

Model Prevention Performance Measures

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Statistics for Firefighters

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Overview

- NOT a statistics class.
- A quick conceptual overview.
- An opportunity to invite you to think more critically about evaluation.
- Orient you to the Model Performance Measures initially outlined for prevention programs – more to come.

Background

- Licensed Mental Health Counselor – 36 years experienced working with youth and families
- University of Rochester
 - Psychology & Counseling Degrees
 - Department of Psychiatry – 7 Years
 - Fire-Related Youth Program, Rochester NY FD
- Director – Community Counseling Agency
- Private Counseling/Consulting Agency
- Executive Director – Finger Lakes Regional Burn Association

Common Attitudes to Avoid Statistics

- You can make statistics say anything you want.
- I cannot understand these numbers.
- No one really uses this data.
- Statistics are for academic-types

How many alarms does your department respond to annually?



What is your response time?



Why do you care about these numbers?



You are using statistics everyday

Univariate Data	Bivariate Data
<ul style="list-style-type: none">involving a single variable	<ul style="list-style-type: none">involving two variables
<ul style="list-style-type: none">does not deal with causes or relationships	<ul style="list-style-type: none">deals with causes or relationships
<ul style="list-style-type: none">the major purpose of univariate analysis is to describe	<ul style="list-style-type: none">the major purpose of bivariate analysis is to explain
<ul style="list-style-type: none">central tendency - mean, mode, mediandispersion - range, variance, max, min, quartiles, standard deviation.frequency distributionsbar graph, histogram, pie chart, line graph, box-and-whisker plot	<ul style="list-style-type: none">analysis of two variables simultaneouslycorrelationscomparisons, relationships, causes, explanationstables where one variable is contingent on the values of the other variable.independent and dependent variables
Sample question: How many alarms do you respond to annually?	Sample question: Is there a relationship between fire deaths and age?

Ask Critical Questions

- As you listen to the programs at the symposium imagine that you are charged with developing further understanding:
 - What else do you want to understand?
 - What do you need to know?
 - What additional information?
 - What are the relationships involved?

Model Prevention Performance Measures

Jim Crawford, Fire Marshal, Ret. Vancouver WA FD

Purpose of models: comparability

- “Apples to Apples”
- Evidence based decision making
- Model Programs criteria
- Results/Outcome orientation
 - Output vs. Outcome
 - Output = measure of effort, not result
 - Outcome = result

Why Evaluate Fire Safety Programs?

- To understand how to improve service
- To learn whether programs have any unexpected benefits or problems
- To monitor whether program is having desired results
- To document/report results

Stages of Evaluation

- Formative
- Process
- Impact
- Outcome

Formative Evaluation

- Purpose: to ensure program materials, strategies, and activities are of high quality
- When to Conduct: when new program being developed
- May include: interviews with program staff and target audience

Process Evaluation

- Purpose: to count # of people program is serving, to determine if reaching the right audience; workload distribution
- When to Conduct: when new program is put into action and continue throughout life of program
- May include: direct contacts, indirect contacts, items/materials distributed or collected

Impact Evaluation

- Purpose: to learn about changes in knowledge, attitudes, beliefs, and behaviors
- When to Conduct: collect baseline info before first encounter, then collect same information after first encounter
- May include: survey, questionnaires, direct observation, group discussions

Outcome Evaluation

- Purpose: to learn about decreases in fire occurrence, injuries, and deaths
- When to Conduct: long term follow-up
- May include: surveys of self-report data, fire incident reports, data from hospitals

Outcome vs. Impact vs. Process

- Outcome: How well a program achieves its ultimate goals (changes in loss)
- Impact: Measuring the changes in the target population (changes in risk)
- Process: Measuring achievement of program objectives, milestones, or quantifiable workload

Outcomes expected of prevention programs

- Reduced Losses*
 - Incident Numbers
 - Deaths
 - Injuries
 - \$ Loss (direct and indirect)
- *cautionary note

Outcome Examples

- **Code Compliance**

- Changes in % of total fire losses occurring in inspectable occupancies
- Changes in fire deaths/1000 residents of inspectable occupancies
- Changes in number of structural fires/1000 residents of inspectable occupancies
- Changes in inspectable property structures fires with at least \$25,000 in loss

Outcome Examples continued...

- **Public Education**
 - Changes in fire incidents per 1000 residents in target population
 - Changes in fire deaths per 1000 residents in target population
 - Changes in medical costs per 1000 residents in target population

Outcome Examples continued...

- **Plan Review**
 - Changes in fire incidents in reviewed occupancies
 - Changes in property damage costs from fire in reviewed occupancies

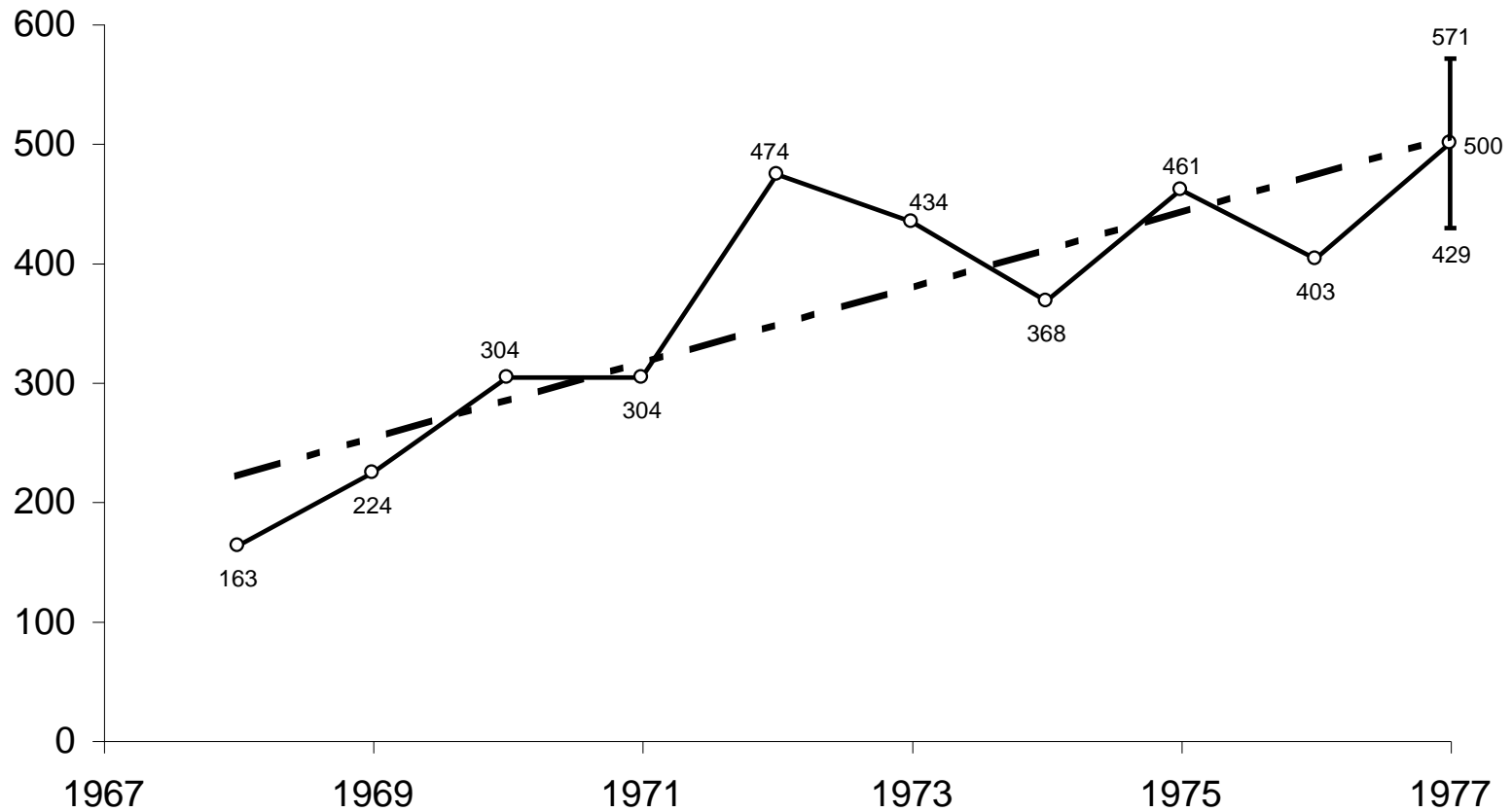
Outcome Examples continued...

- **Fire Investigation**
 - Increase in percentage of fires where cause is determined
 - Increased arson arrest and conviction rates

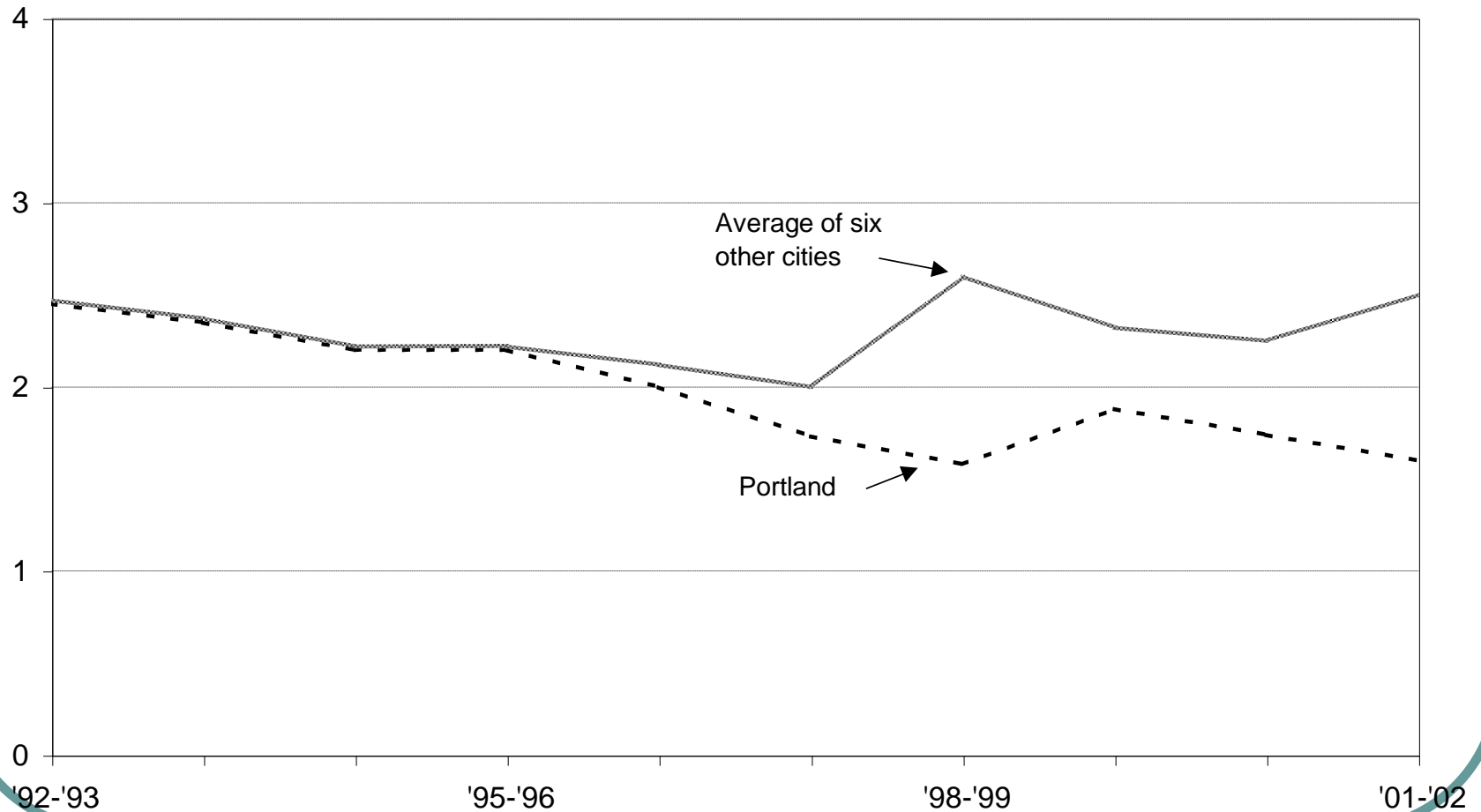
Trending

- Be careful to make claims
 - 50% reduction in one year?
- Trending important for outcome measurement

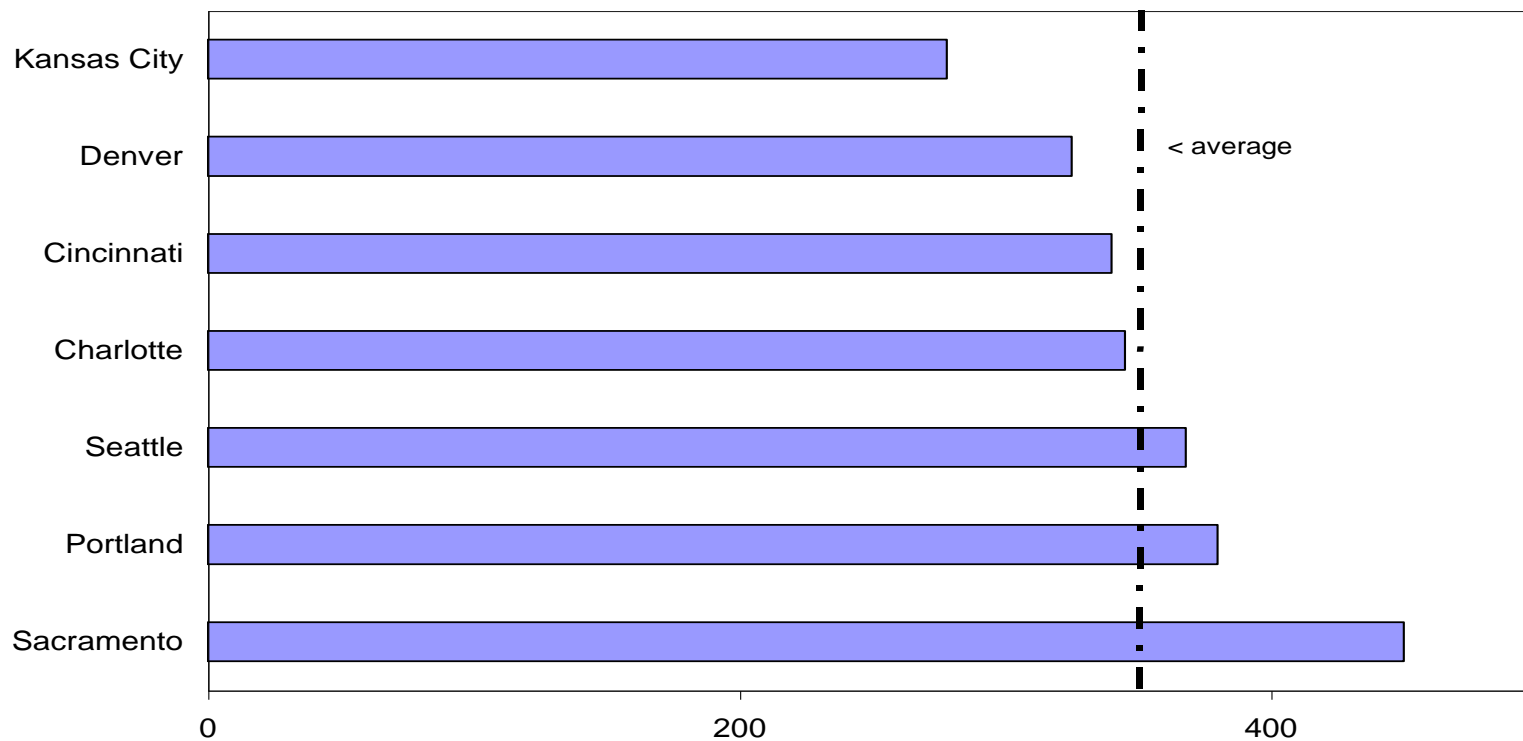
Trend Analysis



Trend Benchmarking



Benchmarking Examples



Impact Measures

- **Code Compliance**
 - Number of code violations noted and abated
 - Percentage of fires where there were pending, uncorrected violations present at the time of the fire
 - Enforcement of fire safety legislation and regulation

Impact Measures continued...

- **Public Education**
 - Improvements in participant's safety knowledge, attitudes, and beliefs
 - Observed and documented changes in behavior (hazard reduced or safety increased)
 - Introduction of fire safety legislation

Impact Measures continued...

- **Plan Review**

- Percentage of turn-a-round time goals met for plan review
- Decreased percentage of errors on plans reviewed
- Observed and documented reductions in code violations found during “acceptance” inspections (during construction)

Impact Measures continued....

- Fire Investigation
 - Reduced percentage of fire reports “cleared” without determination of cause
 - Increased number of arson cases picked up by prosecutors

Process Measures

- Code Compliance

- Percentage of fires in properties subject to inspection that were not listed in inspection files
- Percentage of inspection for which time since last inspection is greater than the department's target cycle time
- Percentage of inspections conducted by inspectors with all necessary certifications

Process Measures continued...

- **Public Education**
 - Number of fire safety-related focus groups conducted
 - Number of fire-safety related surveys conducted
 - Number of people reached in target population
 - Number and type of fire materials distributed

Process Measures continued...

- **Plan Review**
 - Number of plans reviewed
 - Number of permit application meetings held

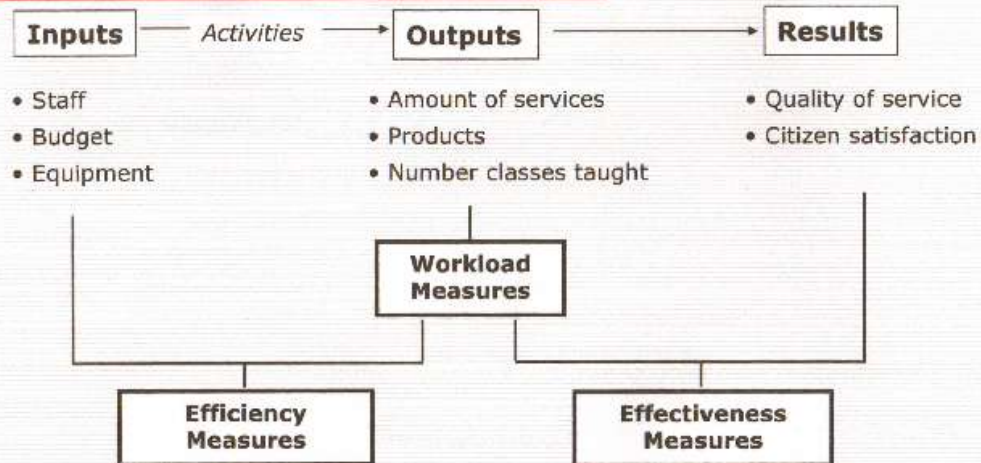
Process Measures continued...

- Fire Investigation
 - Number of fires investigated
 - Time spent on investigation activities
 - Number of fires investigated by personnel with professional qualifications
 - % of fire investigators with professional qualifications

Administrative/Bureau/ Governmental Level Perspectives

- **Workload**
 - Output, demand
- **Efficiency**
 - Input/output ratio
- **Effectiveness**
 - Results, outcomes

Schematic of measures



Examples of performance measures by program: Fire Bureau

PROGRAM	Workload	Efficiency	Effectiveness
EMERGENCY OPERATIONS	Number of fires responded to	<ul style="list-style-type: none">• Cost per response• Response time	<ul style="list-style-type: none">• # of fire deaths per 100,000 pop.• Fire property loss per capita
FIRE PREVENTION	<ul style="list-style-type: none">• # of inspections conducted• Total # of buildings requiring inspection• Total number of fires investigated	<ul style="list-style-type: none">• Cost per inspection• Cost per investigation	<ul style="list-style-type: none">• % of fires occurring in inspected buildings• % of total fires where the cause is identified

Importance of performance measurement

- Are we doing the right thing?
- Are we doing the thing right?
- Does anyone know or care?
 - An important part of advocacy for fire prevention

Challenges

- Evaluation takes resources
- Available data may not be available or reliable
- Small numbers
- Impact may not be immediately seen

You do not have to do this alone

- Local universities
- Local government departments responsible for record-keeping
- Private consultants
- USFA/National Fire Academy Technical Assistance
- Vision 20/20 Steering Committee and Affiliates

Resources

- NFPA Fire Protection Handbook
- NFPA Research Foundation
 - Project on Measuring Code Compliance Effectiveness
- Government Accounting Standards Board www.gasb.org
- Association of Government Accountants www.agacgfm.org

Resources continued.....

- Public Entity Risk Institute
www.riskinstitute.org
- Center for Public Safety Excellence
www.publicsafetyexcellence.org
- ISO www.iso.com
- ICMA www.icma.org

Resources continued.....

- CDC's Web-based Injury Statistics Query and Reporting System (WISQARS)
<http://www.cdc.gov/ncipc/wisqars/>
- Primer on Evaluation ("Demonstrate Your Program's Worth")
<http://www.cdc.gov/ncipc/pub-res/demonstr.htm>

Resources continued.....

- Proving Public Fire Education Works (TriData Corp, 1990)
- Fire Safety Council's White Paper: Home Smoke Alarms (Appendix F: Measures of Effectiveness for Program Evaluation of Home Smoke Alarms [p.51-52])
- National Electronic Injury Surveillance System (NEISS)
<http://www.cpsc.gov/LIBRARY/neiss.html>