

RENCI@ East Carolina University
Department of Public Health at Brody School of Medicine
Coastal Impact Public Health: At-Risk Populations (PHS)

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Project Aspect Discussion Points

- **Determination & Enrollment of Medically Fragile Individuals by Physicians**
- **Mapping of Potentially Vulnerable Populations in Storm Surge**
- **Justification for use of Community Outreach for Registry Enrollment**

Definition of the Medically Fragile (cont.):

Three Priority Levels

Level 1 (High Priority)

Patient requires uninterrupted health care

Medical services required within 24 hours

Level 2 (Moderate Priority)

Patient requires medical services within 48 hours

Level 3 (Lower Priority)

Patient requires medical services within 1 week

Delimiting Populations Vulnerable to Storm Surge

The Problem:

1. Develop an emergency management registry for the medically fragile
2. Determine the magnitude and scope of the registry population

Identify the Vulnerable:

1. Medically Fragile: determination based on literature review (8%)
2. Ages 65+ and 75+ years
3. Other groups (poverty, race, etc.), social vulnerability index (SoVI)

Event Example:

1. A slow moving hurricane: category 4/5

Definition of the Medically Fragile¹:

Insulin Diabetes Calculation

(National Diabetes Information Clearinghouse of National Institute of Diabetes and Digestive and Kidney Diseases)

Estimated **1.96%--in ENC 49,153**

Chronic Obstructive Pulmonary Disease (COPD) Calculation

(National Health Interview Surveys)

Estimated **3.89%--in ENC 97,484**

Long-term Treatment Calculation (LTOT) Calculation

(National Health Interview Surveys)

Estimated **0.33%--in ENC 8,377**

Definition of the Medically Fragile¹ (cont.):

End-Stage Renal Disease (ESRD) Calculation

(Annual Data Report of the National Renal Data System)

Estimated **0.14%--in ENC 3,511**

Congestive Heart Failure Calculation

(National Health and Nutrition Examination Survey)

Estimated **1.76%--in ENC 44,138**

Estimated 8%--in ENC 202,663 using 2,507,844 as base ENC population²

¹Appendix 1 from RENC Coastal Impact on Public Health: At Risk Populations
Regional Special Medical Needs Registry Proposal for Eastern North Carolina (12-18-07)

²US Census American FactFinder

Method

Clipping census populations using a “surge map” layer and interpolating affected populations where the surge layer intersects census geography.

Spatial Interpolation

- 1. **areal weighting** (proportion of area × population)
- 2. **surface smoothing** (algorithms that assume a continuous surface)
- 3. **dasymetric** (use of ancillary data, imagery, land classification, etc.)

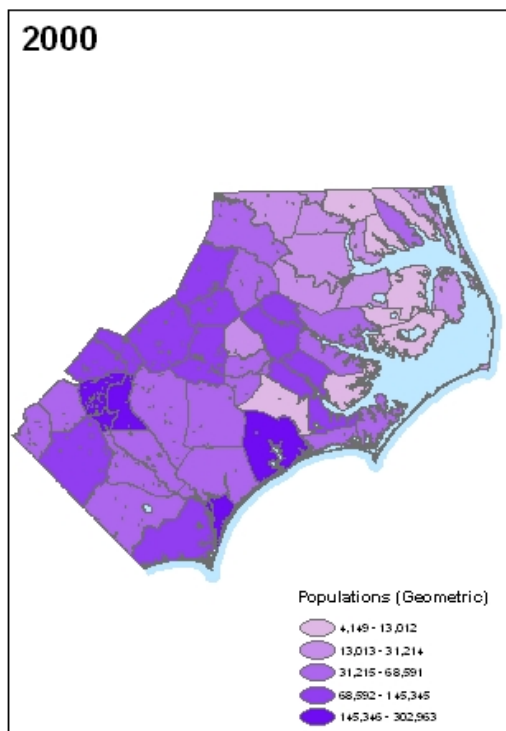
Updating Populations

Extrapolated 2006 county level populations down through the census geography hierarchy using population (total and age group) proportions of one level to the next:

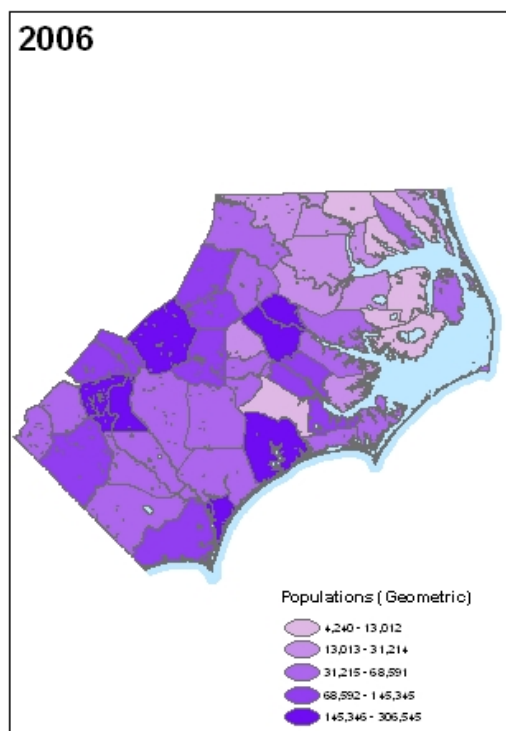
County → Census Tract → Block Group → Block

Assumption: Growth/decline of county populations is continuous and replicated throughout the census hierarchy.

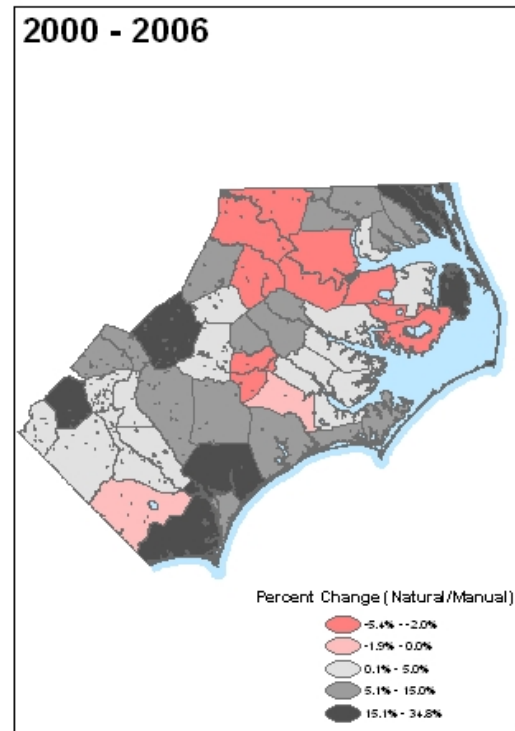
Eastern North Carolina Counties: Population Change 2000 to 2006 Total Population



ENC Population: 2,389,287

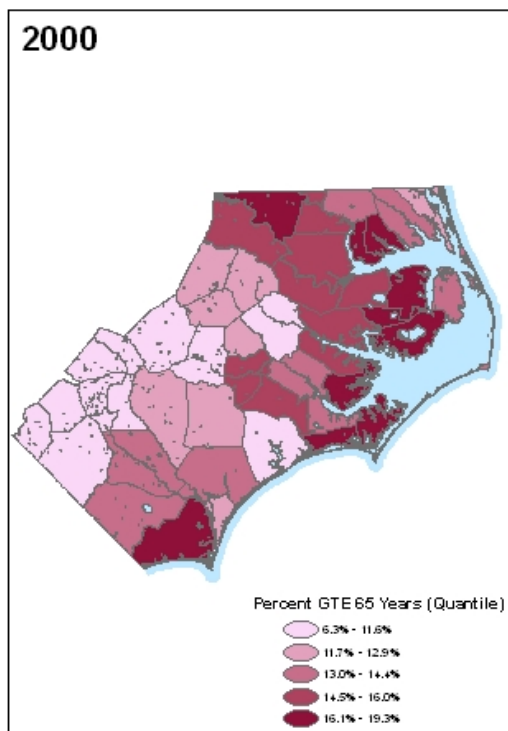


ENC Population: 2,568,962

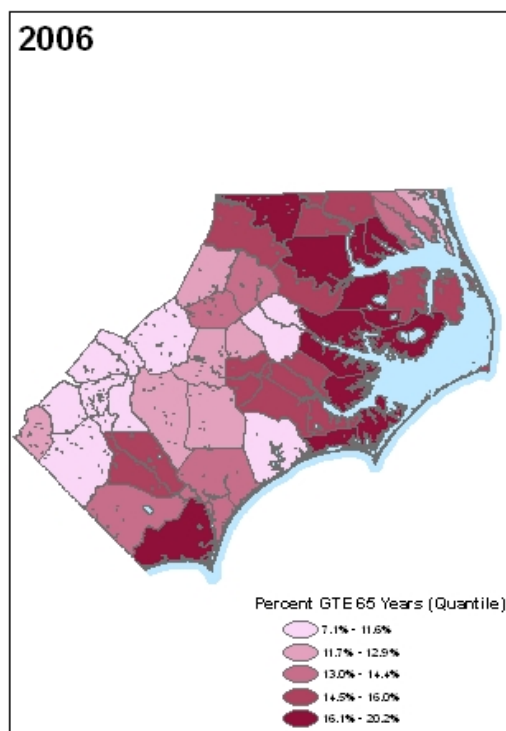


ENC Population Change: 179,675 (+7.5%)

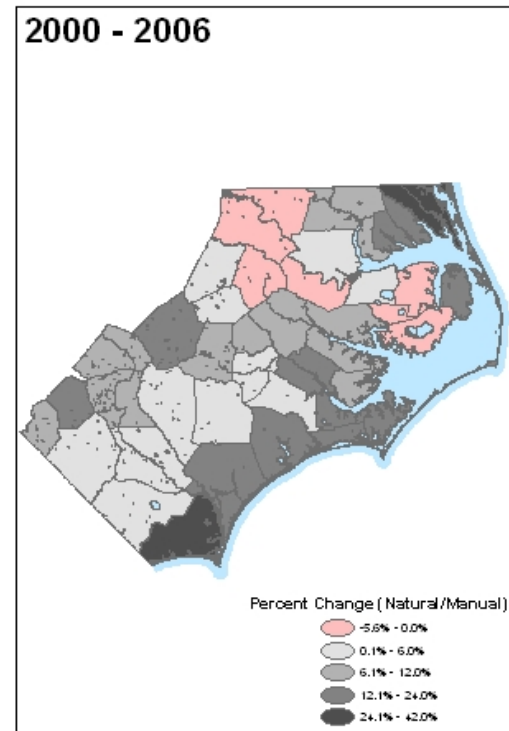
Eastern North Carolina Counties: Population Change 2000 to 2006 Percent of County Populations 65 Years and Older



ENC Population GTE 65: 281,381 (11.8%)

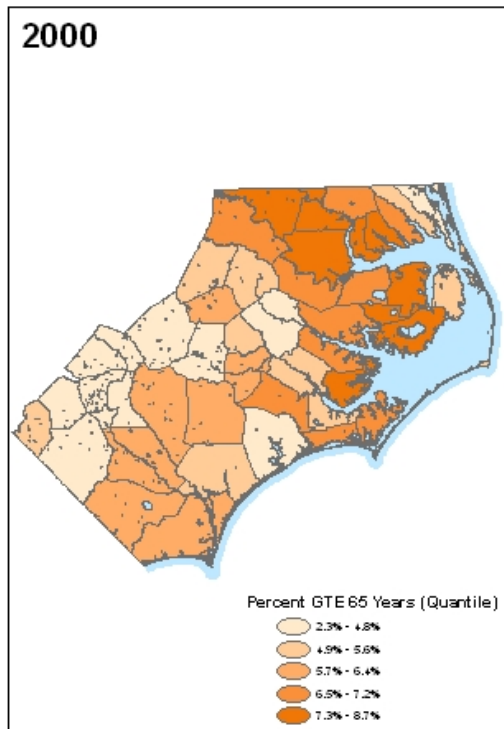


ENC Population GTE 65: 311,176 (12.1%)

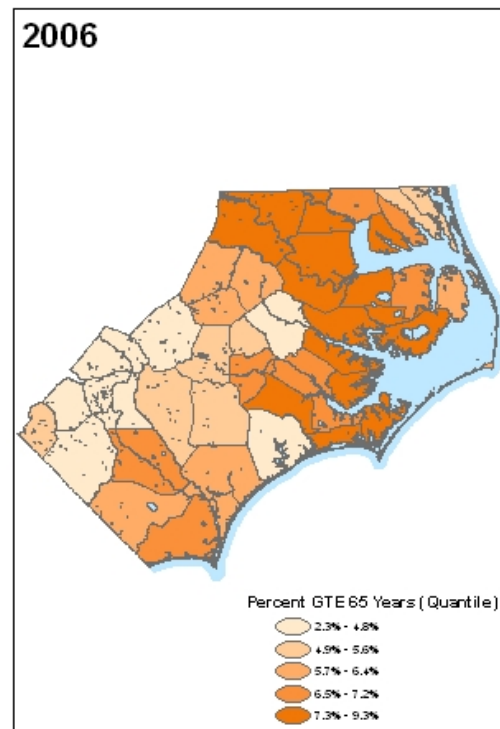


ENC Pop. GTE 65 Change: 29,795 (+10.6%)

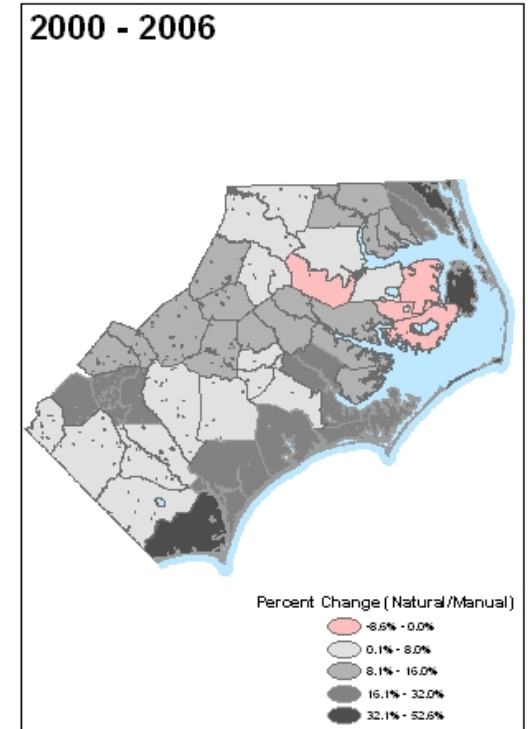
Eastern North Carolina Counties: Population Change 2000 to 2006 Percent of County Populations 75 Years and Older



ENC Population GTE 75: 120,066 (5.0%)



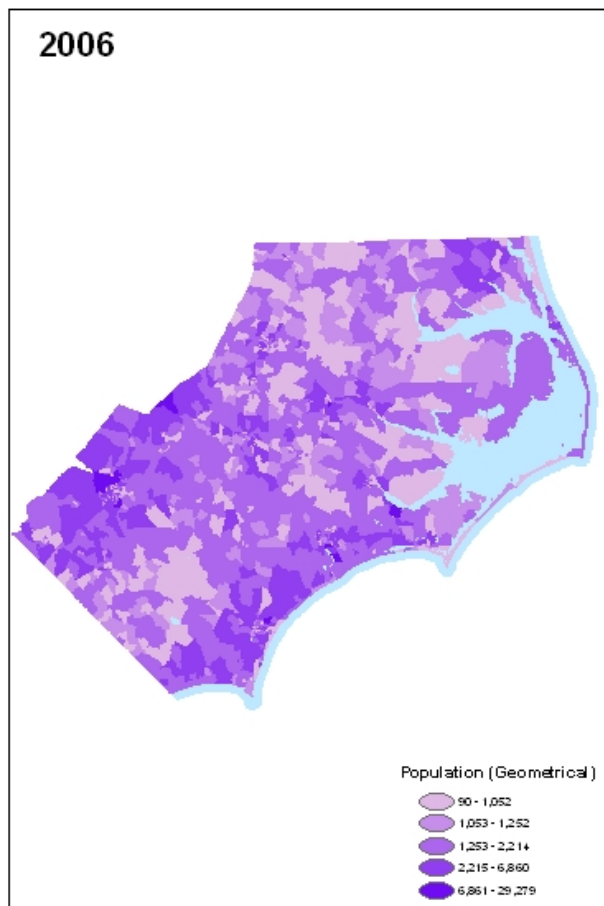
ENC Population GTE 75: 137,568 (5.4%)



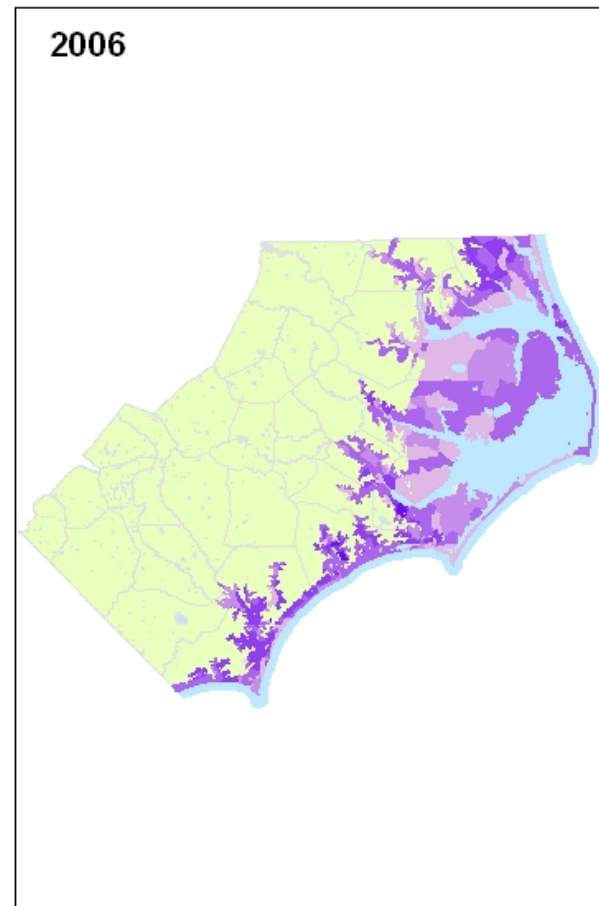
ENC Pop. GTE 75 Change: 17,502 (+7.5%)

**Estimating the Medically Fragile Population
in Eastern North Carolina Affected by a Surge Zone Produced by a
Slow Moving Category 4/5 Hurricane**

Eastern North Carolina Counties: Medically Fragile (0.08) Block Group Populations Affected by a Storm Surge Generated by a Slow Moving Category 4 or 5 Hurricane

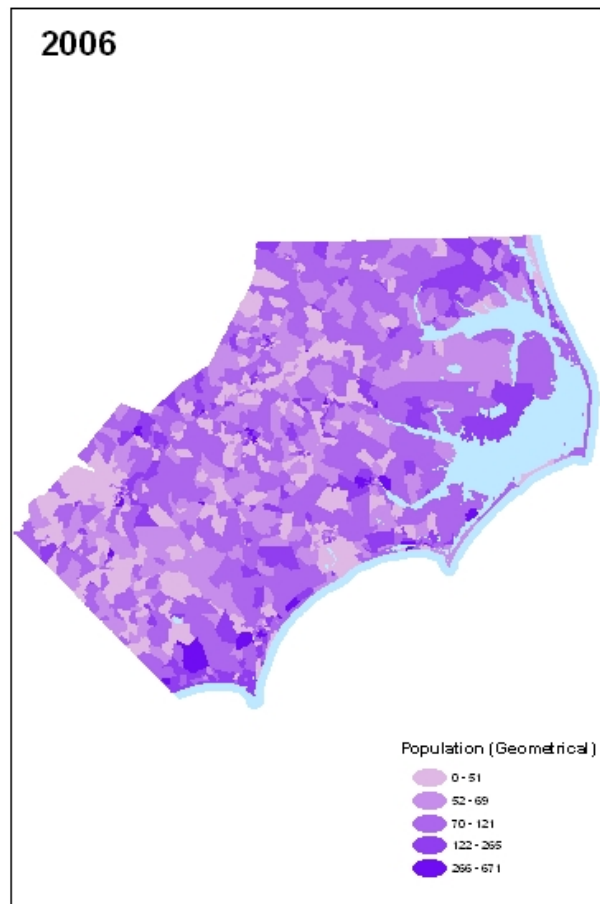


ENC Population: 2,568,962
ENC Population Medically Fragile (0.08): 205,517

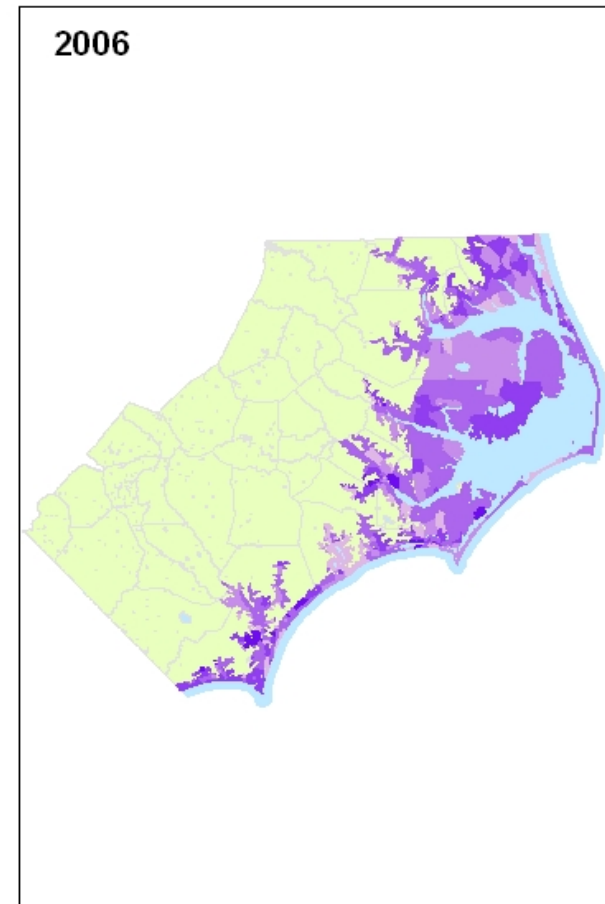


Surge Affected ENC Population: 398,169
Surge Affected ENC Medically Fragile (0.08): 31,853

Eastern North Carolina Counties: Block Group Populations Age 75 Years and Older Affected by a Storm Surge Generated by a Slow Moving Category 4 or 5 Hurricane



ENC Population: 2,568,962
ENC Population 75+: 137,568



Surge Affected Total ENC Population: 398,169
Surge Affected ENC Population 75+: 26,731

ENC Vulnerable Populations for 2006 (Slow Moving Hurricane Cat. 4/5)

Census Unit	Medically Fragile (0.08)		Population 65+		Population 75 +	
	No Fractions ¹	Fractions ²	No Fractions	Fractions	No Fractions	Fractions
County n = 25	92,446	28,194	156,728	52,452	69,030	23,117
Census Tract n = 154	75,761	30,128	132,323	56,810	57,386	24,494
Block Group n = 490	66,014	31,853	114,464	62,185	49,317	26,731
Block n = 17,972	48,747	30,806	88,132	61,654	37,918	26,514

¹The entire population of the census unit intersected by the surge zone is included—no areal weighting is used.

²Areal weighting is used in calculating the population of the census unit intersected

Results

Using smaller census units provide closer estimates of the actual geographic distribution of population.

Delimited/reduced medically fragile (0.08) population from 200,000+ in ENC (41 county) to 32,000 in ENC's storm surge affected zone.

Delimited/reduced elderly 75+ years population from 137,000+ in ENC (41 county) to almost 27,000 in ENC's storm surge affected zone.

Analysis at higher spatial resolutions shows that population age groups are not distributed uniformly throughout ENC. For example, the age group 75+ years represents 15.5% of ENC's total population, but within the region's storm surge zone they represent 19.4% of the zone's population—a 25% increase in the geographic concentration of this group.

Determines an approximate target size for populating a registry for the vulnerable and medically fragile.

Two Demonstration Practices

Federally-Qualified Health Center/Local Health Department

Jones County Health Department, Trenton, NC

Kristen Hoover, MPH, Health Director

Private Primary Care Practice

Medical Park Family Physicians, Greenville, NC

Dr. Wilton Gay, Jr.

Dr. Lara Surles

Practice Demonstration Summary

	Jones County Health Department	Medical Park Family Physicians
Total Number of Patients Seen By Physician	65	156
Age Range	1.5 to 74 years Median= 30 Mean= 31	11 to 94 years Median= 64 Mean= 62
Number & Percent Deemed Medically Fragile by Physician	5 (8%)	110 (71%)
Number & Percent of Patients Who Self- Registered	19 (29%)	36 (23%)

Conclusion and Discussion

Percent patient population categorized as medically fragile by physician correlates with the mapping hypothesis that the very aged population (≥ 75 years) comprises the largest medically fragile population.

The increasing uninsured population often lacks a medical home precluding physician enrollment. This population is disproportionately comprised of ethnic minorities.

Use of lay health advisors and faith-based approaches have demonstrated effective mechanisms for engaging minority populations.

In a 2008 survey to all North Carolina public health departments, **73 out of 84(87%)** responded. **25 (43.9%)** health departments use Faith-Based Interventions to address disaster preparedness.

Discussion(cont.)

Outreach efforts at the local level are essential for the continued identification and enrollment of the medically fragile population in eastern North Carolina and beyond.

We must continue to identify and implement multichannel mechanisms for ensuring the safety and treatment of the medically and economically vulnerable.