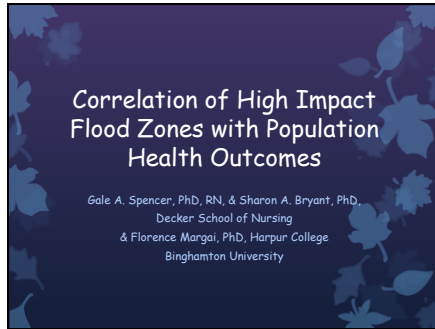


Slide 1



Correlation of High Impact
Flood Zones with Population
Health Outcomes

Gale A. Spencer, PhD, RN, & Sharon A. Bryant, PhD,
Decker School of Nursing
& Florence Margai, PhD, Harpur College
Binghamton University

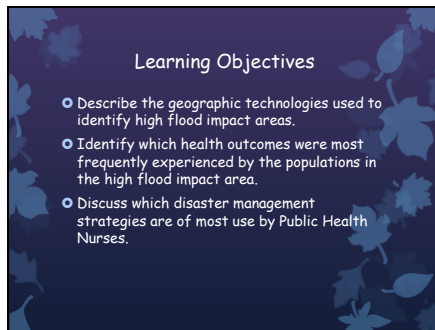
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Disclosure

- We do not have any relevant financial relationships to disclose

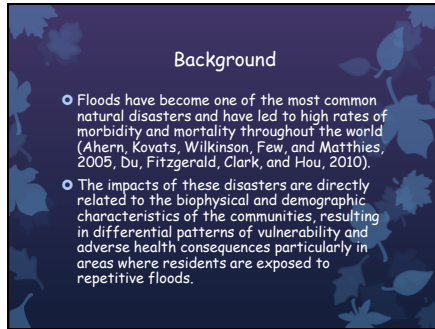
Slide 3



Learning Objectives

- Describe the geographic technologies used to identify high flood impact areas.
- Identify which health outcomes were most frequently experienced by the populations in the high flood impact area.
- Discuss which disaster management strategies are of most use by Public Health Nurses.

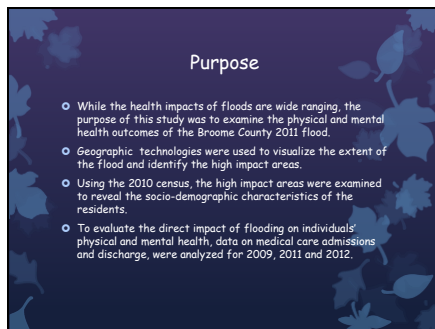
Slide 4



Background

- Floods have become one of the most common natural disasters and have led to high rates of morbidity and mortality throughout the world (Ahern, Kovats, Wilkinson, Few, and Matthies, 2005; Du, Fitzgerald, Clark, and Hou, 2010).
- The impacts of these disasters are directly related to the biophysical and demographic characteristics of the communities, resulting in differential patterns of vulnerability and adverse health consequences particularly in areas where residents are exposed to repetitive floods.

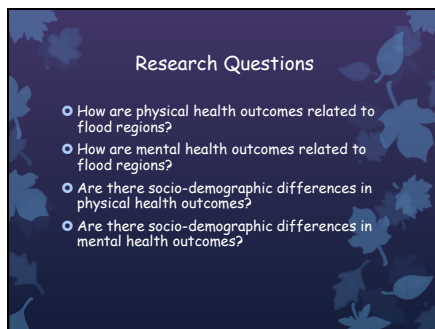
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Purpose

- While the health impacts of floods are wide ranging, the purpose of this study was to examine the physical and mental health outcomes of the Broome County 2011 flood.
- Geographic technologies were used to visualize the extent of the flood and identify the high impact areas.
- Using the 2010 census, the high impact areas were examined to reveal the socio-demographic characteristics of the residents.
- To evaluate the direct impact of flooding on individuals' physical and mental health, data on medical care admissions and discharge, were analyzed for 2009, 2011 and 2012.

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Research Questions

- How are physical health outcomes related to flood regions?
- How are mental health outcomes related to flood regions?
- Are there socio-demographic differences in physical health outcomes?
- Are there socio-demographic differences in mental health outcomes?

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Methods

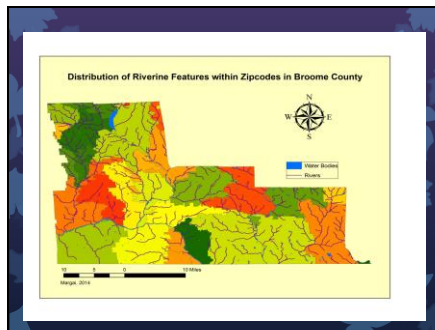
- 2009 to 2012 Hospital Discharge datasets were used to examine physical and mental health outcomes related to flooding.
- The observed rates were generated based on the NYDOH SPARCS admissions database for 2009, 2011 & 2012 for Flood and non-Flood zones.
- Statistical analyses were performed using SPSS 22
 - Frequencies were used to describe the characteristics of the sample
 - Significance tests of association
 - Spatial scale: five digit zipcode data was used for Broome County
- ArcGIS Software
 - Proximity Analysis
 - Vulnerability Assessment
 - Overlay and Spatial Analysis of Associations

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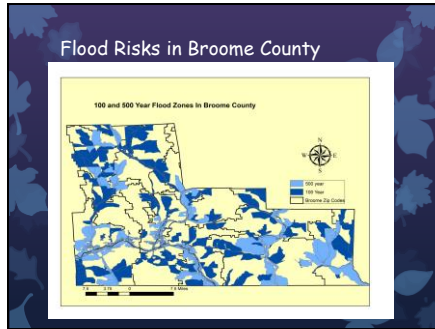
Geographic Technologies Used to Identify High Flood Impact Areas

- GIS Data
 - Geographic Information Systems (GIS) to compile data layers on the following:
 - 100 year and 500 year Flood probability maps
 - 2006 and 2011 Flood Impact Zones
 - Landuse Land Cover Maps
 - Proximity to Rivers/ Watersheds
 - Demographic data (based on 5 year ACS estimates)
 - Shape files for census tracts, block groups and zip codes
- Sources of Data: Broome County Department of Planning, GIS & Mapping services, Binghamton University Geography Department

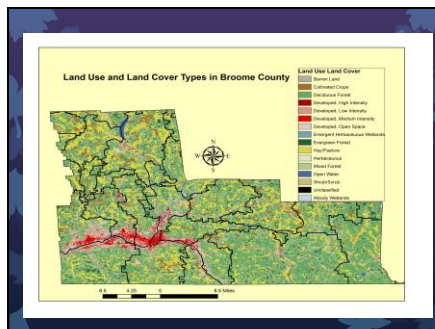
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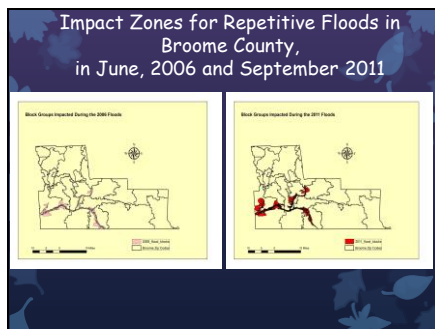
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Slide 11



Slide 12



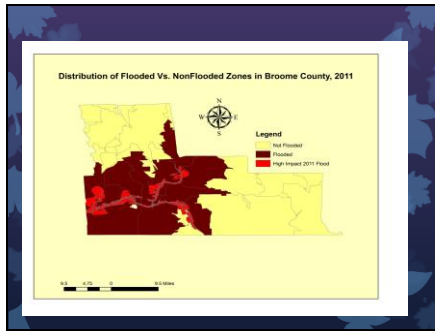
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Statistical Analysis

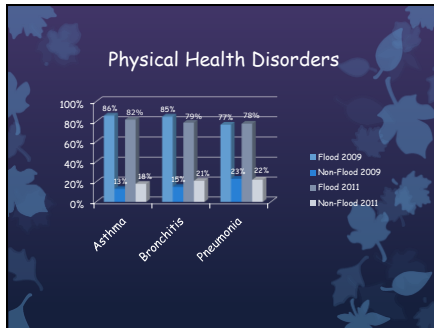
- A test of means differences (and logistic regression analysis) was done to compare health outcomes in Flooded versus Non-Flooded Zones.
- The analysis focused on the following variables:
 - Acute Respiratory Infection rate per 1000 (ARIRATE).
 - Upper Respiratory Tract Infection rate per 1000 (URTRATE).
 - Pneumonia and Influenza rates per 1000 (PIRATE).
 - Pulmonary and other Lung disease rates per 1000 (POLDRATE).
 - COPD rate per 1000 (COPDRATE).
 - Other Diseases of the Respiratory System per 1000 (ODRSRate).
- The observed rates were generated based on the NYDOH SPARCS admissions database for 2009, 2010, 2011.

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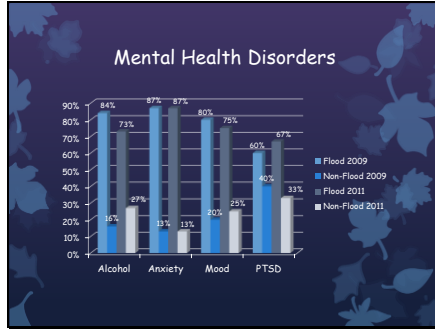
Physical & Mental Health Outcomes Experienced in High Flood Impact Areas

- Physical Health Categories
 - Asthma
 - Pneumonia
 - Bronchitis
- Mental Health Categories
 - Alcohol Related Disorders
 - Anxiety Disorders
 - Mood Disorders
 - PTSD

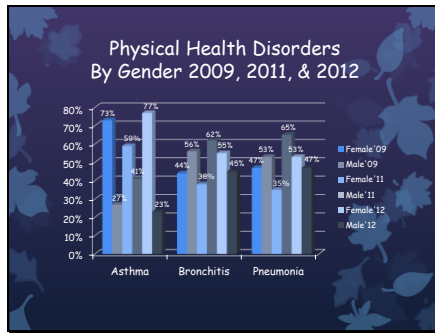
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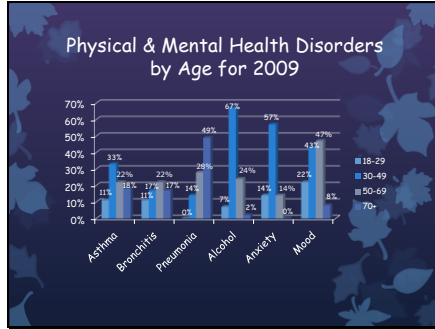
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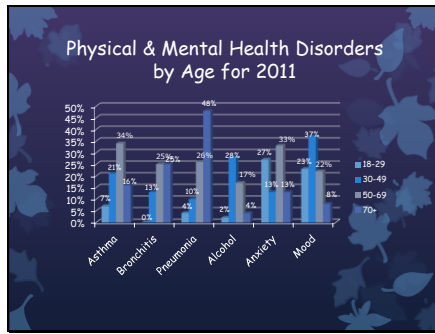
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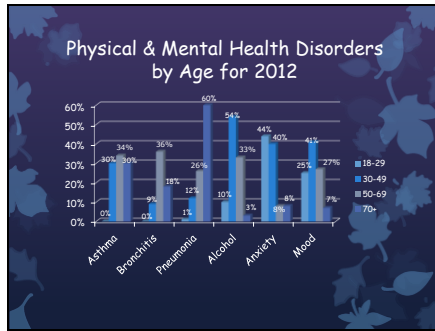
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Health Outcomes Experienced in High Flood Impact Areas

| Immediate | Recovery | Reconstruction |
|---|---|--|
| <ul style="list-style-type: none"> Injuries | <ul style="list-style-type: none"> Respiratory Illnesses | <ul style="list-style-type: none"> Psychosocial health |
| <ul style="list-style-type: none"> Electrical, Burns, chemical exposures | <ul style="list-style-type: none"> Acute respiratory infections | <ul style="list-style-type: none"> Psychoses |
| <ul style="list-style-type: none"> Fractures, sprains, strains etc. | <ul style="list-style-type: none"> Other Upper Resp. Tract Illnesses | <ul style="list-style-type: none"> Other Mental conditions |
| <ul style="list-style-type: none"> Hypothermia etc. | <ul style="list-style-type: none"> COPD | <ul style="list-style-type: none"> Malnutrition |
| <ul style="list-style-type: none"> Communicable Diseases | <ul style="list-style-type: none"> Skin Infections | <ul style="list-style-type: none"> Disability |
| <ul style="list-style-type: none"> Disruption of health services and critical infrastructure | <ul style="list-style-type: none"> Other | <ul style="list-style-type: none"> Social Disruption in Neighborhoods |

Du et al., 2010; Taylor et al., 2011; Alderman et al., 2013; Lawe et al., 2013

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- ### Disaster Management Strategies Used by Public Health Nurses
- Immediate
 - Be prepared for Mass Evacuations
 - Prepare vulnerable populations to have medications, formula, medical equipment, vaccination, insurance and medical documents are ready when evacuation occurs
 - Recovery
 - Prepare for long term recovery
 - Respiratory illnesses, sprains, sprains and cuts occur during this period with resulting hospitalization due to infections
 - Reconstruction
 - Homes, schools and churches will need to be renovated creating long term displacement
 - Collaboration with local state and federal agencies as well as community based agencies
 - Public Health Nurses are often the ones who know the community best and should be prepared to serve as referral agents