Mapping Community Profiles:

A Data Development Project to Support the Massachusetts Healthy Families Evaluation II: Program / Community Substudy

healthy families children's trust fund

Caroline Campbell, MPP 2007
Urban and Environmental Policy and Planning
Intro GIS: UEP 232 / ENV 193
Spring 2007

Tufts UNIVERSITY

MHFE II is a Tufts University research project sponsored by the Eliot-Pearson Department of Child Development and the Department of Urban and Environmental Policy and Planning. The research team includes faculty members and co-principal investigators Jayanthi Mistry, Ph.D., M. Ann Easterbrooks, Ph.D., and Francine Jacobs, Ed.D., project manager Jess Goldberg, project coordinator Meg Brady, senior research associate Anne Brady, and several graduate student research associates. My work on this project is through a directed study, advised by Francine Jacobs.

Objective: To collect, organize and start to analyze data that will be used in GIS to assist the second phase of the MHFE

Program Quality Score: MHFE I Study Participants
Average Z Score
- -2.35 - -2.13
- -2.12 - -1.12
- -1.11 - -0.21
- -0.20 - 0.00
- 0.01 - 2.33

Procedure:

The majority of effort with this project focused on data development. Based on MHFE II's theoretical frameworks, and on theoretical and practice-based information about indicators to measure community contexts, I researched and developed data in several areas. These include: Public Health, Safety and Environmental Risks; Human Capital; Social Capital; Socio-Economic Stratification; and Community Resources — infrastructure, services, recreational and cultural facilities, etc. Critical to the process was collecting and organizing data from this wide array of sources that meet important criteria for GIS and MHFE II use. These criteria include:

- Extant, publicly available, tabular data (or easily made tabular)
- Available at appropriate level (municipal, Census block, community-level, etc.)
- Available for appropriate time frame
- Related to theoretical frameworks of MHFE II Substudy

Data Development

A. Collect, sort and download information from SPSS, Excel and PDF files. Create DBF IV data files and 'clean' information— re-name and organize database fields

B. Geocode and address-match participants using StreetMap USA as Address Locator. Interactively map ~ 20% of misses

C. Create layer files for eight program 'catchment' areas

D. Create layer files for participant data

E. Join tabular data from MassGIS Census tables to catchment area polygon layers at the Census Block Group level

F. Join point data from participant layer to joined catchment area and Census layer

G. Add new fields and calculate values for variables

GIS Functions Applied in Cartography

- Select by location
- Select by attribute
- Merge
- Join
- Clip
- Union

Next Steps:

The intensity of data collection and organization precluded a deeper level of spatial analysis for this project. The challenges of obtaining useable data at the desired geographic level necessitate further decision-making regarding aspects of communities to incorporate into the analysis...and some further collection to confirm usability for MHFE II as it builds its study and collects primary data about HFM over the next several years. The MHFE SPSS database has a wealth of information that is organized effectively for statistical analyses, however, a system to ensure that the data is useful in GIS analyses will need to be developed.
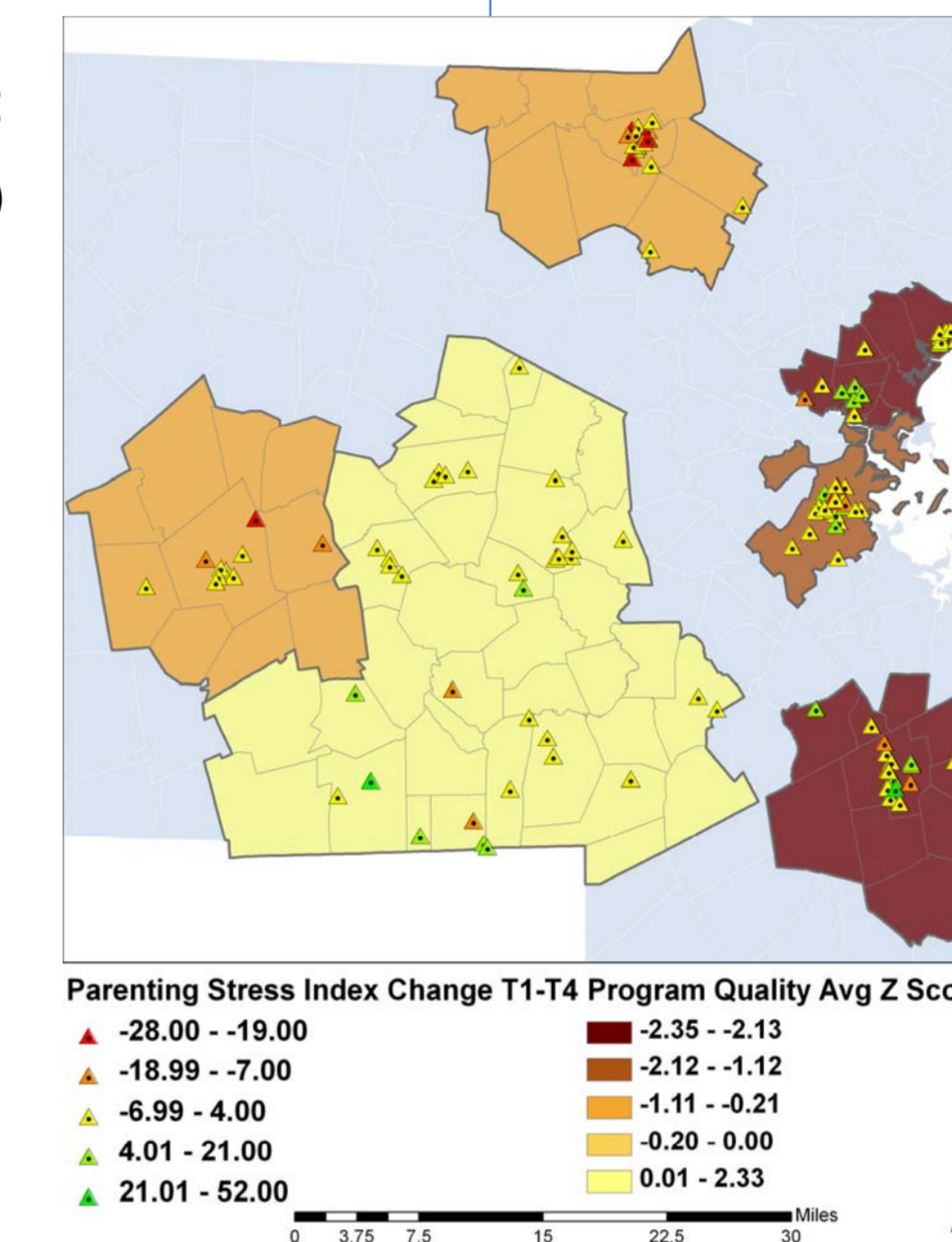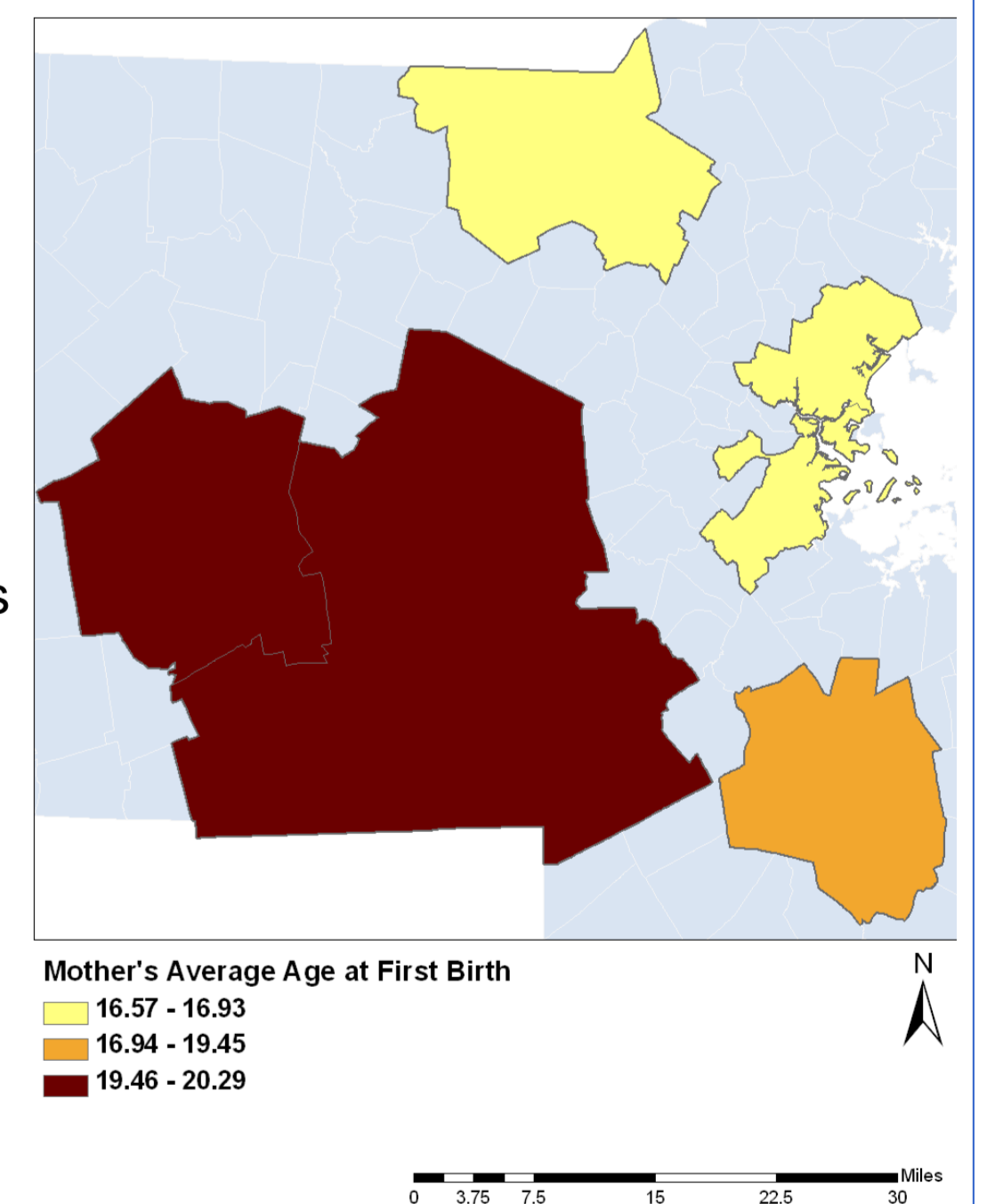
Once those decisions and actions are taken, there is great opportunity to spatially analyze qualitative and quantitative MHFE II and community context data using GIS. Such analyses may help to identify possible correlations between characteristics of participants, the program and community contexts. The following GIS functions will be useful to generate community profiles that incorporate various levels of integrated analyses.

- Proximity analysis — to measure spatial patterns between various features such as hazardous waste sites, and other environmental and public health hazard location points, "as the crow flies"

- Network analysis — to map networks of roads and routes around particular points (libraries, health centers, day care centers, the Healthy Families program, grocery stores, etc.) to identify access and barriers to those resources within a particular walkable distance, or in relation to hot spots of crime

- Spatial analysis — to map and overlay densities of particular risks and assets in communities and among populations

Parenting Stress Index Change T1-T4
- -28.00 - -19.00
- -18.99 - -7.00
- -6.99 - 4.00
- 4.01 - 21.00
- 21.01 - 52.00

Program Quality Avg Z Score
- -2.35 - -2.13
- -2.12 - -1.12
- -1.11 - -0.21
- -0.20 - 0.00
- 0.01 - 2.33

Overview:

The second phase of the Massachusetts Healthy Families Evaluation (MHFE II) is an investigation of Healthy Families Massachusetts (HFM), which provides long-term home visiting services throughout Massachusetts for first-time parents, ages 20 and younger. The goals of Healthy Families Massachusetts are to:

1. Prevent child abuse and neglect by promoting positive parenting environments
2. Achieve optimal health, growth, and development in infancy and early childhood
3. Encourage educational attainment and economic self-sufficiency among parents
4. Prevent repeat pregnancies during the teen years

MHFE II is a follow-up to the first evaluation, which conducted a multi-tiered study focused on three components: Process Study (to understand how the program works), Outcome Study (to determine to what extent and how the program achieves its goals), and Ethnographic Study (to understand in what ways ethnographic characteristics play a role in the program).

Among the results are that the program has varying degrees of quality (as measured by its fidelity to the model, characteristics of agency and staff, and demographics, etc.). In the map above, the overall Program Quality for the eight catchment areas of MHFE II is depicted with average z scores.

Participants, likewise have varying levels of outcomes. The key questions for MHFE II and its Program / Community Substudy are:

- Do particular programs in particular communities "work" in certain ways? Can we identify certain program/community profiles?
- Do participants from these programs/communities use HFM differently? Do these participants have different outcomes?
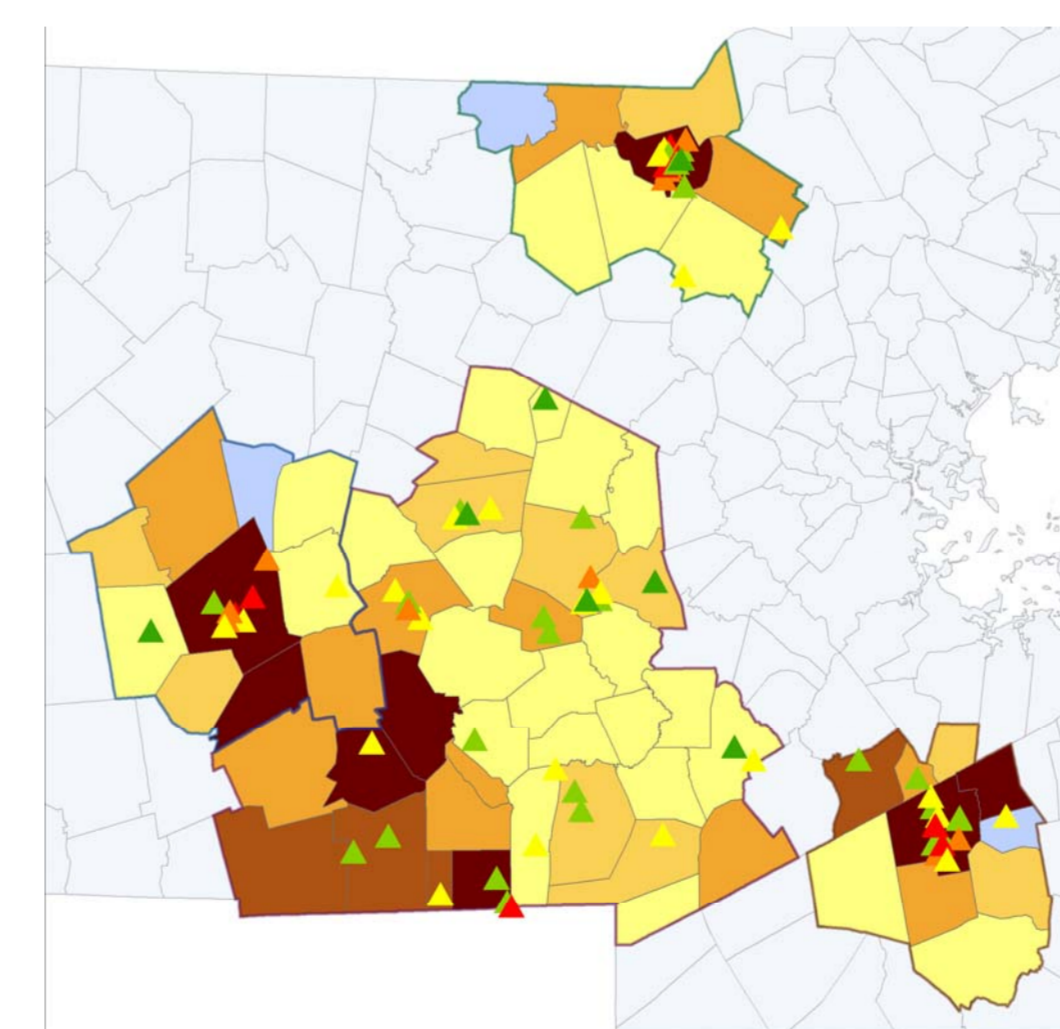
My goal with this project was to collect data and start the process of determining how to generate community profiles that will effectively assist the research team in capturing information. Ideally, this information will help the MHFE II team identify to what extent particular characteristics of clients, programs, and communities moderate the attainment of HFM goals and objectives.

Socioeconomic Indicators	
County	Worcester
Total Population	26,799
Median Household Income	$50,856
Household Count	10,420
Per Capita Income	$23,742
Unemployment Number	886
Unemployment Rate	5.9%

Population Distribution (%)
- 0-4
- 5-14
- 15-17
- 18-44
- 45-64
- 65+

Indicators of Need for Family Literacy Services	
Public High School Dropout Count	25
Public High School Dropout Percent	2.3%
Projected 4 Year Dropout Rate	9%
Adult High School Non-completers 18 and Older Count	3,385
Adult High School Non-completers 18 and Older Percent	16.74%
Adults 18 and Older with Limited English Proficiency Count	818
Adults 18 and Older with Limited English Proficiency Percent	4.05%

Indicators of Need for Family Support Services	
Children Under 18 Below Poverty Level Count	617
Children Under 18 Below Poverty Level Percent	9.37%
Female Head of Household with Own Children Under 18 Count	618
Female Head of Household with Own Children Under 18 Percent	5.93%
Teen Births Under 20 Count	19
Teen Births Under 20 Percent	4.9%

Data Sources:
U.S. Census 2000, Mass. Division of Employment and Training 2002, Mass. Department of Education 2000, Mass. Department of Public Health 2001

Participants' Neighborhood Scores Layered on Crime Rates by Municipality

Neighborhood Score T1
Scale of 1-20
- 3 - 6
- 7 - 10
- 11 - 14
- 15 - 17
- 18 - 20

Rates of Violent Crime
Per 100,000 Population
- 0 - 100
- 101 - 200
- 201 - 375
- 376 - 600
- 601 - 1056

The tables to the left are taken from the Massachusetts Department of Education website. This is an example of data that DOE has in tabular format, and that is very useful for this project.

Challenges:

➤ Data collection at the right level and in the right format!

Mother's Average Age at First Birth
- 16.57 - 16.93
- 16.94 - 19.45
- 19.46 - 20.29

Through this process, and with the assistance of the MHFE research team, I have collected and whittled down from hundreds of measurements a more manageable set of theoretically, empirically and professionally accepted indicators. Being able to find data to support investigation of those indicators remains a challenge given the complexity of the MHFE research questions.

Data Sources:

MHFE Participant Data System (PDS), MassGIS, U.S. Bureau of Census, Massachusetts Department of Education, National Center for Education Statistics, National Center for Health Statistics, Massachusetts Community Health Information Profile (MassCHIP), Harvard School of Public Health's Diversitydata.org, MassVote, Annie E. Casey Foundation's KIDS COUNT, Scorecard: The Pollution Information Site, Environmental Protection Agency, National Low-Income Housing Coalition's "Out of Reach" Data, Citizens for Tax Justice, Bureau of Labor Statistics, Boston Foundation Indicators Project, Sustainable Measures