Sea Level Rise and Health Effects: 
Current Initiatives in SE Florida

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Grant Steering Committee Member
Presentation

I. CDC Climate Change/Health Effects

II. Regional Climate Action Plan Health Impact Assessment (HIA)-Broward County

III. Kresge Foundation Project
   – Florida Atlantic University
   – South Florida Regional Planning Council

IV. Health Effects Focus Area
   – Monroe County
Part I

Centers for Disease Control
Climate Change/Health Effects
CDC-11 Health Effects due to Climate Change

- Asthma, Respiratory Allergies, and Airway Diseases
- Cancer
- Cardiovascular Disease and Stroke
- Foodborne Diseases and Nutrition
- Heat-Related Morbidity and Mortality
- Human Developmental Effects
- Mental Health and Stress-Related Disorders
- Neurological Diseases and Disorders
- Vectorborne and Zoonotic Diseases
- Waterborne Diseases
- Weather-Related Morbidity and Mortality
# BRACE Framework

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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<td>Step 1</td>
<td>Forecasting Climate Impacts and Assessing Vulnerabilities</td>
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<td>Step 2</td>
<td>Projecting the Disease Burden</td>
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<td>Step 3</td>
<td>Assessing Public Health Interventions</td>
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<td>Step 4</td>
<td>Developing and Implementing a Climate and Health Adaptation Plan</td>
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<td>Step 5</td>
<td>Evaluating Impact and Improving Quality of Activities</td>
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Population Vulnerability Factors
(adapted from Dr. Christopher Emrich's BRACE presentation 9/2013)

- **Special needs** populations: difficult to identify (infirm, transient) let alone measure; invariably left out of recovery efforts; often invisible in communities
- **Age (elderly and children)** affect mobility out of harm’s way; need special care; more susceptible to harm
- **Socioeconomic status (rich; poor)** ability to absorb losses and recover (insurance, social safety nets), but more material goods to lose
- **Race and ethnicity (non-white; non-Anglo)** impose language and cultural barriers; affect access to post-disaster recovery funding;
- tend to occupy high hazard zones
- **Gender (women)** gender-specific employment, lower wages, care-giving role
- **Housing type and tenure (mobile homes, renters)**
Part II

- Regional Climate Action Plan (RCAP)
- Health Impact Assessment
RCAP HIA Background Information

• Florida Institute for Health Innovation (FIHI)  
  (formerly Florida Public Health Institute)

• Project Inception-Southeast Florida Regional Climate Change Compact (SEFRCCC)

• South Florida Regional Planning Council (SFRPC)
## HIA Methodology

<table>
<thead>
<tr>
<th>Screening</th>
<th>Determine whether an HIA is needed and likely to be useful.</th>
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<tbody>
<tr>
<td>Scoping</td>
<td>In consultation with stakeholders, develop a plan for the HIA, including the identification of potential health risks and benefits.</td>
</tr>
<tr>
<td>Assessment</td>
<td>Describe the baseline health of affected communities and assess the potential impacts of the decision.</td>
</tr>
<tr>
<td>Recommendations</td>
<td>Develop practical solutions that can be implemented within the political, economic or technical limitations of the project or policy being assessed.</td>
</tr>
<tr>
<td>Reporting</td>
<td>Disseminate the findings to decision makers, affected communities and other stakeholders.</td>
</tr>
<tr>
<td>Monitoring and Evaluation</td>
<td>Monitor the changes in health or health risk factors and evaluate the efficacy of the measures that are implemented and the HIA process as a whole.</td>
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*Health Impact Project*

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**Public input encouraged at each step.**
Stakeholder Engagement

• Who Were the Stakeholders?
  – Steering Committee

• Community Input

• Input-Entire Process
Sea Level Rise Vulnerability Mapping

Florida Institute for Health Innovation

RESULTS-ORIENTED. RESPONSIVE. DATA-DRIVEN
HIA Findings

• Five Diseases expected to Affect Southeast Florida:
  – Asthma, Respiratory Allergies and Airway Diseases
  – Foodborne Disease and Nutrition
  – Mental Health
  – Vectorborne and Zoonotic Diseases
  – Waterborne Diseases
HIA Findings (cont.)

• The health of NE Miami-Dade County and SE Broward County will be particularly affected by sea level rise and heat waves
• Monroe County is very vulnerable to rising sea levels, but not heat waves
• Palm Beach County’s east coast is vulnerable to health problems from heat waves
• Sections of inland Broward County are vulnerable to sea level rise
HIA Recommendations

1) Integrate public health planning with municipal and regional planning to prepare Southeast Florida for the broader impacts of Climate Change.

2) Educate the public and elected officials on health outcomes associated with climate change.

3) Include heat vulnerability, health, and socio-economic factors when developing vulnerability mapping or determining priority zones.
HIA Recommendations (cont.)

4) Encourage, foster, and support investigative work to fully understand the impacts and economic costs attributed to climate change and health.

5) Establish health-related metrics to use when planning for adaption strategies to mitigate climate change effects.

6) Revisit city and county development plans and revise based on heat vulnerability mapping to develop a specific amount of shade trees or canopy to increase safe active access to goods in extreme heat.
Part III

Kresge Foundation Project
Project Goals

1) Identify the communities in Southeast Florida (Palm Beach, Broward, Miami Dade and Monroe counties) that will be most vulnerable to sea level rise impacts in the coming decades;

2) Identify specific areas of public health risks and correlate these risks to identified populations under a 2030 and 2060 SLR scenario;

3) Share this information with local decision makers to create more robust adaptation plans that include human health considerations; and

4) Develop a technical assistance guidebook and toolkit that can be shared with other coastal communities.
# Southeast Florida Vulnerability Index: Health and Social Denominators

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<th>Health and Social Denominators</th>
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<td><strong>Socio-economic vulnerability</strong></td>
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<tr>
<td>Number of cases in ED</td>
<td>Age</td>
</tr>
<tr>
<td>Number of hospitalizations</td>
<td>Race/Ethnicity</td>
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<tr>
<td>Asthma</td>
<td>Income</td>
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<tr>
<td>COPD</td>
<td>Education</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Housing</td>
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<tr>
<td>Heart failure</td>
<td>Poverty</td>
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<tr>
<td>Myocardial infarction</td>
<td>Family structure</td>
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<tr>
<td>Pneumonia</td>
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<td>Serviced population</td>
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<tr>
<td><strong>Sub-index</strong></td>
<td><strong>Physical vulnerability to SLR</strong></td>
</tr>
<tr>
<td>Percent area vulnerable to 1, 2 and 3 ft of SLR</td>
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</tbody>
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<table>
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<tr>
<th>Data sources:</th>
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<tr>
<td>FL Department of Health</td>
<td>NOAA</td>
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<tr>
<td>UDS Mapper</td>
<td>FGDL</td>
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<tr>
<td>2010 Census</td>
<td>American Community Survey 2007-2011</td>
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</table>
Southeast Florida Vulnerability Index: Health and Social Denominators

Sub-index: Burden of Disease

Variables:

- Number of cases
- Crude rate per 100,000
- Age-adjusted rate / 100,000
- Confidence intervals
- Relative SE
- # of Health Centers Serving ZCTA
- Total # Health Center Patients
- Unserved (by Health Centers) Low-Income Population
- Health Center Penetration of Low-Income Population
- Health Center Penetration of Total Population

Sub-index: Socio-economic vulnerability

Variables:

- Percentage of population over age 65
- Percentage of population over age 75
- Median Household Income
- % Low-Income Population
- Percentage of Housing Units that are Mobile Homes
- % Pop in Poverty
- Percentage of households receiving Public assistance
- Percentage of total population that are White
- % Non-White
- Percentage of population that does not speak English well
- Percentage of population over 25 with less than 8th Grade education
- Percentage of population over 25 with less than High School education
- Percentage of households that consist of single persons over 65
- Percentage of population with disabilities
Mapping

- Zip codes for the Keys
Diabetes Incidence

Avg Diabetes Emergency Visits By Zip Code (N Values)

Legend
AVGDIAEDE
N Value
High : 21089
Low : 0

Source: Florida's County Health Rankings & Roadmaps, Robert Wood Johnson Foundation and Health Prevention Institute
ENVIRONMENTAL ICD9 CODES

Pertinent ICD9 Codes
- E908 Accident due to cataclysmic storms and floods resulting from storms
  - E908.2 Floods
  - E908.9 Unspecified cataclysmic storms, and floods resulting from storms
- E928 Other and unspecified environmental and accidental causes
  - E928.6 Environmental exposure to harmful algae and toxins
- E929 Late effects of accidental injury
  - E929.5 Late effects of accident due to natural and environmental factors
  - E929.9 Late effects of unspecified accident

Other Codes: Accidents Due To Natural And Environmental Factors
- E900 Accident caused by excessive heat
- E901 Accidents due to excessive cold
- E902 Accident due to high and low air pressure and changes in air pressure
- E903 Accident caused by travel and motion
- E904 Accident due to hunger thirst exposure and neglect
- E905 Venomous animals and plants as the cause of poisoning and toxic reactions
- E906 Other injury caused by animals
- E907 Accident due to lightning
- E908 Accident due to cataclysmic storms and floods resulting from storms
- E909 Accident due to cataclysmic earth surface movements and eruptions
Part IV

Health Effects-Focus Area
Monroe County
Issues with Data Collection

- Limited local recognition of relationship of climate change and population health data
- Small numbers due to small population
- Geographic challenges to coordination of resources including data and data collection
  - Long, narrow, rural county
  - Collecting and reporting infrastructure inconsistent
Health Effects-Monroe County

- Salt Water intrusion into sewer and drainage systems
- Standing Water
  - Bacterial infection
  - Parasitic infection
  - Injury hazard
  - Mold and fungus
Health Effects-Monroe County

- Mental and Behavioral Health related to stress
  - Extreme weather events
  - Changing economic opportunities in fishing and tourism industries; economic vulnerabilities
  - Rising costs of mitigation/adaptation too great for individual homeowners

- Respiratory problems related to mold from flooding or standing water
  - Asthma, allergies, COPD
Options and Opportunities

- Adaptation Action Area planning
- Consistent leadership within the Compact
- New coordinated data collection resources through Community Health Centers' participation in Meaningful Use monitoring of electronic medical record systems
- Coding of data by environmental causes
Fort Lauderdale Example

- Adaptation Action Area collaborative:
  - SFRPC, FLDOE, City of Ft. Lauderdale, and Broward County community tool:
    - AAA Policy Options for Adaptive Planning for Rising Sea Levels

- Compact counties and municipalities tool:
  - Localized policy guidance
  - Localized program development guidance
Resources

• http://southeastfloridaclimatecompact.org


• http://seven50report.org/

• http://www.cdc.gov/climateandhealth/climate_ready.htm

• www.flhealthinnovation.org

• www.nwf.org/ClimateSmartGuide
Contact Information

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