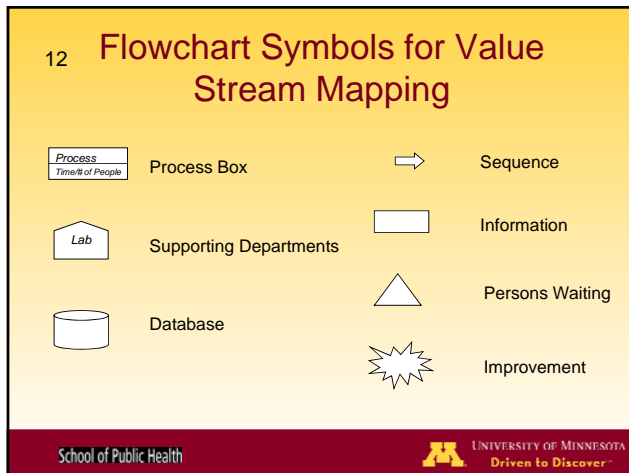
8 **Identifying Inefficiencies in a Process Map for a Childhood Immunization Clinic**

Inefficiency	Definition	Example
Disconnect	when a handoff from one group to another is managed poorly	appointment scheduler makes a patient appointment on a day the nurse is not in the clinic.
Bottleneck	a point in a process where volume overwhelms capacity	two patients are scheduled during the same appointment time.
Redundancy	an activity repeated at two points in a process	when a patient is asked for insurance information at several different times
Rework	when work is fixed or corrected	if the patient insurance information is entered incorrectly or incompletely, extra work is required to retrieve the information at a later time
Inspection	a point in the process where appraisal occurs	



- 11
- ### Process Features: Four Distinctions
- Core process and support process
 - The cross functional nature of core process
 - Process lead time
 - Process and system
- School of Public Health UNIVERSITY OF MINNESOTA Driven to Discover™

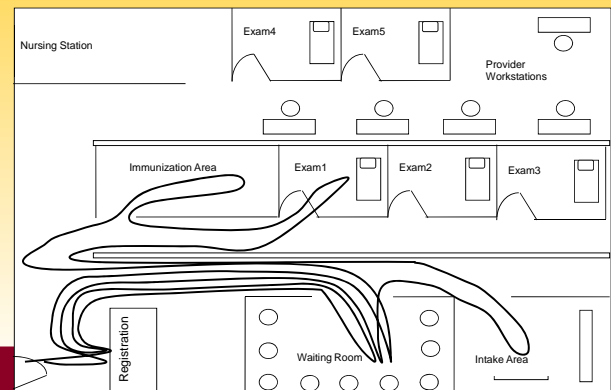
- 10
- ### Value Stream Mapping
- Process map that examines flow throughout a health department.
 - The goal is to increase flow in a process.
- School of Public Health UNIVERSITY OF MINNESOTA Driven to Discover™



13 Flowchart Symbols for Value Stream Mapping

- *Process Box*: The process box shows the steps in the process with additional information regarding time and number of persons involved in the specific steps.
- *Supporting departments*: departments that support a process are depicted by a house-shaped box. These departments can include the laboratory, cardiology, medical records, and so forth.
- *Cylinder*: the cylinder represents a database. A VSM usually shows the flow of a client (or tasks) as well as flow of information.
- *Arrow*: An arrow shows the direction of flow in a process
- *Information*: Information is an important component of a value stream map and in relation to process flow.
- *Triangle*: The triangle depicts the number of clients (or potential number of clients) waiting at each step in the process.
- *Explosion*: The explosion symbol represents an area in the process targeted for improvement.

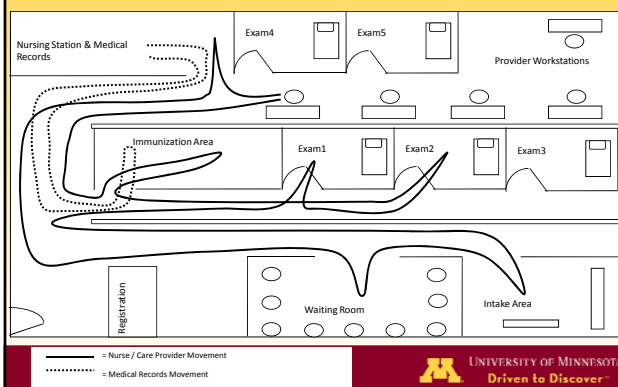
15 Spaghetti Diagram for a Patient at Childhood Immunization Clinic

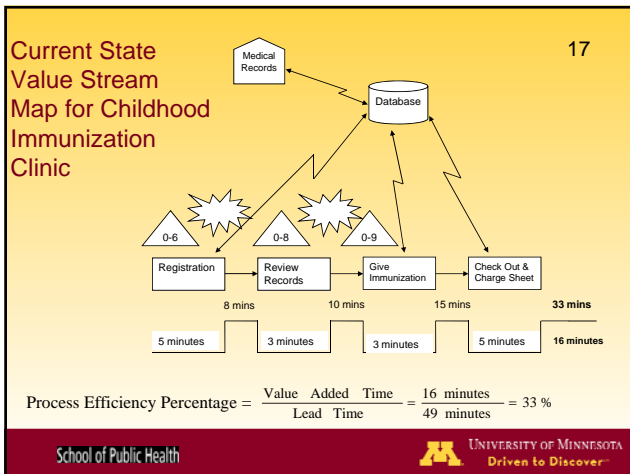


14 Current State Value Map

- A current state map focuses on one service from beginning to end.
- If the intent is to map the flow for a childhood immunization clinic, it is not necessary to map the entire WIC program.
- Mapping other health department processes would make the current state map too complicated to analyze the process of interest.

16 Spaghetti Diagram for a Provider at Childhood Immunization Clinic

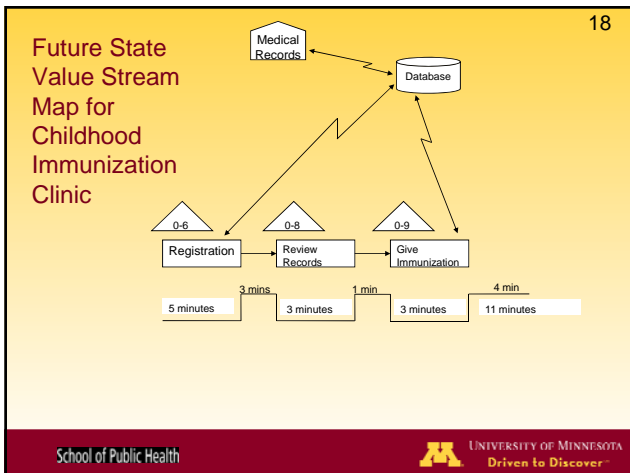




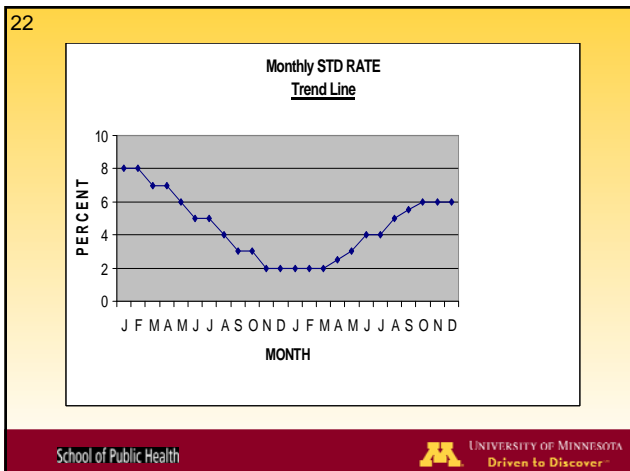
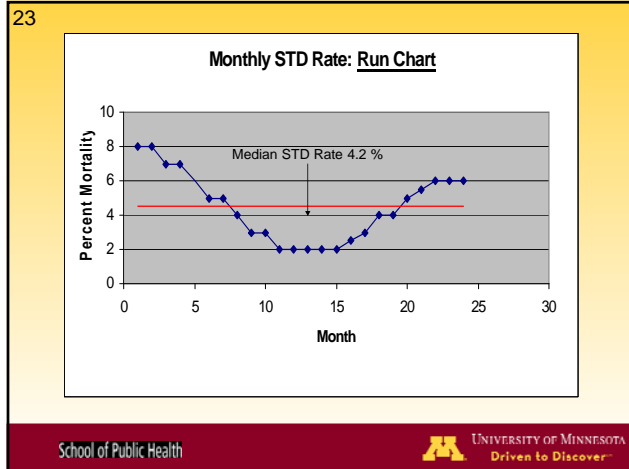
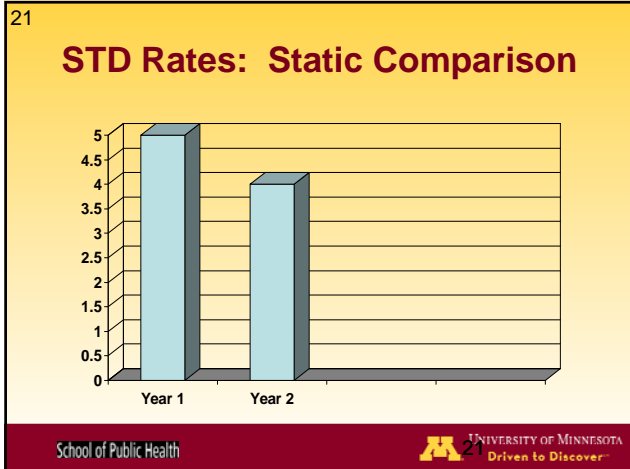
19 The Six Wastes

Type of Waste	Definition	Example
Delay	Waiting	Client waits in waiting room
Over Processing	Too much paperwork	Client registers multiple times
Transportation	Moving people, supplies	Client travels to separate site
Motion	Excess movement of staff	Searching for chart and immunization
Inventory	Excess supplies	Vaccine is overstocked and becomes outdated
Defects	Errors and mistakes	Childhood immunization shots not given

School of Public Health UNIVERSITY OF MINNESOTA Driven to Discover™

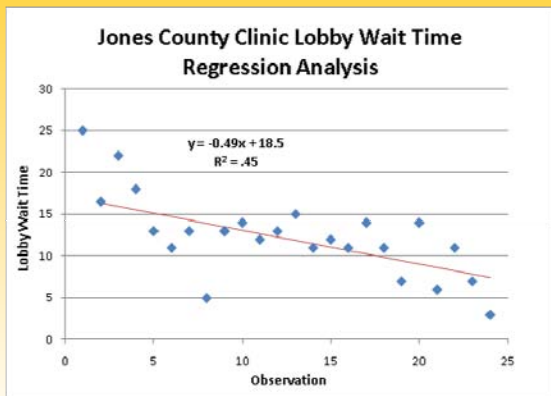


- ### 20 Exploring the Black Box: Quality Improvement Opportunities in Public Health
- Understand the Value Stream
 - Understand the Process Capability
 - Understanding flow
- School of Public Health UNIVERSITY OF MINNESOTA Driven to Discover™



- 24
- ### Time Series Analysis
- Regression Analysis
 - Beta Coefficient
 - Explained Variance
 - Multiple Determinants
 - Control Chart Analysis
 - Process Performance (Stability and Capability)
 - Special Cause, Common Cause
 - Early Detection
- School of Public Health UNIVERSITY OF MINNESOTA Driven to Discover™

25



School of Public Health



27

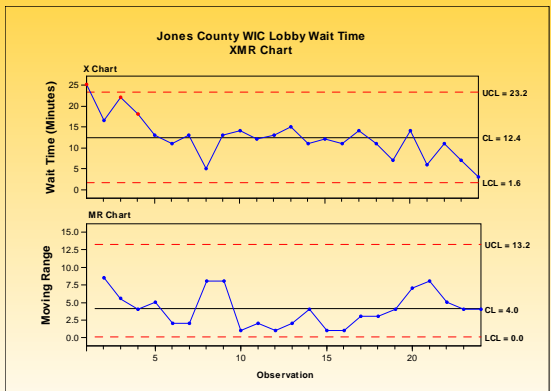
Statistical Process Control and Regression Analysis

	Control Chart	Regression Analysis
Statistical Principles	Create Control limits Detect special cause Identify common cause	Y Intercept Slope Best Fit
Probability	0.003 3 Standard deviations	0.05 1.97 Standard deviations
Features	Process Stability Process Capability Process Shift	Prediction Explained Variance Strength of relationship

School of Public Health



26



School of Public Health



28

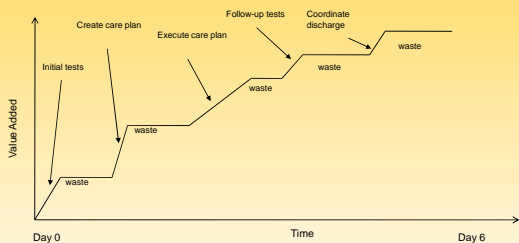
Summary

- Understanding process performance is an importance first step to penetrating the black box to ensure public health services are delivered efficiently and effectively
- Techniques to analyze processes:
 - Process Map
 - Opportunity Map
 - Value Stream Map
 - Spaghetti Diagram
 - Value Added vs. Time Chart

School of Public Health



29 Value Added vs. Time



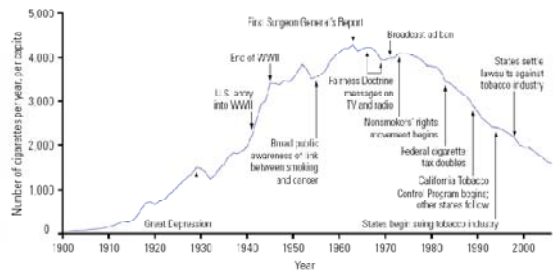
Source: Smith, A.C., Barry, R., & Brubaker, C.E., (2008) "Gong Lear: Busting Barriers to Patient Flow" Health Administration Press, Chicago, IL.

31 Science of Discovery

- Randomized Control Trial (RCT)
- Classic Experimental Model
- O X O Treatment Group
- O O Control Group

30

Figure 13.1 Adult Per Capita Cigarette Consumption and Major Smoking-and-Health Events



Note: Adapted from Glantz, S. A. 2003. *Tobacco: Biology and politics*. West, Texas: WFS HealthEdCo.

32 Science of Improvement

- Most public health (and health care) interventions occur in complex, multi-component settings
- Improvement is a process of social change (Berwick, "Science of Improvement," JAMA, 2008)
- CMO Model

Context + Methods = Outcome
(Paulsen & Tilley, *Realistic Evaluation*, 1997)

33

What is Transformational Change?

- A shift in the way work is viewed and the approaches to improve performance.
- Combine Big QI and small qi to create a new way of looking at the PH process to transform the way value is delivered to the community and client.
- Professional Knowledge and Process Knowledge

School of Public Health



35

The 11 Domains

1. Conduct assessment activities focused on population health status and health issues facing the community
2. Investigate health problems and environmental public health hazards to protect the community
3. Inform and educate about public health issues and functions
4. Engage with the community to identify and solve health problems
5. Develop public health policies and plans
6. Enforce public health laws and regulations
7. Promote strategies to improve access to healthcare services
8. Maintain a competent public health workforce
9. Evaluate and continuously improve processes, programs, and interventions
10. Contribute to and apply the evidence base of public health
11. Administrative Capacity & Governance

School of Public Health



34

Voluntary Accreditation Goal

The goal of a voluntary national accreditation program is to improve and protect the health of the public by advancing the quality and performance of state and local public health departments.

60% of population served by an accredited health department by 2015

Exploring Accreditation Final Report, p. 4

School of Public Health



36

Thank You!

School of Public Health

