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Assessing the return on investment in public health in North Carolina

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Background

- Local public health spending has been associated with:
  - the ability of local health departments (LHDs) to perform essential services
  - improved health outcomes
- The economic recession in 2008 resulted in decreased funding for LHDs.
- Our objectives were to:
  - examine the impact of reductions in LHD spending, staffing and services on community health outcomes
  - develop 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
    - North Carolina was a state that was hit particularly hard by the recession
    - NC LHDs have asked for ways to better measure their value
  - Multilevel modeling with data from two time periods to examine relationship between LHD factors and community health outcomes
- Data sources
  - National Association of County and City Health Officials (NACCHO) profiles of LHD, 2005 & 2008
  - CDC and NC Mortality and population data
  - Integrated cancer information and surveillance system (ICISS) containing health insurance claims

LHD measures

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

Measures for health outcomes

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

Measures for health outcomes

- **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***

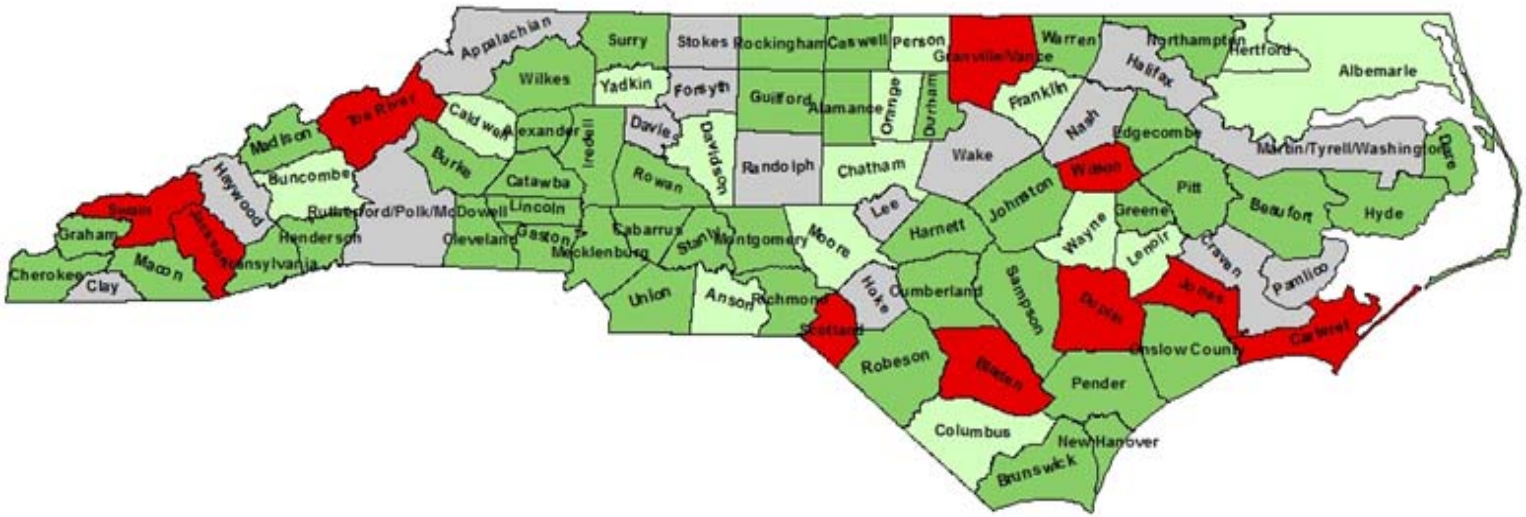
Results

- 80 (of 85) LHDs in NC completed NACCHO profile surveys in both 2005 and 2008
- LHD investments vary widely across NC
  - Spending ranges from $35 to $218 per capita
  - Staffing ranges 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

Results

- 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
  - 37 LHDs had fewer staff

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



Change in Per Capita Expenditure

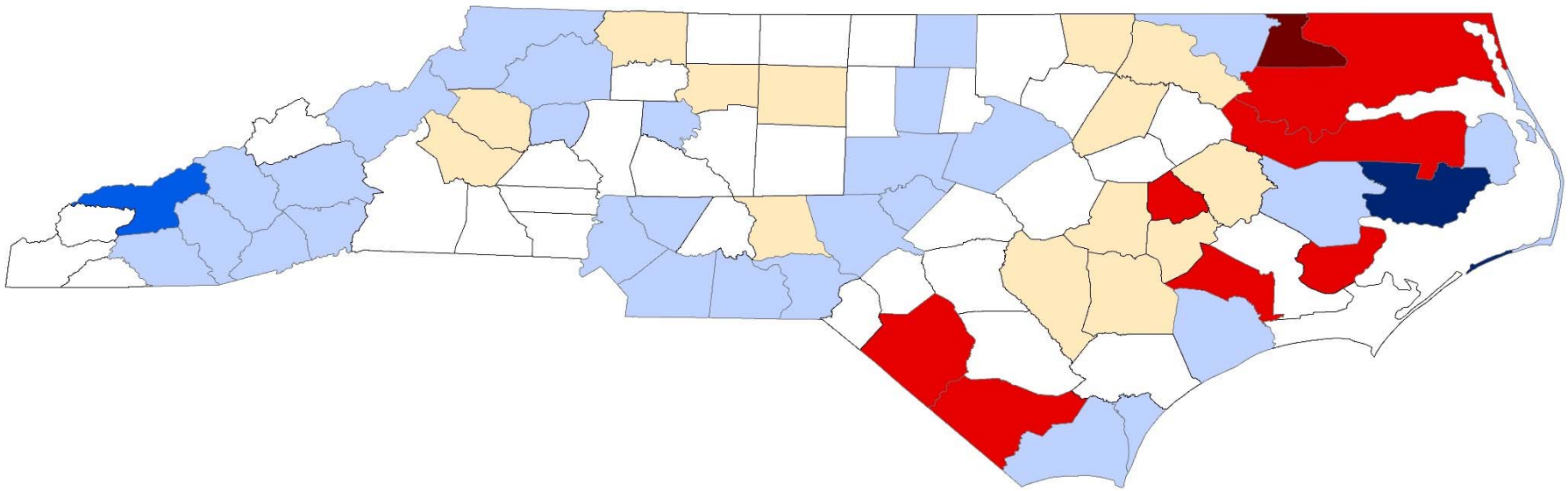
- Decrease (n=10)
- No Data (n=16)
- < $5 increase (n= 15)
- > $5 increase (n=44)

Results

- Mortality for heart disease, cancer, diabetes, pneumonia/influenza and infant mortality fell between 2005 and 2010 in most LHD service areas
- Mortality burden varied by location as illustrated by the pockets of high infant mortality in Eastern NC

Infant Mortality Rate in 2008-2010

Mean= 7.9, Std.Dev= 3.1



< -2.5 Std. Dev.
-2.5 - -1.5 Std. Dev.
-1.5 - -0.50 Std. Dev.
-0.50 - 0.50 Std. Dev.
0.50 - 1.5 Std. Dev.
1.5 - 2.5 Std. Dev.
> 2.5 Std. Dev.

Findings for mortality outcomes

- Significant associations seen for infant mortality
  - Increased LHD staffing associated with decreased infant mortality
  - Provision of women's and children's services associated with decreased infant mortality
    - significant associations were seen with provision of prenatal care

Findings for morbidity outcomes

- Increased LHD spending was significantly associated with decreased hospitalizations for heart disease
- Increased provision of population based services was associated with increased mammography use

Translating the findings in NC

- Infant mortality
  - Provision of prenatal care services by local health departments in 2008 was associated with 191 fewer infant deaths.
- Heart disease hospitalizations
  - A one-percent increase in LHD spending could result in a reduction of 70 cardiovascular health-related 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

Cautions and caveats

- We saw no associations between LHD spending, staffing and services and many of the outcomes we explored. Possible reasons include:
  - small sample size (82 NC LHDs in 2005 and 83 in 2008)
  - short time window of study
  - there may be no association
- Spending data were challenging:
  - some questions not asked every survey
  - LHDs reported on different time periods
  - missing data

Implications for Research

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

Implications for 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 infant health in their communities
- Additional PHSSR studies needed to assess effects of cuts in spending, staffing and services on health outcomes

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