Building Maine’s Capacity to Apply GIS Methods to State & Local Data for Chronic Disease Program Planning, Implementation, & Evaluation

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Acknowledgments

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  - Nathan Morse
  - Troy Fullmer

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Overview

- Training Program and Maine’s Approach
- Our Projects
- Since the Training and Where We’re Headed
- Things We Learned
Training Program & Maine’s Approach
Opportunity

- NACDD released an RFA to states and some local health departments for “GIS Training for Surveillance of Heart Disease, Stroke and Other Chronic Diseases” (Jan 2011)
- Maine put together a team, submitted an application, and was one of 5 states selected for the 2011 training
  - Idaho, Indiana, Maine, Louisiana, New York
  - Two local health agencies in Michigan and Montana also selected

(NACDD = National Association of Chronic Disease Directors)
Integrate the use of GIS approaches into the daily operations of state health departments, in order to meet existing priorities for prevention of heart disease, stroke and other chronic diseases.
GIS Surveillance for Heart Disease, Stroke and Other Chronic Diseases

GIS Projects:
- Document the burden
- Inform policy and programs
- Facilitate external partnerships
- Enhance agency collaboration

CEHI Duke University

CDC DHDSP
NACDD
CEHI Duke University

Health Departments

Build capacity for Geographic Information Systems (GIS) Surveillance

Improve heart disease and stroke and other chronic disease surveillance programs through GIS capacity
Connecting GIS Efforts to Program Priorities

- Document the burden of heart disease, stroke and other chronic diseases
- Inform policy and program decisions
- Facilitate partnerships with external agencies
- Enhance collaboration within each agency
Phase I: Two (2) states; Teams from Colorado and Michigan received eight (8) GIS training modules over a period of twenty-four (24) months.

Phase II: Six (6) states; received three (3) GIS training modules over a period of six (6) months. Phase II teams included: Arkansas; Massachusetts; Montana; Minnesota; North Carolina; and Utah.

Phase III: Two (2) local* and five (5) state health departments will receive three (3) GIS training modules over a period of six (6) months. Phase III teams include: Delta-Menominee, MI; Idaho; Indiana; Louisiana; Maine; New York; and Riverstone, MT.

*Local health departments eligible for participation must come from a state that has participated in either Phase I or Phase II.
Training Approach

- Team based
- Needs assessment informed
- Multiple support strategies used
- Project driven
Training Structure and Content

GIS I: May, 2011
GIS II: July, 2001
GIS III: Oct, 2011

3-day trainings
At Duke University
Technical Support

• Virtual and Live access to GIS analysts at Duke University

• Weekly Office hours for special topics and participant generated issues

• Project portal for document and data sharing
Maine’s GIS Training Team

- **Purposeful decision to create a team made up of both epidemiologists and program staff**
  - Really want to integrate GIS thinking and work into day to day operations of the Cardiovascular Health Program and eventually into Chronic Disease Programs

- **Team:**
  - David Pied, Public Health Educator, Cardiovascular Health (Team Lead)
  - Holly Richards, Cardiovascular Health Program Coordinator
  - Nathan Morse, Diabetes Program Coordinator
  - Sara Huston, Lead Chronic Disease Epidemiologist
  - Troy Fullmer, Diabetes and Cardiovascular Health Program Manager

- **Some changes in Team and Team lead over time**
Maine’s Priorities for the Training Project

- Build GIS infrastructure to support our Maine CVH Program priority areas
  - Maps to document burden (CVD mortality, risk factors, etc.)
  - Master Blood Pressure Trainer Program
- Use GIS to enhance our chronic disease integration efforts
  - Diabetes Self-Management Programs
  - Tobacco
  - Healthy Maine Partnerships
  - Coordinated Chronic Disease
- Get GIS incorporated into the work of the Division of Chronic Disease (now the Division of Population Health)
Getting our Feet Wet

Our First Maps – homework between Training Session I and II
GIS Projects

Documenting the Burden: Maps to Produce and Use Prior to the GIS Training in July 2011

Mortality Data

Main Map:
Heart Disease, Total Population, age-adjusted death rates, all ages, 2003-2007.

Sub-categories (choose 2):
- By Gender
- By Race/Ethnicity
- By Age Group
- By Time Period

Hospitalization Data

Main Map:
Heart Disease, Total Population, age-adjusted hospitalization rates, all ages, 2003-2007.

Sub-categories (choose 2):
- By Gender
- By Race/Ethnicity
- By Age Group
- By Time Period

Social Environment Data

Main Variables:
- Poverty
- Persistent Poverty

Optional Required

Main Map:
Coronary Heart Disease, Total Population, age-adjusted death rates, all ages, 2003-2007.

Sub-categories (choose 2):
- By Gender
- By Race/Ethnicity
- By Age Group
- By Time Period

Main Map:
Other Chronic Disease Condition, Total Population, age-adjusted death rates, all ages, 2003-2007.

Sub-categories (choose 2):
- By Gender
- By Race/Ethnicity
- By Age Group
- By Time Period

Main Map:
Coronary Heart Disease, Total Population, age-adjusted hospitalization rates, all ages, 2003-2007.

Sub-categories (choose 2):
- By Gender
- By Race/Ethnicity
- By Age Group
- By Time Period

Main Map:
Other Chronic Disease Condition, Total Population, age-adjusted hospitalization rates, all ages, 2003-2007.

Sub-categories (choose 2):
- By Gender
- By Race/Ethnicity
- By Age Group
- By Time Period

Choose 2:
- Median Home Value
- Education
- % White-Collar Workers
- Urban-Rural
- Other socio-demographic variables
Division of Labor

- For these first maps, the epidemiologist on the team put most of the data together in a format ready to be opened in ArcGIS and joined with county shape files.
- Everyone on the team made maps!
- All the maps were slightly different in choice of colors, level of technical notes/detail, etc.
  - We did this on purpose, to see what ideas we would come up with.
Diabetes Deaths in Maine for ages < 65

Heart Disease Mortality Rate by Maine Counties
Age-Adjusted 2003-2007

Mortality Rates per 100,000

- 144.4
- 144.5 - 171.5
- 171.6 - 187.7
- 187.8 - 210.1

Maine Diabetes death rate for ages less than <65 y/o Per 100,000 2004-2009
- 0.0
- 0.1 - 15.7
- 15.8 - 25.4
- 25.5 - 42.7
Heart Disease Hospitalization Rates by County of Residence among Females and Males, Maine, 2005-2009

These maps illustrate that hospitalization rates among Maine males and females have similar geographic patterns. While males have higher rates than females in general, both Maine males and females living in northern and eastern counties have higher hospitalization rates compared to their counterparts living in the southernmost counties. The three categories for each sex were created using the ArcMap natural breaks method.

GIS Advisory Group

- We formed a larger GIS Advisory Group to
  - provide input on what projects to take on initially and
  - Provide feedback on maps
  - Made up of folks through the Maine CDC with some GIS expertise and also those in the Division with an interest in GIS work

- We met before the second training in July
  - Had a map gallery with all the maps we had prepared
  - People really got into talking about the maps, making suggestions for improving them, and suggestions for new things to map
  - David brought ice cream sandwiches…
Jumping Into Projects

Taking it the next step: projects between training session II & III
Jumping into the Deep End!

- Program staff on the team started working with their own data
  - Gained a new respect for how difficult it can be to get the data you want, and in the right format
  - Started learning more details about surveillance data
- Developing a map template
  - We all started using it, so our maps would have a similar look
- Wrestling with Maine geographic layers (ongoing!)
  - “Bloppiness” of Maine coast in many shape files
  - Developing set of layers for political and public health areas: county, town, public health district, Healthy Maine Partnership (HMP) areas
- Developing some more complicated maps
Maps Addressing CVH Program Priority Areas

Documenting Burden and the Master Blood Pressure Trainers
Stroke Death Rates by County and Time Period, Maine

1999-2003
Maine: 55.7
Sagadahoc: 63.4

2000-2004
Maine: 53.7
Sagadahoc: 68.3

2001-2005
Maine: 50.9
Sagadahoc: 68.2

2002-2006
Maine: 48.2
Sagadahoc: 76.4

2003-2007
Maine: 45.4
Sagadahoc: 80.2

This map illustrates changes over time in stroke death rates by Maine county and attempts to answer the question of whether all Maine counties have experienced the decline in stroke death rates seen at the state level. The Maine overall stroke death rate declined from 55.7 in 1999-2003 to 45.4 in 2003-2007, which is consistent with national trends. Most Maine counties also experienced substantial declines in stroke death rates over this time. One notable exception is the small coastal county of Sagadahoc, where death rates were in the highest quartile in each time period and increased from 63.4 in 1999-2003 to 80.2 in 2003-2007. The reason for these high stroke death rates is unknown and warrants further exploration. The four categories of stroke death rates are quartiles based upon the distribution of stroke death rates across the 16 counties over the five time periods.

Stroke Mortality Rates per 100,000 age-adjusted to the year 2000 U.S. standard population. ICD-10: I60-I64, underlying cause.
Data Source: Compressed Mortality Data, CDC Wonder.
Map Created: 10/8/2011 Name: Sara L. Hulston
Why we chose this project
- A project CVH works on directly
- Inform Program Development
- Focus on ABCSS

Getting started
- Connecting with MBPT leader
- What makes sense to map
- Data, what data?
- Geocoding locations
Maps to Enhance Integration Efforts

Tobacco, Diabetes Self-Management, Chronic Disease Integrated Data
Why we chose this project?
- Strong collaboration between Maine CVH and Diabetes Program
- Inform Program Development

Getting started
- Geocoding sites
- What makes sense to map?

Next Steps
- Overlaying on diabetes prevalence
- Uses for program planning – are there areas that need DSME sites that don’t have them?
Getting Closer to our Friends in Tobacco Prevention

- Why we chose this project?
  - Facilitate collaboration within Division
  - Connection to ABCSS of cardiovascular disease prevention (Aspirin, Blood Pressure, Cholesterol, Smoking, Sodium)

- Getting started
  - Meetings with Tobacco Program & Partners
  - Areas to map: Smoking Rates, Tobacco Helpline, Cessation Specialist, Smoke Free Hospitals…
  - Getting the data – Good luck
Data old but available

Uses ~ who knew?

Next steps
Data ~ not pretty

Uses

Next Steps
Chronic Disease Rates by Public Health District, Maine

Overall Score for 5 Chronic Diseases

*Overall Score is determined by the number of times (shown in parentheses in the legend) the district falls into the highest or 2nd highest quartile for each of the five chronic diseases shown.

All rates are age-adjusted to the year 2000 U.S. standard population. Cancer rates are incidence rates, all others are hospital discharge rates. Hospitalization rates use principal diagnosis only.

Data Sources: Maine Cancer Registry; Maine Inpatient Database.

Analysts: Santosh Nazare; Alison Green-Parsons.
The HMP Map

- Maine’s political boundaries:
  - Town
  - County
- Maine’s public health boundaries:
  - Public Health District (based on county)
  - Healthy Maine Partnerships (based on towns)
- Need to be able to map at all levels and have the shape files “line up”
- Map to the right was created graphically, not through GIS
Second Advisory Group Meeting

- Met just before the third training
- Shared these project maps we had just developed and got feedback
- Discussed forming a Maine CDC GIS user’s group
  - There had been one in Maine CDC some years ago
  - A lot of interest in getting one going again
- David brought apples....
Since the Training Ended and Where We’re Headed

- GIS Advisory Team Metamorphosis
  - Maine CDC GIS Users Group formed
- Map making sessions
  - Revisiting and polishing the simple burden maps we started with
  - Refining our “project” maps
  - Broadening our team to include chronic dx epis hired since
- Increasing Use of the Maps for Planning, Implementation, Evaluation
  - The maps are not an end product in themselves! Like surveillance, they must be used.
  - Sharing work more widely with Division and Partners
- A New Mission!
  - Maine Chronic Disease Atlas
- No more trainings! 😞
  - But we have great friends at CEHI who will still help when we have questions
  - We think they should have an “alumni” session!
Success! The HMP and Town Maps

- November 2011 successfully created shape files for more geographic levels
  - State, county, public health district, towns, Healthy Maine Partnerships
  - “linked” to each other, showing the relationships between each
- Opened up more levels of mapping projects
Local Healthy Maine Partnerships

Aroostook District
1. Healthy Aroostook
2. Power of Prevention

Central District
3. Greater Somerset Public Health Collaborative
4. Greater Waterville PATCH
5. Healthy Communities of the Capital Area
6. Healthy Sebasticook Valley

Cumberland District
7. Healthy Casco Bay
8. Healthy Portland
9. Healthy Rivers
10. Healthy Lakes

Downeast District
11. Healthy Acadia
12. Washington County: One Community

Midcoast District
13. ACCESS Health
14. Healthy Lincoln County
15. Healthy Waldo County
16. Knox County Community Health Coalition

Penquis District
17. Bangor Region Public Health and Wellness
18. Partnership for a Healthy Northern Penobscot
19. Piscataquis Public Health Council

Western District
20. Healthy Androscoggin
21. Healthy Community Coalition
22. Healthy Oxford Hills
23. River Valley Healthy Community Coalition

York District
24. Choose To Be Healthy
25. Coastal Healthy Community Coalition
26. Partners for Healthier Communities
What We Learned

- Some of our data wasn’t as good as we assumed it was
  - Taking steps to improve collection of information where we can
- It’s hard to find time to devote to learning GIS
  - We would often forget how to do little things
  - We scheduled a 1.5 hour bi-weekly session to work on our maps together and help each other out as we got stuck – very helpful but hard to sustain
- Maps seem to create more questions than they answer!
  - And they are powerful communication tools
- Having a GIS team made up of both program staff and epidemiologists has a lot of benefits
  - Program staff often have connections to unique data, may think of ideas epi staff would not
  - Program staff gain a new understanding of “data”
  - There is so much to map that epi staff probably can’t do it all!
  - The only way to really get GIS work integrated throughout chronic disease efforts
- Maps are never really finished!
- Bring good snacks…
Welcome!
This site is designed for public health managers, community leaders, GIS users, epidemiologists, and others interested in using GIS to prevent heart disease, stroke, and other chronic diseases.

The intent is to provide a forum for sharing specific examples, ideas, and techniques for using GIS to document geographic disparities, inform policy and program development, and build partnerships, thereby contributing in a powerful way to prevent heart disease, stroke, and other chronic diseases.

View maps that make an impact
View innovative maps designed to address the burden of heart disease, stroke, and other chronic diseases, and learn about the data sources and GIS techniques used to produce the maps.

Learn how to make maps
Learn new GIS techniques via on-line training modules that use chronic disease data for examples.

Explore GIS Resources
View a list of useful data, map making, and GIS software resources.

Learn more about the site »

http://www.cdc.gov/dhdsp/maps/gisx/
Contact Info

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- Chronic Disease GIS Exchange:
  http://www.cdc.gov/dhdsp/maps/gisx