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Assessing the impact of public health investments on community health outcomes

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Background

Local public health spending has been associated with the ability of local health departments (LHDs) to perform essential services and improved health outcomes

The economic recession in 2008 resulted in decreased funding for LHDs. North Carolina was a state that was hit particularly hard by the recession. Our NC LHDs have asked for ways to better measure their value.

Our objectives were to:

- examine the impact of reductions in LHD spending, staffing and services on community health outcomes in the context of the 2008 recession
- develop and demonstrate new approaches to measuring and visualizing the impact of the work of LHDs on community health outcomes

Methods

Study design

- A natural experiment following North Carolina LHDs from 2005 – 2010

Data sources

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

Measures of LHD investments in spending, staffing and services

- Spending was captured using expenditure data for most recent fiscal year
- FTE was captured from the most recent fiscal year
- Services were counted if provided or contracted for by the LHD

Mortality

- Mortality rates were constructed based on the service delivery area for LHD for: cancer, heart disease, diabetes, influenza and infant mortality
- Rates were calculated separately for each outcome for two time periods using three years of data: 2005 – 2007 and 2008 – 2010

Morbidity

- Using ICISS data, rates were constructed for morbidity outcomes based on the service delivery area for LHD:
 - hospitalizations for heart disease, cancer, diabetes and influenza
 - treatment for sexually transmitted diseases (STDs)
 - mammography and colorectal cancer test use using age and sex appropriate denominators
 - measures for food borne illnesses and vaccine preventable disease still in development

Analyses

We conducted time-series (multilevel) modeling to examine the relationship between LHD investment and the health outcome measures. Models controlled for demographic and socio-economic characteristics in the population, health care resources and urban/ rural status.

About the Integrated Cancer Information Surveillance System (ICISS)

- Developed to study cancer in NC, although data are not limited to cancer cases
- Contains administrative and claims data for NC residents covered under Medicare, Medicaid, and beneficiaries in privately insured health plans
- Represents 55% of the total population in the state of NC

Principal Findings

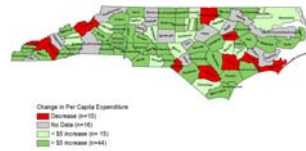
80 (of 85) LHDs in NC completed NACCHO profile surveys in both 2005 and 2008
LHD investments varied widely across NC

- Spending ranged from \$35 to \$218 per capita
- Staffing ranged from 0.53 to 8.13 per 1000 population
- Service provision varied by location and year
 - All LHDs provided immunizations, HIV screening, STD screening and treatment
 - Over 90% of LHDs provided prenatal care and family planning
 - 40-50 % of LHDs provided primary care

From 2005 to 2008, the effects of the recession varied by LHD

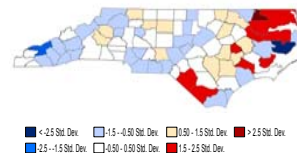
- 10 LHDs had decreased expenditures
- 20 LHDs reduced the number or type of services they provided
- 36 LHDs had fewer staff

Change in Per Capita Expenditure in North Carolina Local Health Departments, 2005-2008



Mortality for heart disease, cancer, diabetes, pneumonia/influenza and infant mortality fell between 2005 and 2008 in most LHD service areas

Infant Mortality Rate in 2008-2010
Mean=7.94, Std Dev=3.15



Mortality burden varied by location as illustrated by the pockets of high infant mortality in Eastern NC

Significant associations were seen for infant mortality

- Increased LHD staffing was associated with decreased infant mortality
- Provision of women's and children's services associated with decreased infant mortality (prenatal care and obstetrical care)

Increased LHD spending was associated with decreased hospitalizations for heart disease

Increased provision of primary care services was associated with increased mammography

An unexpected finding: provision of population based and specialty care services associated with increased hospitalizations due to flu and pneumonia (0.7 and 0.8 more hospitalization per 100,000, respectively).

Implications for Research and Practice

Research

- New measures and approaches were developed that can be used by other researchers
- Preliminary validation on some outcome measures has been completed but additional validation of measures needed
- Our results are consistent with previous researchers in the area of infant mortality but not for mortality due to other causes – we need additional studies to better understand why

Practice

- Tough economic times increase competition for financial resources
- LHDs are increasingly competing for limited local dollars
- LHDs are asked to cut staffing and services without good evidence to guide their decisions
- Our results provide support for the work LHDs are doing to improve the health of infants and adults in their communities
- Additional PHSSR studies are needed to assess the effects of cuts in spending, staffing and services on health outcomes

Cautions and Caveats

We found no associations between NACCHO metrics for LHD spending, staffing and services and many of the outcomes we explored. Possible reasons include:

- small sample size (80 NC LHDs)
- short time window of study
- lack of variable sensitivity or specificity
- there may be no association

Spending data were challenging:

- data are self-reported
- some questions not asked every survey
- LHDs reported on different time periods

Translating the impact in North Carolina

Infant mortality

- Provision of prenatal care by LHDs that do not currently provide it could potentially prevent 38 infant deaths per year

Heart disease

- A 1% per capita increase in LHD spending could result in a reduction of 70 CHD hospitalizations

Mammography use

- Provision of primary care by LHDs that do not currently provide it could potentially result in 14 more mammography tests per 1000 population

Acknowledgements

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