Tale of Two Floods
The long and short of it for public health practice

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Floods Are Not a Public Health Issue… Or, Are They?

• Washington has floods every year—a county road floods; a septic system overflows into the Puget Sound; someone is cut off from emergency services… No big deal, right?

• Wrong…
Conditions: Ripe for Disaster

November 30 – December 3, 2007

heavy rains + cold front followed by a warm front + snow watches & warnings + high wind warning + a series of storms +

excess runoff + high surf warning + rivers above flood stage =
Unfolding Events

• State Emergency Operations Center (EOC) raises response level
• Requests agency presence including Department of Health
• DOH representative tries contacting local health and local emergency management
• Calls for assistance from local health to various programs in DOH
• Realization the event is bigger than expected
The Governor’s Press Conference

• Public Health was front and center

• Early issues highlighted
  • Drinking water
  • Carbon monoxide
  • Personal protection

• Clear need for specific, detailed information
Immediate Follow-up Activities

- Activated the agency Assessment Response Team (ART)

- Identified need to enhance:
  - Internal and external communications
  - Coordination

- ART decision to activate the agency EOC
  - Limited EOC activation, later expanded
Public Water System Status Report

Public water systems affected by wind and rain storm 12/3/07

Status as of noon 12/6/07

- **Systems without water**
  - Systems: 11
  - Population: 2819

- **Systems with boil water advisories**
  - Systems: 10
  - Population: 10,657

- **Service restored (no water advisories)**
  - Systems: 1
  - Population: 62
Water System Status: One Week Later

Public water systems affected by wind and rain storm 12/3/07

Status as of noon 12/13/07

- **Systems without water**
  - Systems: 1
  - Population: 2

- **Systems with boil water advisories**
  - Systems: 17
  - Population: 4,671

- **Service restored (no water advisories)**
  - Systems: 13
  - Population: 11,437
Water System Status: Two Weeks Later

Public water systems affected by wind and rain storm 12/3/07
Status as of 10 a.m. 12/20/07

- **Systems without water**
  - Systems: 1
  - Population: 2

- **Systems with boil water advisories**
  - Systems: 10
  - Population: 4,395

- **Service restored (no water advisories)**
  - Systems: 22
  - Population: 11,922
Shellfish Growing Area Status Report

Shellfish growing areas affected by wind and rain storm 12/3/07

Status as of noon 12/7/07

Affected growing areas
Shellfish Growing Areas: One Week Later

Shellfish growing areas affected by wind and rain storm 12/3/07

Status as of noon 12/13/07

- Closed growing areas
- Re-opened growing areas
The Dead Animals

- Needed to deal with issue quickly
- Multi-agency coordination required
- Systems on the ground and operational within 24 hours
Carbon Monoxide (CO)

- Recent experience with illness and death from CO in Washington
  - Outreach program existed
- Incident in small coastal community
  - Generator in store not ventilated properly
- DOH communications office
  - Worked with state EOC to connect with major distributors of generators
  - Included health messages with all generators sold
Immunizations

• DOH assessed:
  • Local vaccine loss due to storm
  • Need for vaccine to protect flood victims and responders

• Immunization program developed vaccine policy

• Through EOC, ordered vaccine and supplies for affected counties
  • 3,450 doses of Tdap and 600 doses of Hepatitis A

• Provided educational materials to a local mobile clinic

• Working to recover cost of vaccine
WIC: Women, Infants, and Children

• 5 DOH staff assisted local staff
• Have plan to work with formula manufacturers to deliver supplies to affected areas
• Have procedures to communicate to clients about emergency procedures
  • Including access to emergency food stamps
Recovery Issues

- Basic sanitation and personal protection
- Drinking water (on-going issues months later)
- Food sanitation
- Solid and hazardous waste cleanup
  - Burning of debris
- Mold
- Mental health issues
Lessons Learned

• Convene ART earlier
• Open agency EOC when staff sent to state EOC
• When activating the agency EOC, always activate all chief level positions
• Improve internal communications—as events unfold and during event
More Lessons Learned

- Maps to show drinking water and shellfish issues were effective communication tools
- Refine process for external communications
  - Don’t duplicate efforts
- Use of SECURES
  - Shotgun approach better way to reach local health staff
- 150 people in DOH responded in some way.
  - We all played a role.
  - All the training and practice paid off.
Public Health Is Critical

“At first we weren’t sure where public health would fit in, now we don’t know what we would have done without them.”

— A county manager

Centralia Chronicle
Tropical Storm Alberto: July 1994
Track of Tropical Storm Alberto

Map shows five major river systems: Flint, Ocmulgee, Chattahoochee, Choctawatchee, and Apalachicola River

Dashed line: Alberto's inland track

Shaded area: 78 counties declared federal disaster areas
The 500+ Year Flood

100 Year Flood Map Estimates

500 Year Flood Map Estimates

Actual Extent of Flooding
Mortality and Grief

- Fits with other U.S. experiences
  - Most flood-related deaths due to flash floods
  - More than 50% of drownings associated with motor vehicles

- Southwest Georgia no exception
  - 31 deaths
  - 96% flood-related
  - 74% motor-vehicle related
Grief Unearthed

- Two large cemeteries
- 409 coffins
- NDMS-DMORT
Sheltering and Disparities
Special Needs Issues
A Massive and Lengthy Housing Crisis

...and a footnote on Karst Geology
Are You Ready to Lose a Major Medical Center?

Palmyra Medical Centers
A Note on Vector-Borne Disease

- Increases in vector mosquito population density
- Expanded human exposure to mosquitoes after a disaster
- Post-Alberto vector-borne surveillance did not detect any increase in arbovirus infections
- Aerial spraying implications
A Disaster Pharmacy Program

• Joseph A. Whaley, pharmacy director for the state's hardest-hit health district

• Partnerships
  • Georgia Pharmacy Association
  • 30 pharmacists from around the state
  • Local hospital pharmacy

• Program incorporated into sheltering component of district public health emergency response plans
  • Post 9/11 evolution
More Long-Term Impacts

- Floods are a wake-up call
  - Karst geology, flooding, and rural wells
  - Non-public water systems

- Drought, the reverse side of flooding
  - A health and water initiative
  - Public health effects of prolonged drought in rural America
Destruction, Displacement, Debris
Public Water Crisis in Macon, GA

Riverside Water Treatment Plant submerged
Public Health and Emergency Planning

• Development and evolution of public health disaster planning
  • Identified needs
  • Assessed benefits for a health district

• Preparedness lessons of Alberto
  • Meet early, meet often
  • Know, appreciate, and communicate with your partners, especially before “the balloon goes up”
Additional Long-Term Effects

- The Environmental Web: A National Profile of the State Infrastructure for Environmental Health and Protection

- Future environmental progress will depend on:
  - Improved understanding of the relationship between human health and the environment
  - Commitment to improving the public health training of environmental professionals
  - Improved cooperation between health and environmental agencies
Thank You