

**Yale University School of Medicine
Department of Epidemiology and Public Health**

**EHS 570a
Public Health Management of Disasters**

Fall, 2008

Instructors:

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Course Description:

This course focuses on the public health role in disaster preparedness, including planning, response, mitigation and recovery. The relationship between the 10 essential public health services and disasters and other public health emergencies will be discussed. In addition, the interplay and collaboration between public health agencies, public health systems and other agencies and systems involved in disaster preparedness and response will be discussed. The use of a conceptual framework (Haddon matrix) for understanding disasters will be presented and used as a basis for analyzing emergency events.

Topics include:

- Disaster definitions and concepts
- Disaster epidemiology
- Incident command and incident management
- Communication (tactical and risk communication)
- Vulnerable populations in disasters
- Evaluation of disaster response and its implications for planning
- Law and regulation
- Disaster risk assessment

Learning Objectives: At the conclusion of the course, the student will be able to:

1. Define the term disaster.

2. Identify the key public health impacts of specific types of disasters, and the modes for ensuring adequate public health system response.
3. Describe the key governmental and non-governmental agencies involved in disaster planning and response, and their specific roles in disaster preparedness.
4. Describe the basis for disaster planning and its relationship to the 10 essential public health services.
5. Describe how the incident command system is used in disaster response.
6. Discuss the utility of various types of exercises in improving disaster response.

Grading:

- Final Exam (40%)
- Assignments (40%)
- Class participation (20%)
 - Attendance (5%)
 - Class Participation (15%) (Readings in bold will be discussed in class)

Course Readings:

Course readings will include selected chapters from 3 texts that will be on reserve in the library, as well as papers from scientific journals, and information from websites related to preparedness. Journal articles are generally available on-line or in the library. Additional readings will be provided during class.

Texts (on reserve in library):

- Landesman LY. Public Health Management of Disasters. 2nd Edition, American Public Health Association, 2005.
- Levy BS, Sidel VW. Terrorism & Public Health. Oxford University Press, 2003.
- Weinstein RS, Alibek K. Biological and Chemical Terrorism. Thieme, 2003.

Session #1: 4 September 2008 - Introduction to disasters and preparedness

Lecturer: Linda Degutis

Learning objectives:

- Define disaster
- Use the Haddon matrix as a conceptual basis for analyzing disasters and disaster response
- Describe the public health consequences of specific types of disaster

Readings:

1. Ahern M, Kovats RS, Wilkinson P, Few R, Matthies F. Global Health Impacts of Floods: Epidemiologic Evidence. *Epidemiologic Reviews*. 2005; 27:36-46.
2. Barnett DJ, Balicer RD, Blodgett D, Fews AL, Parker CL, Links JM. The Application of the Haddon Matrix to Public Health Readiness and Response Planning. *Environmental Health Perspectives*. 2005;113:6.

3. Haddon W Jr. A logical framework for categorizing highway safety phenomena and activity. *Journal of Trauma-Injury Infection & Critical Care*. 12(3):193-207, 1972.
4. Landesman LY. *Public Health Management of Disasters*. Chapter 1: Types of Disasters and Their Consequences.
5. Levy BS, Sidel VW. *Terrorism and Public Health*. Chapter 1: Challenges That Terrorism Poses to Public Health. New York: Oxford University Press, Inc.; 2003.
6. Runyan, C., Using the Haddon matrix: introducing the third dimension. *Injury Prevention*, 1998. 4: p. 302-307.

Session #2: 11 September 2008 - Public Health Role in Disaster

Lecturer: Amanda Durante

Learning objectives:

- Apply the 10 essential public health services to disaster planning, response, mitigation and recovery.
- Discuss public health agencies involved in disaster response on international, national, state and local levels.

Readings:

1. Department of Homeland Security. Emergency Support Function #8 – Public Health and Medical Services Annex. Available at <http://www.fema.gov/pdf/emergency/nrf/nrf-esf-08.pdf>.
2. Essential Public Health Service (website): <http://www.cdc.gov/od/ocphp/nphpsp/EssentialPHServices.htm>
3. Carr SJ, Leahy SM, London S, Sidhu S, Vogt J. The public health response to the Los Angeles 1994 earthquake. *Am J Pub Health* 1996; 86: 589-590.
4. **CDC. Tuberculosis Control Activities After Hurricane Katrina – New Orleans, Louisiana, 2005. *MMWR* 55(12): 332-335.**
5. **Levy BS, Sidel VW. *Terrorism and Public Health*. Chapter 2: The Public Health Response to the World Trade Center Disaster New York: Oxford University Press, Inc.; 2003.**
6. Ramirez M, Peek-Asa C. Epidemiology of Traumatic Injuries from Earthquakes. *Epidemiologic Reviews*. 2005;27:47-55.
7. Shultz JM, Russell J, Espinel Z. Epidemiology of Tropical Cyclones: The Dynamics of Disaster, Disease and Development. *Epidemiologic Reviews*. 2005;27:21-35.

Session #3: 18 September 2008 – Disaster responders / Incident management (ICS)

Lecturer: Sandy Bogucki, MD, PhD, MPH, Associate Professor of Surgery (Emergency Medicine), Core Faculty, Yale Center for Public Health Preparedness

Learning objectives:

- Describe the role of agencies other than public health agencies involved in disaster response
- Define the key principles of the Incident Command System
- Describe the advantages and disadvantages of ICS in disaster response

Assignment 1:

- Complete online NIMS/ICS course (Public Health Incident Command System (PHICS): Implementing ICS Within Public Health Agencies: <http://www.ualbanycphp.org/pinata/phics/default.cfm>)
- Print out certificate of completion and turn in to course instructor.

Readings:

1. Beatty ME, Phelps S, Rohner C, Weisfuse I. Blackout of 2003: Public Health Effects and Emergency Response. *Public Health Reports*. 2006;121:36-44.
2. Cone DC, Weir SD, Bogucki S. Convergent volunteerism. (editorial) *Ann Emerg Med* 2003; 41: 457-462.
3. Department of Homeland Security. Emergency Support Function Annexes: Introduction: Available at <http://www.fema.gov/pdf/emergency/nrf/nrf-esf-intro.pdf>
4. Gebbie, K.M. and Merrill, J. 2002. 'Public Health Worker Competencies for Emergency Response.' *Journal of Public Health Management and Practice*, 8(3): 73-81.
5. Landesman LY. Public Health Management of Disasters. Chapter 3. Structure and Organization of Health Management in Disaster Response.
6. **Lerner EB, Cronin M, Schwartz RB, Sanddal TL, Sasser SM, Czapranksi T, et al. Linking Public Health and the Emergency Care Community: 7 Model Communities. *Disaster Medicine and Public Health Practice*. 2007;1(2):142-5.**
7. **Phillips FB, Williamson JP. Local Health Department Applies Incident Management System for Successful Mass Influenza Clinics. *Journal of Public Health Management and Practice*. 2005;11(4):269-73.**

Session #4: 25 September 2008: Communication

Lecturer: Lauren Babcock-Dunning (Risk and Crisis Communication)
(Tactical Communication)

Learning objectives:

- Describe the core principles of risk communication
- Describe factors that influence the risk perceptions of the public
- Define the Health Alert Network
- Define the tactical communication terms interoperability and redundancy and describe their importance to effective disaster response.

Assignment 2: Write a press release or newsletter (further details will be given in class)

Readings:

1. APHA. APHA Media Advocacy Manual. http://www.apha.org/NR/rdonlyres/A5A9C4ED-1C0C-4D0C-A56C-C33DEC7F5A49/0/Media_Advocacy_Manual.pdf
2. Covello VT, Peters RG, Wojtecki JG, Hyde RC. Risk communication, the West Nile virus epidemic, and bioterrorism: responding to the communication challenges posed by the intentional or unintentional release of a pathogen in an urban setting. *Journal of Urban Health*. 78(2):382-91, 2001.

3. Covello VT. Best practices in public health risk and crisis communication. *Journal of Health Communication*. 8 Suppl 1:5-8; discussion 148-51, 2003.
4. Reynolds B. W Seeger M. Crisis and emergency risk communication as an integrative model. *Journal of Health Communication*. 10(1):43-55, 2005 Jan-Feb.
5. Rudd RE. Comings JP. Hyde JN. Leave no one behind: improving health and risk communication through attention to literacy. *Journal of Health Communication*. 8 Suppl 1:104-15, 2003.
6. Landesman LY. Chapter 6. Disaster Communications (pages 140-149).
7. Primer on Redundant Communications Wisconsin Division of Public Health Hospital Disaster Preparedness, February 2007. Available at <http://www.fcc.gov/pshs/docs-best/redundantCommunications07.doc>
8. US House of Representatives. A Failure of Initiative – Final Report of the Select Bipartisan Committee to Investigate the Preparedness for and Response to Katrina. Communications. Pages 163-181. Available at <http://a257.g.akamaitech.net/7/257/2422/15feb20061230/www.gpoaccess.gov/katrinareport/mainreport.pdf>

Session #5: 2 October 2008: Risk Assessment

Lecturer: Linda Degutis

Learning objectives:

- Discuss the role of risk assessment in overall disaster preparedness
- Describe the key elements of hazard identification and vulnerability analysis

Readings:

1. Arnold JL. Disaster medicine in the 21st century: future hazards, vulnerabilities, and risks. *Prehosp Disaster Med* 2002; 17: 3-11.
2. Arnold JL: Risk and risk assessment in health emergency management. *Prehosp Disaster Med* 2005; 203: 143–154.
3. **Chen K, Blong R, Jacobson C. Towards an integrated approach to natural hazards risk assessment using GIS: with reference to bushfires. *Environ Management* 2003;31:546-560.**
4. Landesman. Chapter 5. Hazard Assessment, Vulnerability Analysis, Risk Assessment and Rapid Health Assessment. Pages 115-122.
5. Malilay J, Henderson A, McGeehin M, Flanders WD. Estimating health risks from natural hazards using risk assessment and epidemiology. *Risk Anal* 1997; 17:353-8.
6. Manassaram DM, Orr MF, Kaye WE. Counterterrorism planning using the Hazardous Substances Events Surveillance System. *Disaster Management & Response* 2003;1:35-40.
7. **Shook G. An Assessment of Disaster Risk and its Management in Thailand. *Disasters* 1997; 21(1): 77-88.**
8. Wirén E. Risk and risk evaluation. *Prehospital Disaster Med* 1994; 9:6-8.

Session #6: 9 October 2008: Planning, Prevention & Mitigation

Lecturer: Meg Hooper MPA, Branch Chief, Planning Branch, Connecticut Department of Public Health

Learning objectives:

- Describe the process of public health planning for disaster
- Explain the concept of all-hazards disaster planning.
- Differentiate between prevention and mitigation.
- Describe the challenges inherent in ensuring that the 10 essential public health services are maintained during a disaster.

Readings:

1. **Connecticut Department of Public Health. Public Health Emergency Response Plan – Emergency Support Function 8 (Public Health and Medical Services. September 2005. Available at http://www.ct.gov/dph/lib/dph/php/bt/pdf/pherp_final_report.pdf**
2. Felland LE, Katz A, Liebhaber A, Cohen GR. Developing health system surge capacity: community efforts in jeopardy. *Research briefs* 2008; 5:1-8.
3. Landsman. Chapter 7. *Essentials of Disaster Planning*.
4. **Perry RW, Lindell MK. Preparedness for Emergency Response: Guidelines for the Emergency Planning Process. *Disasters* 2003; 27(4): 336-350.**
5. US Department of Homeland Security. Target Capabilities List. Available at <https://www.llis.dhs.gov/displayContent?contentID=26724>. Pages iii-29 (review the remainder)

Session #7: 16 October 2008: Disaster Epidemiology

Lecturer: Amanda Durante

Learning objectives:

- Discuss the impact of information quality on preparedness planning and response.
- Describe methods and strategies used to collect information for disaster planning and response (rapid needs assessment, surveillance, GIS)
- Provide examples of the impact of epidemiologic studies on preparedness planning.

Assignment 3:

- Summarize the findings of 2 disaster epidemiology studies from the scientific literature. Describe methods, results and potential uses of data in public health practice (2 page limit)

Readings:

1. **CDC. Public Health Response to Hurricane Katrina & Rita – Louisiana, 2005. *MMWR* 55(2): 29-44.**
2. **CDC. Rapid Health Response, Assessment and Surveillance After a Tsunami – Thailand, 2004-2005. *MMWR* 2005. 54 (3): 61-64**
3. **CDC. Public Health Consequences of Hazardous Substances Acutely Released During Train Transit – South Carolina, 1999-2004. *MMWR* 54(3): 64-67.**
4. Johnson M, Wilfert RA. Rapid Needs Assessment and GIS. *FOCUS on Field Epidemiology*. 2008;5(3).
5. **Holt JB. Using the BRFSS Data and GIS Technology for Rapid Public Health Response During Natural Disasters. *Preventing Chronic Diseases*, 5(3): 1-18.**

6. Noji EK. Disasters: Introduction and State of the Art. *Epidemiologic Reviews*. 2005;27:3-8.
7. Thacker MTF, Lee R, Sabogal RI, Henderson A. Overview of deaths associated with natural events, United States, 1979-2004. *Disasters* 32 (2): 303-315.
8. Sullivent I, Ernest E., West CA, Noe RS, Thomas KE, Wallace LJD, Leeb RT. Nonfatal injuries following Hurricane Katrina--New Orleans, Louisiana, 2005. *Journal of Safety Research*. 2006;37(2):213-7.
9. Chapter 4. Disaster Epidemiology. Public Health Guide for Emergencies. Available at <http://www.ifrc.org/docs/pubs/health/chapter4.pdf>

Session #8: 23 October 2008: Legal Aspects of Disaster: planning, detection, response

Lecturer: Marianne Horne RN, JD, Legal Director, Office of Research & Development, Connecticut Department of Public Health (Law), Amanda Durante (International Health Regulations)

Learning objectives:

- Identify aspects of disaster planning and response that are covered by law and regulation
- Provide examples of laws and regulations that apply to disaster preparedness and response
- Describe the strengths and the weaknesses of the revised International Health Regulations for detection and rapid response to emerging infections

Readings:

1. Trust for America's Health. Ready or Not. Protecting the Public's Health from Diseases, Disasters, and Bioterrorism, 2007. Pages 49-54. Available at <http://healthyamericans.org/reports/bioterror07/>
2. Bristol N, Marcozzi D. Pandemic and All-Hazards Preparedness Act. *Disaster Medicine and Public Health Practice*. 2007;1(1):9-10.
3. Sturtevant JL, Anema A, Brownstein Js. The New International Health Regulations: Considerations for Global Public Health Surveillance. *Disaster Medicine and Public Health Preparedness*. 2007;1(2):5.
4. Baker MG, Fidler DP. Global Public Health Surveillance under New International Health Regulations. *Emerging Infectious Diseases* 2006; 12(7): 1058-1065.

Session #9: 30 October 2008: Evaluation of Public Health Responses

Lecturer: Amanda Durante

Learning objectives:

- Explain the importance of conducting evaluations of public health emergency responses
- Give examples of methods that can be used to conduct and analyze emergency response evaluation data.

Readings:

1. **CDC. Preliminary Results from the World Trade Center Evacuation Study – New York City, 2003. MMWR 53(35): 815-817.**
2. **CDC. Use of Respiratory Protection Among Responders at the World Trade Center Site – New York City, September 2001. MMWR 2002; Special issue (September 11, 2002).**
3. Gursky E. Anthrax 2001: Observations on the Medical and Public Health Response. *Biosecurity and Bioterrorism* 2003; 1(2): 97-110.
4. Landesman. Chapter 13. Evaluation Methods for Assessing Medical and Public Health Responses to Disaster.
5. **Trust for America's Health. Ready or Not. Protecting the Public's Health from Diseases, Disasters, and Bioterrorism, 2007. Available at <http://healthyamericans.org/reports/bioterror07/BioTerrorReport2007.pdf>**
6. US House of Representatives. A Failure of Initiative – Final Report of the Select Bipartisan Committee to Investigate the Preparedness for and Response to Katrina. Executive Summary and Investigation Overview. Pages 1-25. Available at <http://a257.g.akamaitech.net/7/257/2422/15feb20061230/www.gpoaccess.gov/katrinareport/mainreport.pdf>

Session #10: 6 November 2008: Psychosocial and Mental Health Aspects of Disaster

Lecturer: Steve Berkowitz, MD, Associate Professor, Yale Child Study Center, Core Faculty, Yale Center for Public Health Preparedness

Learning objectives:

- Describe the principle psychosocial and mental health effects of disasters
- Identify population subgroups that may be at increased risk for these effects
- Discuss strategies for preventing and mitigating these effects

Readings:

1. Landesman LY. Public Health Management of Disasters. Chapter 9. Mental Health Strategies.
2. Noji, EK. Public Health Consequences of Disaster. Chapter 6. Mental Health Consequences of Disasters.
3. **Burkle FM. Acute-phase mental health consequences of disasters. *Ann Emerg Med* 1996; 28:119-128.**
4. Weisaeth L, Knudsen Ø, Tonnessen A. Technological disasters, crisis management and leadership stress. *J Hazardous Materials* 2002; 93: 33-45.
5. **Pfefferbaum B, Nixon SJ, Tucker PM, et al. Posttraumatic stress responses in bereaved children after the Oklahoma City bombing. *J Amer Acad Child Adol Psych* 1999; 38: 1372-1379.**
6. Holloway HC, Norwood AE, Fullerton CS, Engel CC Jr, Ursano RJ. The threat of biological weapons: Prophylaxis and mitigation of psychological and social consequences. *JAMA* 1997; 278: 425-427.
7. Norwood AE, Ursano RJ, Fullerton CS. Disaster psychiatry: principles and practice. *Psych Quart* 2000; 71: 207-226.

8. Litz BT, Gray MJ, Adler AB. Early intervention for trauma. Clin Psych Sci Prac 2002; 9: 112-134.

Session #11: 13 November 2008: Bioterrorism & Emerging Pathogens

Lecturer: Linda Degutis/Amanda Durante

Learning objectives:

- Describe the categorization of biologic agents that may be used in bioterrorist events
- List biological agents that may cause epidemics
- Describe public health interventions involved in response to epidemics including isolation, quarantine, social distancing, mass dispensing

Assignment 5:

- Register on TRAINConnecticut at <https://www.ct.train.org/DesktopShell.aspx?tabid=1>.
- Complete online "Mass Dispensing Staff Orientation" in TRAINConnecticut

Readings:

1. Barnett, D.J., et al., A Systematic Analytic Approach to Pandemic Influenza Preparedness Planning. PLoS Medicine, 2005. 2(12): p. 7.
2. **Blendon, R.J., et al., Public Response to Community Mitigation Measures for Pandemic Influenza. Emerging Infectious Diseases, 2008. 14(5): p. 778-786.**
3. **CDC. Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States - Early, Targeted, Layered Use of Nonpharmaceutical Interventions. 2007 February 2007. <http://www.pandemicflu.gov/plan/community/commitigation.html>**
4. Hatchett RJ, Mecher CE, Liositch M. Public health interventions and epidemic intensity during the 1918 influenza pandemic. Proceedings of the National Academy of Sciences of the United States of America. 2007 May 1, 2007;104(18):5.
5. Rotz LD, Khan AS, Lillibridge SR, Ostroff SM, Hughes JM. Public health assessment of potential biological terrorism agents. Emerg Infect Dis 2002;8:225-230.
6. Weinstein RS, Kenneth Alibek. Section 1 – Basic Bioterrorism **and** Section 4 – Basic Chemical Terrorism.
7. Wheelis M. Biological Warfare at the 1345 Siege of Caffa. Emerging Infectious Diseases 2002. 8(9): 971-975.

Session #12: 20 November 2008: Disaster Preparedness Drills and Exercises

Lecturer: Cristie Duric / Amanda Durante

Learning objectives:

- Describe the concepts associated with disaster preparedness drills and exercises and their use in disaster preparedness

- Identify the requirements for implementing drills and exercises, and the steps required to successfully implement a disaster exercise program
- Discuss the advantages and disadvantages of drills and exercises that are either inclusive or restricted to specific groups.

Assignment 6: Prior to class, complete online HSEEP Course: IS-120.A An Introduction to Exercises: <http://training.fema.gov/EMIWeb/IS/IS120A.asp>

Readings:

1. **Biddinger PD, Cadigan RO, Auerbach BS, Burstein JL, Savoia E, Stoto MA, et al. Using Exercises to Identify System-Level Preparedness Challenges. Public Health Reports. 2008;123:96-101.**
2. Durante A, Melchreit R, Sullivan K, Degutis L. Partnering for Success: Recruitment, training, and deployment of public health exercise evaluators. Public Health Reports. 2007 November-December 2007;122:4.
3. Jackson BA, Buehler JW, Cole D, Cookson S, Dausey DJ, Honess-Morreale L, et al. Bioterrorism with Zoonotic Disease: Public Health Preparedness Lessons from a Multiagency Exercise. Biosecurity and Bioterrorism. 2006;4(3):287-92.
4. Varney, S., et al., Extending injury prevention methodology to chemical terrorism preparedness: The Haddon Matrix and sarin. American Journal of Disaster Medicine, 2006. 1(1): p. 18-26.

Session #13: 4 December 2008: Hurricane Vulnerable Populations Exercise

Learning objectives:

- Perform selected public health roles during an exercise focusing on vulnerable populations
- Identify ways in which evaluation of the exercise can improve planning for events

Readings:

1. US House of Representatives. A Failure of Initiative – Final Report of the Select Bipartisan Committee to Investigate the Preparedness for and Response to Katrina. Evacuation pages 103-123. Available at <http://a257.g.akamaitech.net/7/257/2422/15feb20061230/www.gpoaccess.gov/katrinareport/mainreport.pdf>
2. CDC. Public Health Workbook to Define, Locate and Reach Special, Vulnerable, and At-Risk Populations in an Emergency. www.bt.cdc.gov/workbook.

Session #14: 18 December 2008: Final Exam