Evidence-Based Public Health: Supporting the New York State Prevention Agenda

MODULE 9: EVALUATING THE PROGRAM OR POLICY

July 23, 2015
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Division of Chronic Disease Prevention

Learning Objectives

• Define program evaluation and understand how it relates to public health activities (public health surveillance, policy making, program implementation)
• Understand basic components of an evaluation of a public health program or evaluation
• Understand the types of data collection that can be incorporated into an evaluation and factors to consider when selecting an evaluation design and methods
• Understand how to develop an evaluation plan for a public health program or policy
The Role of Evaluation in Evidence-Based Public Health

Provides feedback to support mid-course corrections in implementation (short-term);

Can reinforce program or policy efforts (short-term);

Aids decision making about scaling up or changing program; (intermediate);

Can support sustainability and community/decision maker education (intermediate);

Can provide feedback and provide practice-based evidence to the field (intermediate);

What is program evaluation?

“...a process that attempts to determine as systematically and objectively as possible the relevance, effectiveness, and impact of activities in light of their objectives.”

A Dictionary of Epidemiology, 2008

“Systematic collection of data to understand and investigate the merit, worth or significance of an organized public health action.”

Adapted from CDC, 1999. Framework for Program Evaluation in Public Health, MMWR
Research in Public Health

Systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalized knowledge.

Adapted from CDC, Office of Public Health Research (OPHR).

Program Evaluation in Public Health
Versus Public Health Research

Emphasis on describing, understanding and improving a specific public health program not contributing to generalized knowledge.

Evaluation results must have direct implications for public health programs or policies.

Program “merit, worth or significance” are more relative concepts than the probabilistic absolutes that are often the goal of scientific research research.
Why evaluate?

- Improve existing programs
- Measure effectiveness
- Demonstrate accountability
- Share effective strategies and lessons learned
- Ensure funding and sustainability

**Evaluation is a practice that can measure and contribute to the success of a program or policy.**

### Basic Types of Evaluation

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formative</td>
<td>Data collection to evaluate the appropriateness of a proposed program or policy; Examples: Health Impact Assessment; Literature Review; Focus Groups/Key Informant Interviews;</td>
</tr>
<tr>
<td>Process</td>
<td>Data collection to document the implementation of program or policy including: costs, partners involved, locations, achievement of program or milestones, assessment of population reached.</td>
</tr>
<tr>
<td>Outcome</td>
<td>Data collection to document the association between the policy/program and changes in health-relevant indicators (environment, attitudinal, behavioral, health).</td>
</tr>
</tbody>
</table>
How does program evaluation differ from other types of data collection used in public health, namely public health surveillance and performance measurement?

Public Health Surveillance

Ongoing systematic collection, analysis, interpretation and dissemination of data on health-related events in the population for use in the planning and the evaluation of public health programs.

based on CDC MMWR “Guidelines for Evaluating Public Health Surveillance”
Performance Measurement

Ongoing monitoring and reporting of program accomplishments, against identified standards to measure progress towards pre-established milestones.

<table>
<thead>
<tr>
<th>Action (things you do)</th>
<th>Accomplishment/Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity 1</td>
<td>Status Measure:</td>
</tr>
<tr>
<td></td>
<td>Standards:</td>
</tr>
<tr>
<td>Activity 2</td>
<td>Defines where you are now</td>
</tr>
<tr>
<td>Activity 3</td>
<td>Define what you expect to accomplish</td>
</tr>
</tbody>
</table>

Performance Measurement

Engage in community mobilization and decision maker education to support adoption of food procurement policies within school district X.

<table>
<thead>
<tr>
<th>Action (things you do)</th>
<th>Accomplishment/Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engage School Committee</td>
<td>Status</td>
</tr>
<tr>
<td>Review existing food</td>
<td>Standard</td>
</tr>
<tr>
<td>procurement standards</td>
<td>Adoption of food</td>
</tr>
<tr>
<td>Engage Local Wellness</td>
<td>procurement policies</td>
</tr>
<tr>
<td>Committee</td>
<td>that align with dietary</td>
</tr>
<tr>
<td></td>
<td>recommendations</td>
</tr>
<tr>
<td>Engage key officials in</td>
<td>regarding fat, sugar</td>
</tr>
<tr>
<td>school (Superintendent,</td>
<td>and sodium</td>
</tr>
<tr>
<td>Food Service Director, Nutritionist)</td>
<td></td>
</tr>
</tbody>
</table>
Logic Model (Analytic Framework) Worksheet: Evidence-Based Public Health

**Program Title:**

**Goal:**

**Long-Term Objective:**

- Intermediate Objective (Individual Level):
- Intermediate Objective (Social Level):
- Intermediate Objective (Govt/Org Level):
- Intermediate Objective (Environmental Level):

**Activities:**

**Inputs:**

**Instructions:** First discuss your target population. Using data, evidence-based recommendations (the Community Guide or others), your own knowledge, and group discussion, develop a program strategy for your issue of focus. Define the goal, objectives, activities, and costs and enter them in this sample logic model worksheet.

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Self Evaluation in Relation to Logic Model Worksheet

**PROGRAM PLANNING**

**Evaluation**

**Goal**

**Objective**

**Activities**

**Outcome**

**Process**

**Program Impact**

**DATA SOURCE**

Surveillance

Performance Measurement

Ongoing public health surveillance and data collection to support performance measurement are data sources to incorporate into an evaluation of a specific program or policy.
Evaluation in Action
Evaluating a Program to Promote Adoption of Paid Leave Policies for Breast, Cervical and Colorectal Cancer

Used with Permission from Gina O’Sullivan

Community Transformation Framework
Primary Objective: Increase cancer screening rates for breast, cervical and colorectal cancers.

Goal: Reduce the burden of cancer

Intervention Strategy

- Build health promoting public policy
  - Give employees time off or flextime to access preventive services and to attend community programs aimed at disease self-management.

Work Plan Activities

- Educate and engage communities
- Mobilize and empower communities
- Engage organizational decision makers
- Educate government decision makers

Outcomes

- Community is supportive of policy
  - Awareness, beliefs and attitudes are changed
  - Policies are adopted and implemented
    - By June 2014, At least one municipality will implement paid leave policies for employees to obtain breast, cervical and colorectal cancer screenings

Measuring Progress for the Community Demonstration Projects

- Public Opinion Polling
- Community is supportive of policy change
- Health Behaviors Changed
- Improved Health Outcomes
- Contractor Activities
- Policies Adopted
- Policies Implemented
- Performance Measurement (Monthly Activity Reporting)
- Outcome Evaluation (Policy Implementation Reporting)
- Public Health Surveillance (BRFSS, E-BRFSS, NYSCR)
Performance Measurement

• Communities recorded information on program implementation measures linked to work plan activities
• Regular collection and reporting of this data documents progress

Example project implementation measures for the community demonstration projects:
✓ Number of community education events
✓ Number of visits with organizational decision makers
✓ Number of legislative visits
✓ Amount of earned media generated
✓ Number of sites where partnerships have been formed

Evaluation

How much progress has been made towards desired policy change?
✓ Number of sites where a partner relationship has been formed
✓ Number of sites where a key decision maker has committed to policy change
✓ Number of sites where policies have been adopted and implemented

How many individuals have the potential to be reached by the policy or systems changes?
✓ Number of individuals employed by the municipality
How many people have the potential to be affected by the cancer screening leave policy in Broome County?

- Existing cancer screening leave policy for Broome County employees was amended to add 4 hours of paid leave to obtain colorectal cancer screening
- Total number of employees: 2,300
- About 70% of employees (~1,610 employees) are greater than 50 years old

Outcome Evaluation

Has the adopted policy resulted in a health behavior change? How many employees utilize the time-off benefit to obtain cancer screenings?

✓ Number of employees utilizing the time-off benefits to obtain cancer screenings
**Steps in CDC Program Evaluation Framework**

Step 1: Engage Stakeholders  
↓  
Step 2: Describe the Program  
↓  
Step 3: Focus the Evaluation Design  
↓  
Step 4: Gather Credible Evidence  
↓  
Step 5: Justify Conclusions  
↓  
Step 6: Ensure Lessons Learned

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**Consolidating Steps 3 & 4: Evaluation Plan**

<table>
<thead>
<tr>
<th>Question</th>
<th>Indicator</th>
<th>Data Source</th>
<th>Who is responsible</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1) A specific question about a program or its attribute  
2) A concrete measure that will be used to reflect that attribute  
3) Source of information on that attribute…plan for collecting or accessing that source  
4) List of individuals responsible for the specific data source  
5) Expectation about when the information from the source will be available
Evaluation Planning: Developing Good Evaluation Questions

- Good evaluation questions are empirical questions that can be answered through planned data collection (specific, measurable, and answerable)

- Good evaluation questions about a program reflect its current stage of development (they are relevant and time bound)

- Good evaluation questions are sensitive to the timing between a program/policy and when expected milestones should occur and changes in outcomes are observed

Exercise 1:
Developing Evaluation Questions and Potential Data Sources
Evaluation Designs

Did a program or policy contribute or cause to a specific outcome?

Designs differ in the extent to which they:

• establish a link between an initiative & outcome
• rule out alternative explanations

This is referred to as a design’s internal validity

Evaluation Designs

Design Notation

• “X” is used to denote an intervention
distribution of a media campaign
initiation of a policy
start of a program activity

• “O” is used to denote observations
measurement of outcomes

• Time is expressed from left to right
Evaluation Designs

Goal:
Evaluate the impact of a public health policy.

Evaluation Designs

Post-Test Only Design

O = observation
X = intervention

\[
\begin{align*}
X & \quad O_1 \\
\end{align*}
\]

3-months

Does not establish a link between intervention or product and outcome.
Evaluation Designs

One Group Pre-Post Design

\[ O_1 \ X \ O_2 \]

Improves upon post-test only because you can establish change.

History: something other than intervention may be responsible for changes from pre to post

Testing: the effect of being surveyed/observed may alter subsequent observations

Control Group Designs

Non-Equivalent Control Group Design

Group 1 \[ X \ O_1 \]

Group 2 \[ O_1 \]

• Control group addresses history & testing
• Control group comparison tests intervention
• Can’t be sure groups were equivalent to start
Control Group Designs
Randomized Control Group Design

<table>
<thead>
<tr>
<th>Group 1</th>
<th>R</th>
<th>X</th>
<th>O₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 2</td>
<td>R</td>
<td></td>
<td>O₁</td>
</tr>
</tbody>
</table>

Randomizing (R) can ensure equivalent groups

- Everyone received the intervention
- Can’t control who receives a product

Design Options:
Adding Observations – Interrupted Time Series

<table>
<thead>
<tr>
<th>Group 1</th>
<th>O₁</th>
<th>X</th>
<th>O₁</th>
<th>O₂</th>
<th>O₃</th>
</tr>
</thead>
</table>

- Can address threats due to history & maturation
- Ensuring follow up can be a challenge
1) In identifying goals, is it important to:
   
   • establish change?
   • rule out alternative explanations?

2) Choose most practical design to meet goals

3) Recognize limitations of your design

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**Design Issues to Consider**

Is important to document a change in the outcome you are tracking?

   What is your “control” or comparison group?
   What are alternative explanations?

The timing of assessments

Follow-up and selection bias
Evaluating Comprehensive Smoke-Free Air Laws

Used With Permission From Harlan R. Juster

Clean Indoor Air Laws

- **New York State:** Pop = 19M (10M 35+)
  - July 24, 2003
  - Incremental process beginning in 1985
    - Weak - Worksites with non-smoking areas, municipal buildings only
    - Weak - Restaurants with separate smoking/non-smoking areas
    - Moderate - All workplaces are smoke free indoors (exception for hospitality venues)
    - Comprehensive – All workplaces are smoke free including hospitality venues
Evaluating Public Health Policy

• Awareness
• Support
• Compliance
• Short-term Impact - Exposure
• Intermediate/LT Impact - Health Outcomes
• Economic Impact

Support

• Support
  – Adult Tobacco Survey (ATS)
  – Smokers and Non-smokers
  – ATS Question: Are you personally in favor, opposed to, or indifferent to the New York State law prohibiting smoking in all public and work places, including bars and restaurants?
    • 1 FAVOR
    • 2 OPPOSE
    • 3 INDIFFERENT
    • 4 NOT FAMILIAR WITH LAW
Adults in Favor of New York’s Clean Indoor Air Act (CIAA)


Compliance

• Observed Random Sample of Restaurants and Bars
• All 62 counties in NYS
• 2 restaurants, 2 or 3 bars per county
• Pre-CIAA, 1, 12, 36 Months Post-CIAA
• Standardized observation tool/training
• Presence of smoking and related indicators
Observational Compliance Data
Pre-CIAA to Three Year Post

Source: Addendum - Compliance with New York State's Clean Indoor Air Act: Three Year Follow-up Statewide Observational Study, NYS Department of Health, 2006.

Table 1. Other indicators of smoking or tobacco promotion before and after implementation of CIAA. Observational Study in New York State Bars and Restaurants 2003-2006.

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Year 1</th>
<th>Year 3</th>
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</thead>
<tbody>
<tr>
<td><strong>Bars</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ashtrays</td>
<td>86.2</td>
<td>9.1</td>
<td>13.8</td>
</tr>
<tr>
<td>Visibility</td>
<td>75.9</td>
<td>14.8</td>
<td>18.6</td>
</tr>
<tr>
<td>Odor</td>
<td>82.8</td>
<td>25.0</td>
<td>29.3</td>
</tr>
<tr>
<td>Promotional Items</td>
<td>20.7</td>
<td>9.1</td>
<td>7.8</td>
</tr>
<tr>
<td>Signs</td>
<td>6.9</td>
<td>31.8</td>
<td>56.3</td>
</tr>
<tr>
<td><strong>Restaurants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ashtrays</td>
<td>60.2</td>
<td>1.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Visibility</td>
<td>48.4</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Odor</td>
<td>53.9</td>
<td>1.1</td>
<td>4.2</td>
</tr>
<tr>
<td>Promotional Items</td>
<td>8.6</td>
<td>5.3</td>
<td>0.8</td>
</tr>
<tr>
<td>Signs</td>
<td>34.4</td>
<td>38.3</td>
<td>63.0</td>
</tr>
</tbody>
</table>
Economic Impact

- Taxes Generated
- Bars and Restaurants
- Before and After the CIAA

Short-term Impact

• Reductions in Exposure to Secondhand Smoke
  – Salivary Cotinine
  – Non-smokers in the general public
  – Self-selected sample from Adult Tobacco Survey

Cotinine Concentration Before and After New York’s CIAA

Method: Data Sources

- Statewide Hospital Discharge Database (SPARCS)
- US Census Data
- Americans for Nonsmokers’ Rights Foundation (ANRF) Local Tobacco Control Ordinance Database

Interrupted Time Series Analysis

Dependent (Criterion) Variable
- Hospitalization Rates for AMI/100,000*
  - County level; Monthly; NY, OR
  - County level; Quarterly; FL

Independent (Predictor) Variables
- Comprehensive Ban
  - Main Effect (ME): Sudden 1-time change in rate
  - Interaction (INT; Time X Law): Gradual, continuous change in rate
  - Both/Neither

Controls
- Time trend, County, County X Time, Seasonality, Moderate Ban (ME + INT)

*Age-adjusted to Year 2000 US Census, 35 years and older

<table>
<thead>
<tr>
<th></th>
<th>b (95% CI)</th>
<th>t (F)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall F-test</td>
<td></td>
<td></td>
<td>p&lt;.001</td>
</tr>
<tr>
<td>(138,8789)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R² = 0.3531</td>
<td></td>
<td>113.41</td>
<td></td>
</tr>
<tr>
<td>NY Comp. Law Main Effect</td>
<td>-1.48</td>
<td>-2.20</td>
<td>p&lt;.05</td>
</tr>
<tr>
<td>(-2.81, -0.16)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NY Comp. Law X Time Interaction</td>
<td>-0.25</td>
<td>-11.76</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td>(-.29, -.21)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NY County Moderate Law Main Effect</td>
<td>-0.88</td>
<td>-1.55</td>
<td>ns</td>
</tr>
<tr>
<td>(-2.0, .23)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NY County Mod. Law X Time Interaction</td>
<td>-0.12</td>
<td>-3.09</td>
<td>p&lt;.01</td>
</tr>
<tr>
<td>(-2.0, -.05)</td>
<td></td>
<td></td>
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</tbody>
</table>

Florida’s CIAA

- Florida: Pop = 18M (10.2M 35+)
- July 1, 2003
- Banned smoking in all workplaces and restaurants
- Exemptions for free-standing bars
Interrupted Time-Series Regression Analysis: Florida 1990-2006

<table>
<thead>
<tr>
<th></th>
<th>b</th>
<th>t (F)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall F-test (138,4417)</td>
<td>R² =</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.4689</td>
<td>45.54</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td>FL Comp. Law Main Effect</td>
<td>-4.24</td>
<td>-1.91</td>
<td>p=.056</td>
</tr>
<tr>
<td>(95% CI) (-8.58, 0.10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL Comp. Law X Time Interaction</td>
<td>-2.53</td>
<td>-11.45</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td>(95% CI) (-2.97, -2.10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time (quarter)</td>
<td>-0.23</td>
<td>-2.40</td>
<td>p&lt;.05</td>
</tr>
<tr>
<td>(95% CI) (-.41, -.04)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N.B. Model also includes indicator variables for time of year (3 variables), county (66 variables), and county X time interaction (66 variables).
Oregon’s CIAA

- Oregon: Pop = 4M (2M 35+)
- 2001, OR passed a law that restricted smoking in workplaces
- Excluded hospitality venues
- New comprehensive law for Jan. 1, 2010

### Interrupted Time-Series Regression Analysis: Oregon 1998-2006

<table>
<thead>
<tr>
<th></th>
<th>b (95% CI)</th>
<th>t (F)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall F-test</td>
<td>R² = 0.1358</td>
<td>24.60</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td></td>
<td>(86,3801)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comp. Law Main Effect</td>
<td>4.74</td>
<td>0.88</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>(-5.86, 15.35)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comp. Law X Time Interaction</td>
<td>-0.11</td>
<td>-0.63</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>(-0.45, 0.23)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time (month)</td>
<td>-0.23</td>
<td>-2.40</td>
<td>p&lt;.05</td>
</tr>
<tr>
<td></td>
<td>(-.41, -.04)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N.B. Model also includes indicator variables for time of year (11 variables), county (35 variables), and county X time interaction (35 variables).
Summary

• Comprehensive smoking bans in NY and FL are associated with reductions in rates of hospitalization for AMI.

• The timing of those laws is not associated with any change in hospitalization rates in Oregon.

Disseminating Evaluation Results
Preparing Evaluation Reports

- Reports should take into account stakeholder perspectives and expectations

- Reports should include:
  - A description of the program (e.g., logic model)
  - The evaluation questions (purpose of the evaluation)
  - A description of the evaluation methods used
  - Evaluation results and analyses to date (+ and -)
  - Limitations and lessons learned
  - Recommendations (relevance to practice)

DON’T WAIT UNTIL THE END OF THE PROGRAM

Dissemination

- Timed to be useful
- Shared formally and informally
- Tailored for stakeholder audiences
- Presented in varied formats
  - Written: manuscripts, reports, newsletters, Internet
  - Oral: professional meetings, community forums, stakeholder meetings, media interviews