Systems for Action
Systems and Services Research to Build a Culture of Health

PHSSR Research in Progress Webinar Series
Speaker Biographies

UK UNIVERSITY OF KENTUCKY®
Center for Public Health Systems
and Services Research

Wednesday, December 2, 2015, 12:00–1:00pm ET
**Assessing the Impact of Economic Recession on Public Health Outcomes:
Exploring New Methods and Measures**

Presenters

Anna P. Schenck, PhD, MSPH, directs the Public Health Leadership Program and the North Carolina Institute for Public Health at the UNC Gillings School of Global Public Health, where she is also Professor of the Practice and Associate Dean for public health practice. She holds a doctorate in epidemiology and a master's degree in public health education, both from the University of North Carolina at Chapel Hill. Dr. Schenck is an "interventionist epidemiologist" who works to identify and use data to improve the health of the public. Prior to joining UNC, Dr. Schenck worked with the Quality Improvement Organization (QIO) for North and South Carolina working to improve the systems, processes and outcomes for Medicare enrollees. While at the QIO, she led two national projects to develop quality measures for colorectal cancer screening and hospice care. Dr. Schenck has worked in a local health department as a health educator and as an epidemiologist, and has extensive experience in measure development and assessing the scientific soundness of measures. Dr. Schenck has served on national measurement panels, including the Cancer Data and Methods Panel for the National Quality Forum, the Expert Workgroup for Clinician Level Measures for Palliative Care sponsored by NCQA and the National Health Security and Preparedness Index model design group. Dr. Schenck chairs the scientific advisory committee for the America's Health Ranking. *anna.schenck@unc.edu*

Anne Marie Meyer, PhD is an epidemiologist who focuses on inter-disciplinary methods for leveraging large, real-world, and observational data for public health and outcomes research. As Director of the Integrated Cancer Information and Surveillance System (ICISS), she leads the development of a "big data" research platform which combines data from the state cancer registry, multiple payers, epidemiologic cohorts, medical records, census and other ecological data sources. Using a "team science" approach, the ICISS team is developing novel methods to help identify, organize, manage, and use big data in order to make the data more accessible to patients, clinicians, researchers and public health practitioners. She is an Assistant Professor in the Department of Epidemiology at UNC Gillings School of Global Public health, a member of the Lineberger Cancer Center, research fellow at the Sheps Center for Health Services Research and a faculty member of the Carolina Health Informatics Program (CHIP). *meyera@email.unc.edu*

Commentary

Michael A. Stoto, PhD is Professor of Health Systems Administration and Population Health in the School of Nursing & Health Studies at Georgetown University, and is a statistician, epidemiologist, and a health services researcher. His substantive research interests include public health practice, particularly emergency preparedness; drug and vaccine safety; infectious disease policy; and ethical issues in research and public health practice. Prior to joining Georgetown, Dr. Stoto was a Senior Statistician at the RAND Corporation and the

Associate Director for Public Health in the Center for Domestic and International Health Security. Dr. Stoto is also an Adjunct Professor of Biostatistics at the Harvard School of Public Health. He is a recognized expert on population health and public health assessment, where his work includes systems-oriented evaluations of public health surveillance systems at the local to global level, addressing both statistical methods and public health practice issues. Dr. Stoto has developed methods for evaluating community health assessments and performance measures and worked with state and local health departments, especially in the Washington DC metropolitan area, to implement these methods. He is an expert in public health systems research (PHSR), focusing on applying and developing rigorous mixed-methods approaches to studying and evaluating federal, state, and local public health systems. His recent PHSR focused on public health emergency preparedness, regionalized public health services, and methods development for emergency preparedness capability assessments based on exercises and actual events. *stotom@georgetown.edu*
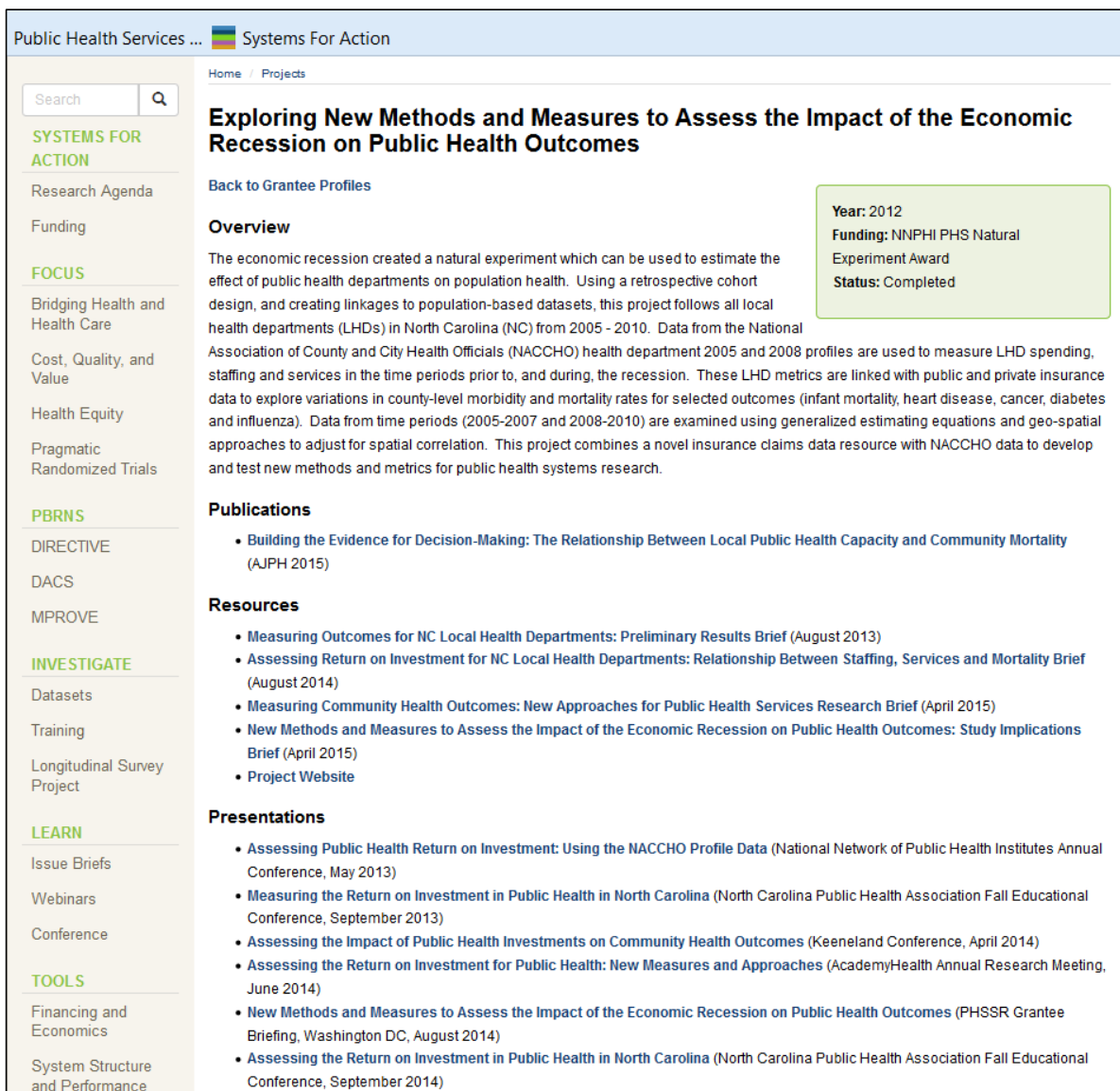
L. Layton Long, Jr, MSA, REHS is Public Health Director for the Chatham County Health Department in Pittsboro, North Carolina. Mr. Long has worked in the public health field since 1988, including the environmental health services of Union, Transylvania, and Buncombe county health departments. He has also served as the as State Environmental Health Director in North Carolina's Department of Health and Human Services and Health Director for Davidson County. He earned degrees from Central Michigan University and North Carolina Wesleyan College, and served four years in the United States Air Force.

layton.long@chathamnc.org

Assessing the Impact of Economic Recession on Public Health Outcomes: Exploring New Methods and Measures

Project Webpage: *http://www.publichealthsystems.org/projects/exploring-new-methods-and-measures-assess-impact-economic-recession-public-health-outcomes*

For more information on Pragmatic Randomized Trials: *http://publichealthsystems.org/pragmatic-randomized-trials*

Systems for Action
Systems and Services Research to Build a Culture of Health

PHSSR Research-In-Progress Webinar

Wednesday, December 2, 2015   *12:00-1:00pm ET*

Cost, Quality and Value of Public Health Services

Assessing the Impact of Economic Recession on Public Health Outcomes:
Exploring New Methods and Measures

Note: Download today's presentation and speaker bios from the 'Resources' box in the top right corner of the screen.

UK
UNIVERSITY OF
KENTUCKY®
Center for Public Health Systems
and Services Research

Agenda

Welcome: **C. B. Mamaril, PhD,** *Systems for Action* National Program Office; Research Assistant Professor, U. of Kentucky College of Public Health

"Assessing the Impact of Economic Recession on Public Health Outcomes: Exploring New Methods and Measures "

Presenters: **Anna P. Schenck, PhD, MSPH,** Associate Dean for Public Health Practice *anna.schenck@unc.edu* and **Anne Marie Meyer, PhD,** Research Assistant Professor, Epidemiology *meyera@email.unc.edu,* UNC Gillings School of Global Public Health

Commentary: **Michael A. Stoto, PhD,** Health Systems Administration & Population Health, Georgetown University *stotom@georgetown.edu*

L. Layton Long, Jr., MSA, REHS, Chatham County Public Health Department, Pittsboro, NC *layton.long@chathamnc.org*

Questions and Discussion

Presenters

Anna P. Schenck, PhD, MSPH

Director, Public Health Leadership Program and North Carolina Institute for Public Health

Professor of the Practice and Associate Dean, Public Health Practice *anna.schenck@unc.edu*

Anne Marie Meyer, PhD

Research Assistant Professor, Epidemiology

Faculty Director, Integrated Cancer Information and Surveillance System (ICISS)

meyera@email.unc.edu

UNC Gillings School of Global Public Health

New methods and measures to assess the impact of the economic recession on public health outcomes

Anna P. Schenck, PhD, MSPH

Anne Marie Meyer, PhD

Public Health Challenges

- Local health departments are increasingly expected to demonstrate the value of their programs and services

- New data sources and methodological approaches offer enhanced opportunities for measuring public health outcomes

- Our study explored demonstrating the value of public health services with both traditional and new methods and measures

Why North Carolina?

- North Carolina was hit particularly hard by the recession

- NC LHDs have asked for ways to better measure their value

  - Can you help us evaluate the work we do and measure ROI and health outcomes?

  - *What we need is cost-benefit analysis - information on how to save money and still have impact*

  - Local health departments need help communicating the value of what we do

  - *We need to create a better understanding of the definition and "value added" of government public health*

What approach should we use to measure value?

- Cost benefit
  - Are the benefits greater than the costs?
    - Requires benefits to be translated into dollar amounts

- Cost effectiveness
  - What is the cost per unit of outcome?
    - Outcomes are measured in units that are appropriate to the condition targeted

- Cost utility
  - What is the cost per standard unit of outcome?
    - Outcomes are measures in a standard unit (e.g.: QALY)

- All approaches require measures of costs and outcomes

What do we know already?

- Local public health spending has been shown to be associated with local health department (LHD) performance of essential services and improved community health outcomes (Mays and Smith, 2009)

- The economic recession in 2008 resulted in decreased funding for LHDs

- We wanted to know:
  If more spending meant better performance and improved health outcomes…..was the opposite true?

- We examined the impact of reductions in LHD spending, staffing and services on community health outcomes

Study Aims

- In the context of the economic recession, assess the relationship:
  - between public health spending, staffing and the provision of public health services
  - between spending, staffing, services and health outcomes

- Develop and examine the feasibility and responsiveness of new measures of population health to respond to changes in public health services.

Methods

- Study design
  - Using a natural experiment design, we followed North Carolina LHDs from 2005 – 2010
  - 85 LHDs representing 100 NC counties

- Data sources
  - National Association of County and City Health Officials (NACCHO) profiles of LHD (2005, 2008)
  - CDC and NC Mortality and population data (2005-2010)
  - Integrated cancer information and surveillance system (ICISS) containing health insurance claims (2005-2010)

Measures for LHD spending, staffing and services

- All measures came from NACCHO profiles (2005 and 2008)
- Spending was captured using expenditure data for most recent fiscal year
  - Our measure was expressed as dollars per capita, based on service delivery area of LHD
- Staffing included full-time, part-time and contractual employees
  - Our measure was expressed as full-time-equivalent (FTEs) per jurisdictional population
- Services were measured following the approach of Mays and Smith 2009
  - As a percent of the total services that could be offered
  - Examining whether individual services were provided

Measures for health outcomes

- Rates calculated separately for each outcome for the service delivery area of each LHD for two time periods using three years of data: 2005 – 2007 and 2008 – 2010

- Mortality
  - 5 mortality outcomes were examined using National Vital Statistics and ICD9 codes: cancer, heart disease, diabetes, influenza and infant mortality

- Morbidity and Prevention
  - indicators of illness and preventive behaviors using published or constructed ICD9 code sets:
    - hospitalizations for heart disease, cancer, diabetes and influenza
    - outpatient care for reportable conditions (i.e.: sexually transmitted diseases (STDs) and foodborne illnesses)
    - mammography and colorectal cancer test use using age and sex appropriate denominators

About the Integrated Cancer Information Surveillance System (ICISS)

- Developed to study cancer in North Carolina
    - data are not limited to cancer cases or cancer treatments
    - Includes data on all persons enrolled in the participating insurance plans for all services received

- Contains administrative and claims data for NC residents covered under Medicare, Medicaid, and private insurance plans

- Represents 65% of the NC population

Analytic approach

- Multilevel models that incorporated the longitudinal structure of the data
  - Every LHD had two time points

- Explored geographic variation of each exposure and outcome

Results: public health spending

- Spending
  - We observed a wide variation in spending across LHD (from $35 per capita to $218 per capita)
  - In the aggregate, spending increased from 2005 to 2008
    - 10 LHDs saw a decrease in spending (all 10 served rural areas)
  - Higher spending was associated (p < 0.0001) with:
    - Increased staffing, measured as full time equivalent (FTE)
    - Increased provision of selected services (medical care and specialty care)

Results: Staffing and services

- Staffing
  - Wide variation in staffing across LHDs
  - In the aggregate, staffing decreased from 2005 to 2008 with 36 LHDs having fewer staff

- Services
  - Wide variation on the types and levels of services provided
    - Almost all provided high levels of clinical preventive services
    - Level of some services (e.g.: environmental services and home health services) more varied

Mortality results

- Spending was not associated with any of the mortality outcomes examined

- Staffing was associated with infant mortality
  – Increased FTE was associated with decreased infant mortality ($p < 0.05$)

- Provision of medical treatment services was associated with decreased infant mortality
  – Examining individual services within the medical treatment services category, two services were associated with reduced infant mortality: prenatal care and obstetrical care

Translating the infant mortality finding

- Implication of these findings is that provision of these services by LHDs in 2008 may have resulted in 100-200 fewer infant deaths

Exploring Burden of Disease: Data Linkages

- Era "Big Data"

- Able to link disparate datasets together
  - Aggregated data
  - Large number of new resources might be useful for public health   (PCORnet, All Payer Claims Database, Nielsen, etc.)

- New datasets = new challenges

- Need Novel Analytic Methods
  - Sampling frame
  - Ecologically connected
  - Non-independent observations

Multi-payer Dataset for Measuring Morbidity

- Outcome data: morbidity measures using claims data from ICISS

- LHD spending and services

- County level covariates from the Area Resource File

Validation with State Inpatient Data (SID)

- Synthetic population estimate created using census data and claims enrollment for denominators and rates from claims in numerator

$$\frac{[\geq 65\ Medicare +\ (<65\ Medicaid + <65\ Private*)]}{\geq 65\ Medicare + <65\ (all\ insured\ census)}$$

Where Private* = (Private event rate) x [Insured<65 (from census) − Medicaid <65]

- Pearson correlation coefficient 0.94 for influenza & 0.80 for heart disease
  - Slightly lower than the data from SID because it excludes uninsured and multiple hospitalizations.

Claims-based measures for morbidity

	2005		2008		Change 2008 −2005	
Preventive Services Rate per 1,000 population	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Breast cancer testing	433.0	36.6	440.8	41.5	7.84	25.51
Colorectal cancer testing	209.0	32.0	158.8	23.9	-50.18	20.99
Cervical cancer testing	369.6	40.4	366.0	40.5	-3.69	32.32
Reportable diseases including flu and STDs	24.0	4.2	30.7	6.1	6.69	4.7
Hospitalization Rate per 1,000 population						
Heart diseases	11.1	2.6	9.6	2.5	-1.45	1.04
Flu/pneumonia	4.3	1.4	3.5	1.5	-0.81	0.70
Cancer	3.7	0.9	3.4	0.8	-0.34	0.61

Associations with Spending, Staffing, Services

- Small but significant associations observed with outcomes: breast & cervical cancer testing, hospitalizations for heart disease, and reportable diseases

- Hospitalizations for heart disease was only measure associated with spending
  – On average an increase in 1% spending across the LHDs would result in 91 fewer hospitalizations

- Primary care services were associated with increased breast/colon testing as well as increased reportable diseases

- Regulatory and licensing facility services were associated with decreased reportable diseases
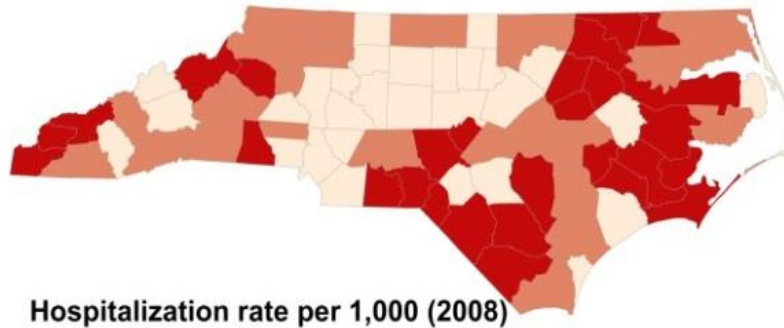
Geospatial approach to understand contextual variables

- Independence of observations are violated in standard biostatistical models
  - "Sharing" between LHDs

- Tobler's Law: *Everything is related to everything else, but near things are more related than distant things*

- LISA + geospatial modeling
  - LISA maps are univariate
  - Spatial lag models can identify the magnitude of the "sharing" effect (aka, spatial dependence)
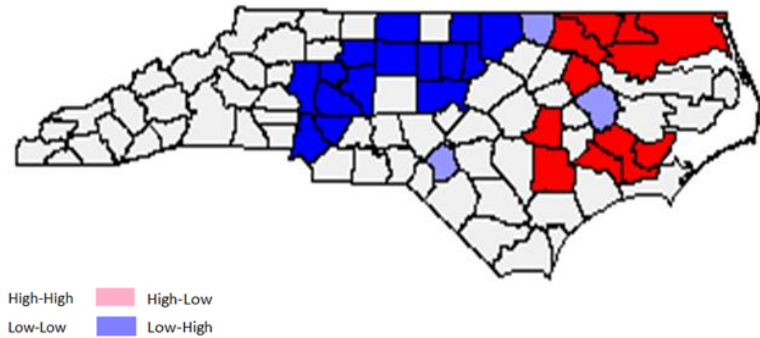
Mapping 2008 Rates

Crude Hospitalization Rate of Hospitalizations for Heart Disease by LHD

LISA Map Demonstrating Clusters in the Rate of Hospitalizations for Heart Disease by LHD

Hospitalization rate per 1,000 (2008)
- 4.6 - 8.3
- 8.4 - 10.6
- 10.7 - 15.7

- High-High
- Low-Low
- High-Low
- Low-High

Spatial Lag Model Results

- Demonstrated that the rate of hospitalizations between an LHD and that of its neighbors is related
  - AFTER controlling for contextual variables

- Several contextual variables significantly associated with the outcome

- Higher rates of disease:
  - Percent non-white population
  - Percent of population over 65
  - Number of hospital beds per 100,000 populations
  - Medical treatment delivered by an LHD

- Lower rates of disease:
  - Increasing the percent of population with college degrees
  - Urban LHDs

- No cross-sectional association with spending in the spatial model

Conclusions

- Linked data resources can potentially provide valid measures of disease morbidity

- GIS mapping can identify significant variation and clustering of disease

- Spatial regression model identifies important contextual variables – "shared" between LHDs

- By combining data and methods approaches can better explore challenging constructs such as contextual variables and time

Methods Challenges

- NACCHO data are self-report
  - Unknown validity and reliability

- Funding for how services are provided is highly variable across LHDs
  - Imperfect crosswalk between NACCHO categories and service categorization at the local level

- Missed events (ICD-9, uninsured)

- Small sample size

- Unable to identify Instrumental Variable (IV)

Implications for PHSSR

- Era of increasing fiscal pressures – need better understanding of context to maximize ROI

- Capitalize on data infrastructure developments
  - Public Health can be important partner
    - Data & context!

- Partner with multi-disciplinary stake-holders to develop inter-disciplinary methods

Research Products

- Research Briefs (http://sph.unc.edu/nciph/research-2/)
  - Measuring Outcomes for NC Local Health Departments: Preliminary Results
  - Assessing Return on Investment for NC Local Health Departments: relationship between spending, services and mortality
  - Measuring community health outcomes: new approaches for public health services research
  - New methods and measures to assess the impact of the economic recession on public health outcomes: Study implications

- Publication
  - Building the Evidence for Decision-Making: The Relationship Between Local Public Health Capacity and Community Mortality (AJPH 2015)

Next steps

- Finalize additional publications
  - Methods
  - Morbidity

- Looking for partner states with comparable data to further the development of more proximal outcome measures

Acknowledgements

Research Team

- **UNC Gillings School of Global Public Health**
  - Anna P. Schenck, PhD, MSPH
  - Anne Marie Meyer, PhD
  - Bill Carpenter, PhD
  - Dorothy Cilenti, DrPH, MSW
  - Carol Gunther-Mohr, MA

- **UNC Lineberger Comprehensive Cancer Center**
  - Anne Marie Meyer, PhD
  - Tzy-Mey Kuo, PhD

- **Chatham County Health Department**
  - Layton Long, MSA, REHS, Health Director

Commentary

Research:

Michael A. Stoto, PhD
Professor of Health Systems
 Administration & Population Health
School of Nursing & Health Studies
Georgetown University
stotom@georgetown.edu

Comments on "New methods and measures to assess the impact of the economic recession on public health outcomes" by Schenck & Meyer

Michael A. Stoto, PhD

PHSSR Grantee Briefing

December 2, 2015

Schenck & Meyer findings

- Overall spending not associated with any of the mortality outcomes examined
- Staffing and provision of medical treatment services associated with decreased infant mortality
  - especially prenatal care and obstetrical care
- Just as you would expect
  - when you focus on the outcomes most likely to be associated with the "intervention"
  - e.g. Case & Deaton (2015) and Sommers (2014)
- Would the same be true for
  - provision of colorectal cancer tests and
  - colorectal cancer (after an appropriate time lag)?

Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century
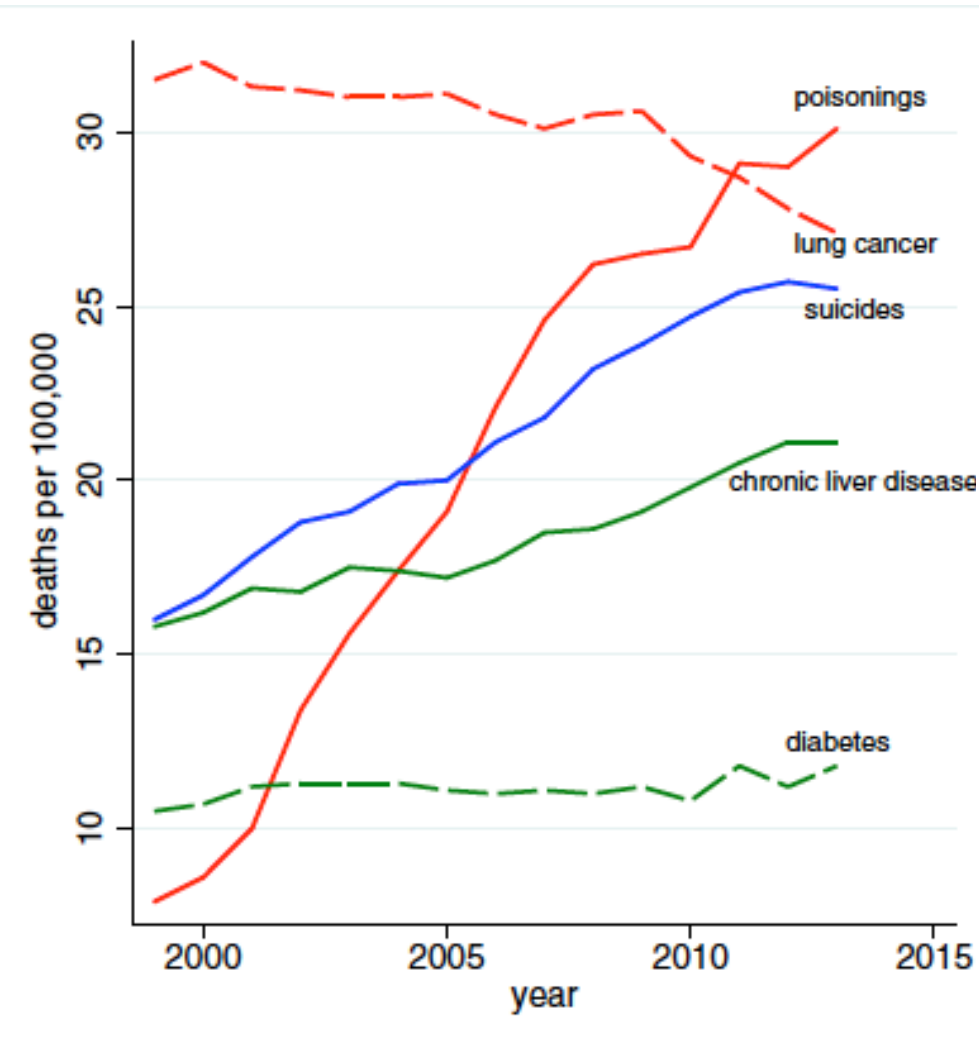
Anne Case[1] and Angus Deaton[1]

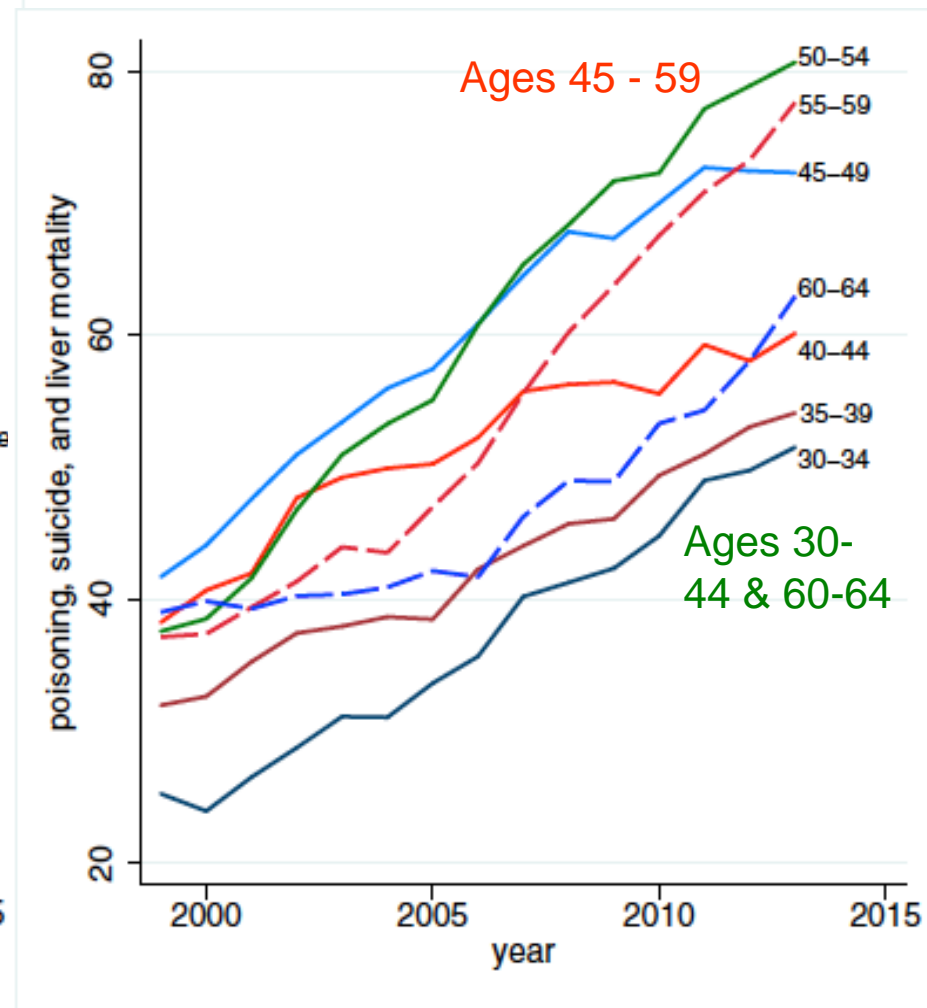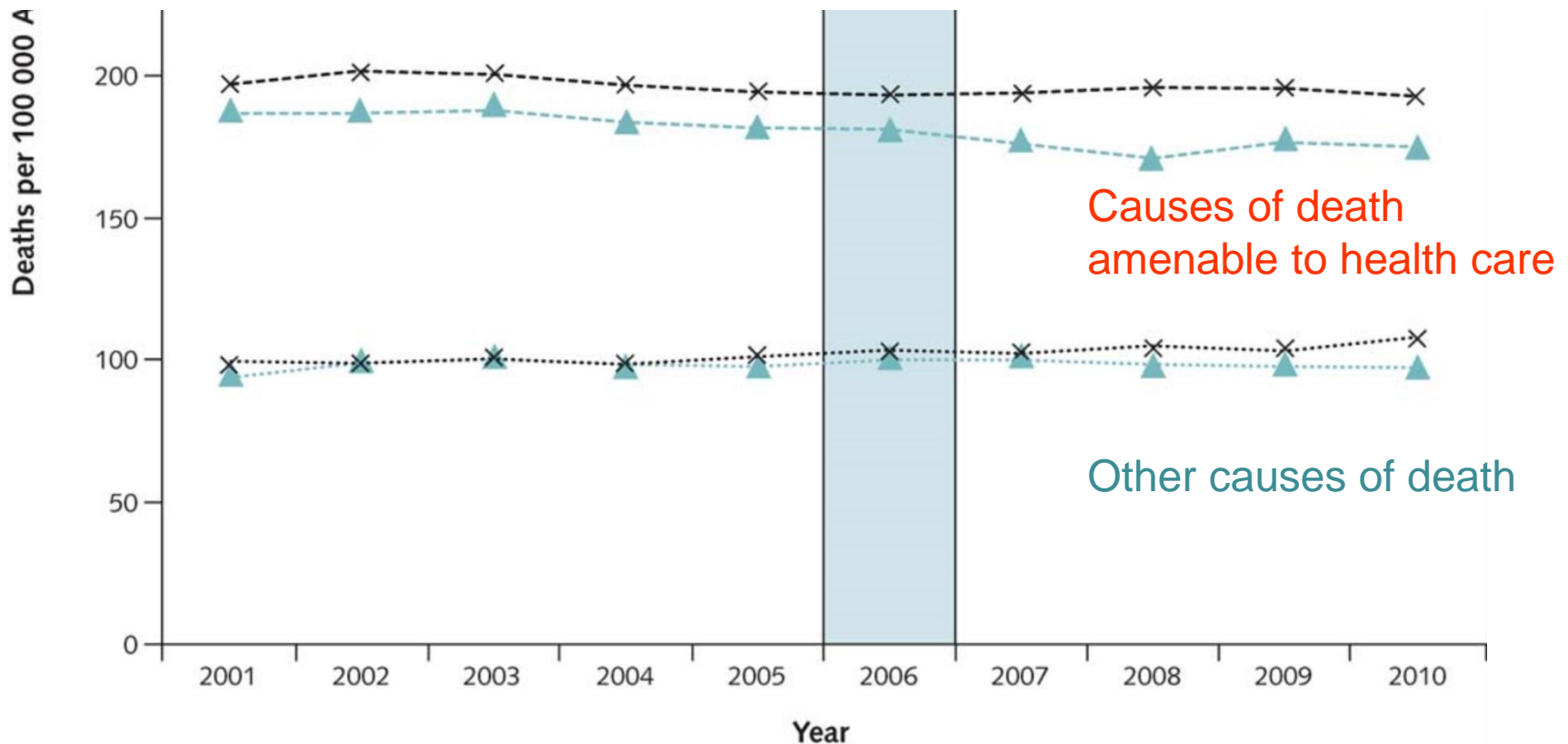Fig. 2. Mortality by cause, white non-Hispanics ages 45–54.

Fig. 4. Mortality by poisoning, suicide, chronic liver disease, and cirrhosis, white non-Hispanics by 5-y age group.

Changes in Mortality After Massachusetts Health Care Reform
A Quasi-experimental Study

Benjamin D. Sommers, MD, PhD; Sharon K. Long, PhD; and Katherine Baicker, PhD

Reform associated with a significant decrease in all-cause mortality compared with matched control counties (-2.9%; *P*=0.003). Deaths from causes amenable to health care also significantly decreased (-4.5%; *P*=0.001). Changes were larger in counties with lower household incomes and higher pre-reform uninsured rates.

Why does this matter?

- Methodologically, focusing on the mortality outcomes most likely to be associated with the public health services provided
  - is the most sensitive test of the impact of those services, and of the associated funding
  - other mortality outcomes serve as a control
- Practically, local health officials have little control over their department's total budget
  - However, they have more influence over spending and staffing on particular services
    - reallocating available funds
    - applying for external funds
    - collaborating with with local healthcare providers engaged in value-based purchasing

Commentary

Practice:

L. Layton Long, Jr., MSA, REHS
Health Director
Chatham County Public Health Department
North Carolina
layton.long@chathamnc.org

Comments Presented by Anna P. Schenck, PhD

Practice implications

- Health departments are increasingly expected to justify services provided
  - Measures of more proximal outcomes are needed
  - Claims /clinical data could help LHDs target and justify their services

- Health departments should be looking to maximize available resources through partnering (hospitals, non-profits and academia)

- Health departments must assess the services being provided
  - Collaborative evaluation needed for cross jurisdictional programs

- Health departments must look closely at the local data
  - Better data = better decisions

Questions and Discussion

Announcing: 2015 Call for Proposals

http://systemsforaction.org/funding-opportunities

- 12 or 24 month projects, up to $100 or 250K funding
- Informational webinar on Dec. 18, 2015
- Letters of Intent due January 12, 2016
- Invited full proposals due March 2016
- Grants initiated June 2016

Funded by the Robert Wood Johnson Foundation

Webinar Archives

Upcoming Webinars

Wed, Dec. 9 (12-1pm ET/ 9-10am PT)

IMPROVING THE REACH AND EFFECTIVENESS OF STD PREVENTION, SCREENING, AND TREATMENT SERVICES IN LOCAL PUBLIC HEALTH SYSTEMS

Lynn Silver, MD, MPH, Senior Advisor for Chronic Disease and Obesity
Public Health Institute, California

Wed, Jan 13 (12-1pm ET/ 9-10am PT)

INTEGRATING HEALTH CARE AND PUBLIC HEALTH TO IMPROVE EARLY HIV DETECTION AND CONTROL
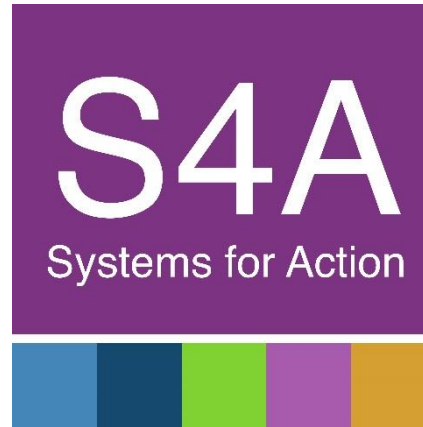
Deborah Porterfield, MD, RTI International, North Carolina

Thurs, Jan. 21 (1-2pm ET/ 10-11am PT)

LEVERAGING A HEALTH INFORMATION EXCHANGE INNOVATION TO IMPROVE THE EFFICIENCY OF PUBLIC HEALTH DISEASE INVESTIGATION

Janet Baseman, PhD, MPH, Debra Revere, MLIS, MA, and Ian Painter, PhD
University of Washington

Thank you for participating in today's webinar!

For more information about the webinars, contact:

Ann Kelly, Project Manager *Ann.Kelly@uky.edu*

111 Washington Avenue #201, Lexington, KY 40536

859.218.2317

www.systemsforaction.org