Public Health-Specific National Incident Management System Trainings: Building a System for Preparedness

Sivan Kohn, MPH[a]
Daniel J. Barnett, MD, MPH[a,b,c]
Costanza Galastri, MA[d]
Natalie L. Semon, MSEd[a,c]
Jonathan M. Links, PhD[a,b,c]

SYNOPSIS

Local health departments (LHDs) are at the hub of the public health emergency preparedness system. Since the 2003 issuance of Homeland Security Presidential Directive-5, LHDs have faced challenges to comply with a new set of all-hazards, 24/7 organizational response expectations, as well as the National Incident Management System (NIMS). To help local public health practitioners address these challenges, the Centers for Disease Control and Prevention-funded Johns Hopkins Center for Public Health Preparedness (JH-CPHP) created and implemented a face-to-face, public health-specific NIMS training series for LHDs. This article presents the development, evolution, and delivery of the JH-CPHP NIMS training program. In this context, the article also describes a case example of practice-academic collaboration between the National Association of County and City Health Officials and JH-CPHP to develop public health-oriented NIMS course content.

[a]Johns Hopkins Center for Public Health Preparedness, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins University, Baltimore, MD

[b]Department of Environmental Health Sciences, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins University, Baltimore, MD

[c]Johns Hopkins Preparedness and Emergency Response Research Center, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins University, Baltimore, MD

[d]National Association of County and City Health Officials, Washington, DC

Address correspondence to: Sivan Kohn, MPH, Johns Hopkins Center for Public Health Preparedness, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins University, 615 N. Wolfe St., Room E7527, Baltimore, MD 21205; tel. 443-418-0598; fax 443-287-7075; e-mail <skohn@jhsph.edu>.

©2010 Association of Schools of Public Health

Local health departments (LHDs) stand at the hub of the public health emergency preparedness system.[1] However, across the U.S., LHDs vary greatly in capacity, authority, resources, operation, and structure.[2] In recent years, LHD employees have faced a steep learning curve attendant to a new set of all-hazards, 24/7 organizational response expectations. A critical aspect of this learning curve relates to National Incident Management System (NIMS) training, a requisite of response agencies since the 2003 issuance of Homeland Security Presidential Directive-5.[3] Across the U.S., the Federal Emergency Management Agency (FEMA) coordinates NIMS credentialing through its Emergency Management Institute.[4] NIMS provides a consistent nationwide template to "enable federal, state, tribal, and local governments, nongovernmental organizations, and the private sector to work together to prevent, protect against, respond to, recover from, and mitigate the effects of incidents."[4] Indeed, NIMS directly informs the definition of a "functional health department," which has been characterized by the National Association of County and City Health Officials (NACCHO) as one that leads "public health emergency planning, exercises, and response activities in the community in accordance with NIMS."[5] During 2008, 78% of LHDs in the U.S. used NIMS principles to activate an Emergency Operations Center. Reasons for activation included emergency response (27%), non-emergency events (28%), and drills or exercises (62%).[6]

A central component of NIMS is the Incident Command System (ICS), which provides a scalable and flexible core command mechanism to drive incident response.[4] Developed in the 1970s by California Fire Services, the history and underlying tenets of ICS reflect a military-style, command-and-control model traditionally seen in emergency services and not in public health.[7] LHDs are not naturally organized using ICS and rarely utilize a command decision-making structure or militaristic hierarchy. Further, the daily terminology, acronyms, and professional jargon used in public health differ from those used by non-public health emergency services. These factors make the integration of NIMS into an LHD response framework challenging.

Against this historical backdrop and in the context of efforts to enhance public health system response, we describe the development, evolution, and delivery of the Johns Hopkins Center for Public Health Preparedness (JH-CPHP) public health-specific NIMS training program for LHDs. In this vein, we also present a case example of practice-academic collaboration to further develop course content.

PUBLIC HEALTH-SPECIFIC NIMS TRAININGS: ORIGINS AND CONTENT EVOLUTION

JH-CPHP is a member of the Centers for Disease Control and Prevention's (CDC's) network of Centers for Public Health Preparedness (CPHPs). Funded by CDC since 2002, JH-CPHP is guided by a mission to ensure the public's health and safety and improve the capacity of the public health workforce to prepare for and respond to emergency situations. This mission is achieved through face-to-face and online training, academic coursework, seminars, and conferences. Preparedness education activities are often partner-requested and based on local needs.

Following the issuance of Homeland Security Presidential Directive-5, the Maryland Emergency Management Agency held meetings with several practice partners, including JH-CPHP, aimed at finding ways to tailor FEMA's NIMS modules for different disciplines. These initial meetings revealed a pronounced need among JH-CPHP's health department-based practice partners for a more public health-friendly NIMS format than the existing public safety-focused FEMA content.

Based upon these discussions, JH-CPHP experts adapted existing FEMA NIMS content into public health-specific face-to-face modules. The JH-CPHP content developers comprised two subject-matter experts with a combined 15 years of field and academic experience related to public health preparedness (PHP) and training, and a third JH-CPHP member with expertise in educational design who independently reviewed the curriculum for its suitability for adult learners. The two subject-matter experts later assumed responsibility as course trainers and performed all adaptations and improvements to the curriculum in close consultation with the educational design expert. These trainers have, to date, delivered all of JH-CPHP's NIMS trainings. This strategy allows trainers to develop a close familiarity with course strengths and weaknesses and creates consistency in course delivery.

FEMA's Emergency Management Institute coordinates NIMS credentialing throughout the U.S.[4] and offers many online courses free of charge as self-paced independent study (IS) modules, including IS-700 (NIMS, An Introduction), IS-100 (Introduction to ICS), and IS-200 (ICS for Single Resources and Initial Action Incidents). The JH-CPHP public health-oriented NIMS training series consists of three Microsoft® PowerPoint presentations adapted from FEMA's IS-700, IS-100, and IS-200 courses (and later adapted from the IS-700a, IS-100a, and IS-200a courses in accordance with FEMA revisions).[7] The JH-CPHP training series used these FEMA courses as a starting point from which material was adapted, changed, and added to fit a public health context.

Each JH-CPHP training module concludes with an in-class administration of the official, open-book FEMA certification exam supervised by the JH-CPHP trainer. No pre-training knowledge assessment is conducted. The IS-700a and IS-100a modules each take three and a half hours to complete, while IS-200a spans six hours.

Rather than create an entirely new course structure, JH-CPHP decided to adapt the existing FEMA modular framework for public health audiences. This enhanced consistency of training materials with existing FEMA offerings reduced development costs by conserving existing preparedness resources and avoiding duplication of effort. This strategy also aligned with CDC's CPHP program priority to "maximize outreach of existing preparedness materials."[8]

Course competencies

The JH-CPHP NIMS courses aim to describe the key concepts and principles of NIMS, introduce ICS functions and underlying principles, and describe ICS applications for differing incident complexities. Further, the trainings describe the relationship between ICS and NIMS, provide LHDs with a consistent nationwide template to work together with other incident responders, and aim to impart a comprehensive understanding of the material to facilitate successful completion of FEMA certification exams. All three courses conform to official FEMA mandates and are in line with FEMA's National Integration Center requirements. The courses include interactive lecture materials and are tailored to meet the unique emergency preparedness demands and challenges of the public health workforce.

The aforementioned training series also meets CPHP program goals set by CDC, including "strengthen public health workforce readiness through implementation of programs for life-long learning" and "develop a network of academic-based programs contributing to national preparedness by sharing expertise and resources across jurisdictions."[8] The training curricula also comply with priorities set by the Association of Schools of Public Health and the Council on Education for Public Health, such as "developing partnerships . . . to strengthen education, research, and service in accredited schools of public health."[9] Finally, the training modules comport with a variety of recommendations from other state and federal public health authorities, including "creating innovative, collaborative partnerships to better utilize academic and practice resources" and "recognizing the essential role of providing continuing education for the public health workforce."[10,11]

Course development

As their first step in curricular development, JH-CPHP experts identified methods to make existing FEMA course material relevant to a public health audience while emphasizing the opportunities and importance of NIMS. Specifically, they identified the methods and adapted course content based on their experiences working in the field of PHP and ongoing CPHP-based training experiences with regional LHD staff.

The JH-CPHP experts applied a variety of strategies to achieve this goal. First, they changed all examples, figures, and pictures in the presentation to fit a public health context. Then they created additional slides to describe challenges and opportunities for LHDs in adoption of NIMS. Further, experts visually rearranged the core conceptual principles of NIMS and simplified technical concepts. Finally, trainers introduced acronyms and mnemonics to facilitate memorizing of key NIMS concepts. For example, the JH-CPHP training applies the "I SAIL FLOP" mnemonic for teaching the principal ICS organizational structure in the following way: **I**ncident Commander; **SAIL**—Command Staff: **S**afety Officer, **A**gency Representatives (not technically part of Command Staff, but reporting to the Liaison Officer), **I**nformation Officer, **L**iaison Officer; **FLOP**—General Staff: **F**inance/Administrative Section Chief, **L**ogistics Section Chief, **O**perations Section Chief, **P**lanning Section Chief.

JH-CPHP experts completed the initial stage of course development in approximately four months. The modules did not receive formal piloting, as they were essentially adapted from the nationally accepted, standardized FEMA curriculum; however, JH-CPHP experts adapted content based on early audiences' feedback, as described in the next section.

Course evaluation

During the initial training sessions, a JH-CPHP expert would accompany the selected trainer to observe course delivery and provide feedback and suggestions for improvement. In addition, at the end of each training module, participants provide feedback through an evaluation sheet that assesses course material and delivery. The JH-CPHP subject-matter experts created this training evaluation tool, which was independently reviewed and approved by the educational design expert. The evaluation contains nine statements regarding course content and presentation, as well as a section for additional comments. Participants indicate their level of agreement with each statement by checking one box on a five-level Likert analog scale, as follows: strongly disagree, disagree, agree, strongly agree, no

opinion.[12] Subsequently, the trainers review the evaluation forms and JH-CPHP staff enter the evaluations into a collective database, which the JH-CPHP experts periodically review. An evaluation of data collected from May 2008 to September 2009 showed that 80% of participants (n=170) agreed or strongly agreed that "the presentation had enough interactive exercises," 89% (n=551) agreed or strongly agreed that "the session provided information that will be useful to [them] now or in the future," and 90% (n=170) agreed or strongly agreed that "overall, the session was valuable to [them]."

Content adaptation

During several months of initial course delivery, JH-CPHP experts' review of course evaluation sheets showed positive ratings for course content, facilitators, and presentation. Also, through informal conversations with participants, trainers learned that participants and supervisors perceived the course as effective and helpful to their professional settings. However, three themes emerged as potential areas for improvement, based on participant feedback: (*1*) certain command concepts were difficult to understand, (*2*) the volume of information presented within a three- to six-hour period was, at times, overwhelming, and (*3*) additional examples and scenarios were requested to illustrate the practical application of NIMS/ICS. Additionally, JH-CPHP experts observed difficulty in explaining certain concepts and models—for example, the rationale behind using a single command, unified command, or area command. To address these identified areas for improvement, JH-CPHP experts simplified difficult concepts and added additional examples where required. Again, the educational design expert reviewed the new adaptations. Further, the trainers added a glossary of terms to course material and condensed content to highlight only fundamental NIMS/ICS concepts. From a logistical perspective, the trainers introduced more breaks within the course delivery.

Early in the training process, JH-CPHP experts observed another challenge for effective training implementation in LHDs; namely, many participants did not view the subject matter as relevant to them. This challenge was mostly due to some participants' perceptions that their LHD roles would rarely lead them to an incident site where they would need to actively apply ICS skills. In moving forward with the curriculum, JH-CPHP experts worked to rectify this issue with more interactive exercises, additional public health-specific scenarios, and nontraditional ICS application examples, such as using ICS to manage a health fair or vaccine clinic. Recent participant feedback has shown encouraging improvement regarding this issue.

To introduce illustrative examples, trainers developed an extended emergency scenario—the "Bag Tabletop"—that they embedded into the IS-100a-adapted content. (Again, a third JH-CPHP expert evaluated this scenario prior to induction.) The Bag Tabletop is a scenario-based exercise formulated by JH-CPHP staff to systematically portray the practical implementation of an ICS structure.

The scenario describes a hypothetical incident occurring in an office cafeteria and periodically jumps forward in time to cover a 28-hour period of incident response and recovery. The exercise starts with an unattended gym bag left inside an office cafeteria. As the incident evolves, a bomb hidden inside the bag detonates, leading to death, injury, and structural damage. Thirty-five minutes after detonation, participants discover that a hazardous gas was released during the bomb's detonation. Throughout the exercise, JH-CPHP expert trainers ask participants a series of questions dealing with ICS concepts, such as resource management, organizational facilities, and reliance on an Incident Action Plan. The trainers also ask participants questions regarding practical incident management dilemmas, such as communicating with the media (including whether, when, and how) and maintaining continuity of operations. The exercise is based on an actual incident that occurred on July 31, 2002, when a bomb exploded inside an unattended bag in the student cafeteria of Jerusalem's Hebrew University in Israel.[13] JH-CPHP trainers chose this scenario because it can apply to a typical office environment and illustrates how incidents can evolve over time as more information about the event and its impact becomes incrementally available.

Practice-academic collaboration: JH-CPHP and NACCHO

One of JH-CPHP's key partners is NACCHO, the national organization representing LHDs. NACCHO supports efforts that protect and improve the health of all people and all communities by promoting national policy, developing resources and programs, seeking health equity, and supporting effective local public health practice and systems. The following section outlines a case example of practice-academic collaboration to further develop JH-CPHP's public health-specific NIMS course content in a timely context of pandemic influenza readiness.

In late April 2009, the World Health Organization announced the emergence of a novel influenza A (H1N1-09) virus not previously circulated in humans.[14]

Following this announcement, CDC requested that NACCHO support federal response to the outbreak by facilitating communications among LHDs, as well as between LHDs and CDC. In an effort to establish an effective multi-agency partnership, NACCHO activated its ICS and provided liaison personnel to CDC's Emergency Operations Center in Atlanta, Georgia. NACCHO's operations were viewed as largely successful by its management team, although several areas for improvement emerged during these response activities.

In June 2009, NACCHO conducted an extensive internal review of its response activities in an effort to identify gaps and opportunities for improvement. The review process aimed to assess the effectiveness of existing infrastructure, resources, and procedures and to identify required corrective actions prior to resuming full-scale operations in the fall. The evaluation found that NACCHO personnel could greatly benefit from additional NIMS/ICS training. Although many NACCHO staff had previously received such training, reviewers felt that public health-specific information was required to ensure the success of future operations. Specifically, this information included recognition of the need for training modules focusing on the needs, roles, and responsibilities of public health associations during emergency response.

NACCHO became aware of the JH-CPHP public health-specific curriculum through its interaction with CDC and LHDs and in the course of its activities throughout the National Capital Region. NACCHO elected to partner with JH-CPHP, as JH-CPHP's menu of NIMS courses appeared to be unique and specifically designed for public health practitioners while also conforming to FEMA training requirements.

On August 17, 2009, JH-CPHP personnel conducted the first in a series of two NIMS IS-700a/100a training sessions at NACCHO headquarters in Washington, D.C. Thirty-nine NACCHO staff participated in this seven-hour, interactive training presentation. Following the training, reviews of the JH-CPHP evaluation tool by the trainer showed positive ratings for course content, facilitator, and presentation. In an informal discussion with supervisors post-training, staff members also stated that information provided helped frame their emergency response roles and responsibilities within a public health context. Participants also communicated that they perceived the training as essential in clarifying some response activities that had taken place during NACCHO's spring activation, and they felt that the core concepts taught would help them operate more effectively during a variety of future emergencies.

Nonetheless, while the training provided all essential awareness-level information, the evaluation tool revealed that a number of trainees felt course materials could have been better tailored to NACCHO's needs. In addition, during the training session, NACCHO staff raised a considerable number of questions regarding NIMS in the context of influenza A (H1N1-09) response.

On August 19, 2009, the U.S. Department of Homeland Security coordinated an H1N1 Business Guidance Press Conference, and CDC released its "Guidance for Businesses and Employers to Plan and Respond to the 2009–2010 Influenza Season."[15,16] That week, JH-CPHP experts added a pandemic influenza and NIMS section to its series of NIMS training for LHDs, based on recommendations by the Department of Homeland Security, CDC, and the U.S. Department of Labor's Occupational Safety and Health Administration.[16,17] The section spans 15 minutes and provides a brief overview of practical steps for preparing the workplace for influenza season, highlighting key ways to utilize NIMS for influenza planning, ensuring employee safety, financial considerations, and maintaining continuity of operations.

After the August 17, 2009, training session, NACCHO and JH-CPHP staff engaged in several evaluation and planning discussions in an effort to further tailor training materials to better meet participants' needs. During the course of these discussions, NACCHO senior staff relayed participant and supervisor feedback on the first training session to JH-CPHP experts. JH-CPHP and NACCHO made the joint decision to add the pandemic influenza and NIMS section to an upcoming NACCHO training session that would also include a tabletop exercise focusing on applying NIMS concepts to a NACCHO-focused hurricane scenario.

The "Hurricane Tabletop," developed by a senior employee in NACCHO's PHP division, received independent review by a JH-CPHP subject-matter expert prior to implementation by JH-CPHP. This tabletop scenario depicts a hypothetical tropical storm that gradually evolves into a Category 4 hurricane and periodically jumps forward in time to cover a four-day period of incident response and recovery. Within the scenario, public health "injects" are based on several real incidents that have previously occurred in the U.S. The scenario's intent is to encourage NACCHO staff to discuss the changing considerations of an emergency situation, talk through plans and problems, and serve as a springboard for further preparedness exercises.

JH-CPHP conducted this second NIMS training session at NACCHO headquarters on September 2, 2009. At that time, NACCHO elected to open the training to members of partnering organizations. Forty NACCHO

staff members, one Association of State and Territorial Health Officials staff member, and three staff members from the Association of Public Health Laboratories participated in the training. Through the JH-CPHP evaluation sheet and informal conversations with supervisors, participants reported that the addition of the Hurricane Tabletop and pandemic influenza section (first trialed at this session) increased the effectiveness of other training materials and facilitated their understanding of NIMS/ICS and its practical application in emergency response operations. In particular, trainees became actively engaged in discussions while performing their assigned ICS roles during the tabletop exercise.

Overall, the JH-CPHP public health-specific NIMS training was important in helping NACCHO expand its cadre of trained staff who can now take part in future response operations. In a NACCHO management meeting, senior NACCHO PHP staff communicated that they felt these trainings have significantly improved NACCHO staff's understanding of ICS principles and ability to address needs of members, partners, the media, and the public during an incident. Following JH-CPHP's training series, all participants were able to successfully complete the FEMA IS-100a and IS-700a requirements and become fully certified for these training levels.

DISCUSSION

According to FEMA, NIMS training must be completed by "all federal, state, territorial, tribal, private sector, and nongovernmental personnel with a direct role in emergency preparedness, incident management, or response." To date, there has been no national-level assessment to quantify NIMS compliance across the U.S. This task presents a challenge, as many different NIMS training courses exist, especially at the awareness and introductory levels. While some agencies and stakeholders have taken the initiative to train personnel beyond the scope of present compliance requirements, others are still striving to meet basic training requisites. As a result, across the country, personnel receive varying degrees of NIMS training.[18] NACCHO's National Profile of LHDs reports that in 2008, 85% of LHDs provided emergency preparedness training to staff on NIMS compliance.[6] However, currently, there has been no formal national assessment of the percentage of LHD employees across the U.S. who are NIMS certified.

Since the inception of the JH-CPHP NIMS trainings, more than 2,500 public health workers representing 13 public health organizations in three states and the District of Columbia have participated in 71 face-to-face training sessions and completed the FEMA examinations. While not formally assessed, feedback on the perceived value, practicality, and usefulness of the training has come from course evaluation sheets, positive anecdotal comments from participants and managers, and LHD requests for additional training sessions to prepare their entire workforce. To test participants' understanding of materials, the modules have a built-in assessment tool in the form of the FEMA-issued certification exams. Although not formally monitored, anecdotal feedback from local partners suggests that close to 100% of course participants become NIMS certified post-training. While these tests are not unique to public health, they do offer an indication of trainees' acquisition of knowledge.

Strengths and weaknesses

Although trainings have been intermittently conducted across the country, a logistical weakness of the JH-CPHP face-to-face NIMS trainings is that they are generally geographically limited to local states and the District of Columbia. To allow for wider availability, after the initial content adaptation, JH-CPHP experts also tailored the public health-specific content to an online format. The intent of this decision was to facilitate broader dissemination of information beyond a single local region and to offer an efficient alternative to face-to-face trainings. The JH-CPHP website now offers the 700a and 100a public health-specific NIMS modules (the 200a module has not yet been fully converted to an online format).[19,20] In addition, the website offers an "Introduction to Public Health Preparedness and Response" module explaining basic preparedness concepts, and an "Example Application: ICS and Influenza A (H1N1-09)" module outlining a nontraditional, public health-relevant ICS application.[21] These online courses include content that is consistent with the corresponding face-to-face versions and utilize a trainer-guided narrative including relevant examples and public health-oriented illustrations. Since the initiation of the JH-CPHP website trainings, more than 350 people have elected to take the public health-specific modules online.

Besides the online modules, JH-CPHP has considered, but not yet developed, a train-the-trainer model for its NIMS content offerings. Such an approach would conceivably efficiently expand geographic training reach and provide a face-to-face alternative to JH-CPHP's online NIMS materials. To ensure quality control, the subject specificity of such trainings would obviously require careful pre-identification of suitable LHD-based trainers who themselves possess the requisite NIMS credentialing and experience in

applying NIMS/ICS concepts to public health situational contexts.

An element of the curriculum that represents both a strength and a weakness is its adaptation from existing FEMA materials. FEMA materials are nationally accepted, verified, and readily available online. However, in some instances, adhering to FEMA regulations has caused JH-CPHP trainers to teach to the test—an approach that can sometimes interrupt the flow of important concepts and understanding of salient ideas. Moreover, successful completion of the FEMA-issued test may not necessarily indicate acquisition of practical, applicable, and sustainable competencies that produce a more robust and prepared public health system. These observations stem from JH-CPHP trainers' recognition that some certification questions appear to focus more upon memorizing peripheral concepts than grasping fundamental concepts.

CONCLUSIONS

To be successful, public health systems need to cope with a wide range of threats and be able to prevent, prepare for, respond to, and recover from emergencies.[1] While training is essential to develop a qualified workforce, we consider qualified personnel to be more than the sum of their training. To qualify a candidate for service in an all-hazards ICS position during an incident, training requires experiential supplementation through drills, simulations, and field deployment. To date, JH-CPHP has not conducted post-training assessments to gauge the usefulness of training knowledge or whether it has been practically applied by participants. Although the JH-CPHP NIMS trainings alone cannot necessarily qualify participants to operate within an ICS structure, we believe that our scenario-based simulations, interactive exercises, and nontraditional ICS-application examples offer an additional dimension of training and more in-depth understanding of NIMS/ICS. In addition to participant and supervisor feedback, JH-CPHP expert trainers have made these observations during several interactive aspects of the training modules, which have allowed them to examine participants' comprehension of study material.

The U.S. government has invested large amounts of financial and human capital in enhancing the preparedness of the American public health system. At present, it is difficult to objectively measure progress and the preparedness gaps that still exist.[1] Successful public health emergency response requires familiarity with emergency management principles, expertise in NIMS/ICS, awareness of hazards and safety precautions, and more. Responders must integrate into a standardized command structure and work together with other response agencies in frequently unfamiliar environments and roles. The needs-driven approach used by JH-CPHP for course development has resulted in a set of face-to-face NIMS trainings that directly address the unique perspectives of public health employees in emergency response contexts. The training series offers the opportunity to strengthen public health workforce preparedness by sharing expertise and resources between academia and practice across state and local jurisdictions. The success of JH-CPHP's NIMS training has been recognized by regional LHDs, NACCHO, and the Maryland Emergency Management Agency, which displays JH-CPHP courses as "sponsored NIMS/ICS training programs" on its website.[22]

Avenues for future investigation should include assessing the number of public health professionals across the country who are NIMS certified and evaluating their familiarity with NIMS principles and their ability to function in an ICS structure. On a broader scale, research is required to evaluate the national level of NIMS compliance and the success of NIMS as a national framework for disaster management. Over time, this research will allow for the development of validated benchmarks, standards, and metrics that will enable public health systems to achieve a better level of preparedness and demonstrate the value of society's investment.

REFERENCES

1. Altevogt BM, Pope AM, Hill MN, Shine KI, editors; Committee on Research Priorities in Emergency Preparedness and Response for Public Health Systems. Research priorities in emergency preparedness and response for public health systems: a letter report. Washington: National Academies Press; 2008. Also available from: URL: http://books.nap.edu/openbook.php?record_id=12136&page=R1 [cited 2009 Oct 15].
2. National Association of County and City Health Officials. 2005 national profile of local health departments. Washington: NACCHO; 2006. Also available from: URL: http://www.naccho.org/topics/infrastructure/profile/upload/NACCHO_report_final_000.pdf [cited 2010 Jun 12].
3. Department of Homeland Security (US). Homeland Security Presidential Directive-5: management of domestic incidents [cited 2009 Sep 29]. Available from: URL: http://www.dhs.gov/xabout/laws/gc_1214592333605.shtm
4. Department of Homeland Security (US). National Incident Management System [cited 2009 Sep 20]. Available from: URL: http://www.fema.gov/pdf/emergency/nims/NIMS_core.pdf
5. NACCHO. Operational definition of a functional local health department [cited 2010 Jun 12]. Available from: URL: http://www.ct.gov/dph/lib/dph/government_relations/local_health_council/operationaldefinitionbrochure-2.pdf
6. NACCHO. 2008 national profile of local health departments. Washington: NACCHO; 2009. Also available from: URL: http://www.naccho.org/topics/infrastructure/profile/resources/2008report/upload/NACCHO_2008_ProfileReport_post-to-website-2.pdf [cited 2010 Jun 12].
7. Federal Emergency Management Agency (US). Emergency Management Institute [cited 2009 Sep 21]. Available from: URL: http://training.fema.gov

8. Centers for Disease Control and Prevention (US). Office of Public Health Preparedness and Response, Centers for Public Health Preparedness (CPHP) Program: about the program [cited 2010 Jun 12]. Available from: URL: http://www.bt.cdc.gov/cdcpreparedness/cphp/background.asp
9. Association of Schools of Public Health. About ASPH [cited 2009 Oct 1]. Available from: URL: http://www.asph.org/document.cfm?page=100
10. Institute of Medicine. The future of the public's health in the 21st century. Washington: National Academies Press; 2002.
11. Association of Schools of Public Health. Demonstrating excellence in academic public health practice. Washington: National Academies Press; 1999. Contract no. 240-95-0023.
12. Likert R. A technique for the measurement of attitudes. Arch Psychol 1932;22:1-55.
13. Bennet J, Kifner J. At least 7 killed as militants bomb Jerusalem campus. The New York Times 2002 Aug 1 [cited 2009 Sep 22]. Available from: URL: http://www.nytimes.com/2002/08/01/world/at-least-7-killed-as-militants-bomb-jerusalem-campus.html
14. World Health Organization. Influenza-like illness in the United States and Mexico [cited 2009 Oct 2]. Available from: URL: http://www.who.int/csr/don/2009_04_24/en/index.html
15. Department of Homeland Security (US). Transcript from H1N1 Business Guidance Press Conference [press release]; 2009 Aug 19 [cited 2009 Oct 10]. Available from: URL: http://www.flu.gov/transcripth1n1pressconf.html
16. Centers for Disease Control and Prevention (US). Guidance for businesses and employers to plan and respond to the 2009–2010 influenza season [cited 2009 Oct 3]. Available from: URL: http://www.cdc.gov/h1n1flu/business/guidance
17. Department of Labor (US), Occupational Safety and Health Administration. Guidance on preparing workplaces for an influenza pandemic. OSHA report no. 3327-02N 2007 [cited 2009 Sep 13]. Available from: URL: http://www.osha.gov/Publications/influenza_pandemic.html
18. Federal Emergency Management Agency (US). National Incident Management System (NIMS) resource center: five-year NIMS training plan [cited 2009 Sep 10]. Available from: URL: http://www.fema.gov/emergency/nims/NIMSTrainingCourses.shtm
19. Johns Hopkins University, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins Public Health Preparedness Programs. National Incident Management System (NIMS) training for public health departments [cited 2010 Apr 20]. Available from: URL: http://www.jhsph.edu/preparedness/training/online/nims.html
20. Johns Hopkins University, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins Public Health Preparedness Programs. ICS-100 training for public health departments [cited 2010 Apr 20]. Available from: URL: http://www.jhsph.edu/preparedness/training/online/ics100.html
21. Johns Hopkins University, Johns Hopkins Bloomberg School of Public Health, Johns Hopkins Public Health Preparedness Programs. Introduction to public health preparedness and response [cited 2010 Apr 20]. Available from: URL: http://www.jhsph.edu/preparedness/training/online/prep_and_response.html
22. Maryland Emergency Management Agency. NIMS training [cited 2010 Jun 12]. Available from: URL: http://www.mema.state.md.us/NIMS/index.jsp#