

Public Health's Role in Terrorism Preparedness and Response for Children

I. Introduction

Public Health for many years has been thought of primarily as a safety net for the poor. Yet its true role embraces the whole population and shapes everyone's lives. It has and must played a significant, and in some cases a singular, role in the nation's preparedness to prevent the effects of terrorism, through its core functions of assessment, assurance and policy development.

Public Health at the governmental and community level strives to assure that ten public health essential services¹ are being met for the population it serves through cooperation with private and public entities. These are:

1. Monitor Health Status to identify community health problems.
2. Diagnose and identify health problems and health hazards in the community.
3. Inform, educate and empower people about health issues.
4. Mobilize community partnerships to identify and solve problems.
5. Develop policies and plans that support individual and community health efforts.
6. Enforce laws and regulations that protect health and ensure safety.
7. Link people to needed personal health services and assure the provision of health care when otherwise not available.
8. Assure a competent public health and personal health care workforce.
9. Evaluate effectiveness, accessibility and quality of personal and population based services.
10. Research for new insights and innovative solutions to health problems.²

Public Health has not received due credit for its singular importance to the nation's health. In fact, the great majority of the increase in the average life span in the U.S. was due to public health efforts. The success of the early public health system to incorporate biomedical advances (e.g., vaccinations and antibiotics) and develop interventions such as health education programs resulted in decreases in the impact of infectious diseases. However, as the incidence of these diseases decreased, chronic diseases (e.g., cardiovascular disease and cancer) increased. In the last half of the century, public health identified the risk factors for many chronic diseases and intervened to reduce mortality. Public health efforts also significantly reduced deaths attributed to a new technology, the motor vehicle. These successes demonstrate the value of community action to address public health issues and have fostered public support for the growth of institutions that are components of the public health infrastructure.^{3 4}

¹ Turnock BJ, Public Health – What it is and How it Works, Aspen, 2001.

² Ibid.

³ Epidemiology Program Office, Achievements in Public Health, 1900-1999; Changes in the Public Health System. *MMWR*, December 24, 1999.(48(50):1141-47, CDC, DHHS..

⁴ Baker EL Jr, Koplan JP, Strengthening the nation's public health infrastructure: historic challenge, unprecedented opportunity, *Health Aff (Millwood)*. 2002 Nov-Dec;21(6):15-27

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Today however, public health faces many challenges, including inadequate infrastructure, training of professionals, and especially funding. Recently, the Institute of Medicine released a final draft version of its revised *Future of the Public's Health in the 21st Century*⁵. This long-awaited document is a call for action for improvements in our nation's public health system.

The committee authors state that the entities and systems that protect and promote the public's health, which is already challenged by threats such as obesity, the environmental toxins, and a large uninsured population, are now facing enormous challenges such as anti-microbial resistance and terrorism. The committee also embraced *Healthiest People 2010*, as a call for healthy people in healthy communities.^{6 7}

Unfortunately, the consensus among many public health providers⁸ is that while there has been a considerable effort to improve both terrorism preparedness and general public health preparedness, many critical systems, especially at the local levels, are not yet prepared. This feeling is particularly acute when the discussion turns to preparedness for children.

It is important to note that neither this IOM Report or *Healthiest People 2010* has any references to children and their inherent vulnerability to the effects of terrorism, despite widespread recognition by public health providers that children are a special population.

Children have singularly unique biological features that make them more susceptible to both chemical and biological threats. As a population they are especially at risk for the psychological effects of terrorism. As such, public health must play a lead role in fulfilling its core function of assessing the threats to children on both an individual and population level. Public health and its partners must also lead efforts to assure full emergency access and care with appropriate treatments; and shape the policies that will ensure that children are protected to the greatest extent possible from the effects of terrorism.

Public Health assumed a lead role after September 11, and during the anthrax scare and the ongoing smallpox vaccination campaign. However, in looking back it appears that children's needs were not a high priority in early planning efforts. Furthermore, neither HRSA nor the CDC specifically required children's issues to be addressed in their

⁵ Institute of Medicine, *The Future of Public Health in the 21st Century* (Unedited final proof), used by permission. 2003

⁶ U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office, November 2000.

⁷ U.S. Department of Health and Human Services. *Healthy People in Healthy Communities*, Washington, DC: U.S. Government Printing Office, January 2003. *Healthy People in Healthy Communities*.

⁸ Local health and state health directors have provided testimonies and or given feedback federal officials or to their professional associations including NACCHO, ASTHO, AMA, APHA and CSTE. A number of local and state health officials have testified to the U.S. Congress on preparedness since September 11, 2001 – source CSTE, Atlanta, GA. (No record was found of specific testimony by a local or state health leader to Congress on children's needs).

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original large RFP's in response to the events of September 11th. (However, this has dramatically changed in the 2003 RFP to States and Territories from both agencies.)

Two large CDC surveys directed at state and local health departments, an ASTHO survey and a Department of Justice Survey, contained no specific questions on children's terrorism preparedness ([cite these surveys](#)).

This consistent lack of mention of children's unique needs is interesting in the light that there are relatively large federal, state and in many cases local health agencies that have programs specifically directed at children. However, these programs do not tend to function holistically, improving children's health from a population perspective; they are often client-centered or concentrate on a small segment of all children. Most state and local health departments have not yet concentrated significant efforts on the effects of terrorism, with some notable exceptions.

During the anthrax investigations, the Public Health Practice Office and the EpiX Alert System at the CDC disseminated a number of important messages regarding drug dosages for prevention of anthrax in potentially exposed cases. Information on governmental policies regarding the non-provision of smallpox vaccine to children in the first stage and the effects of terrorism on children was disseminated by SAMSHA, CDC, HRSA and FEMA to state public health providers who passed on the information to local health departments and clinicians. However, clinicians and public health officials complained of feeling over-whelmed and confused, as there were often conflicting messages regarding dosages, interventions and other risk communication efforts from various federal, state and local agencies, especially when children were mentioned.

The following will highlight some past and ongoing efforts:

The Agency for Substance Abuse and Toxic Disease Registries (ASTDR) staff have considerable hands-on experience in the integrated response to chemical emergencies such as spills, explosions, and other uncontrolled releases. ATSDR maintains a 24-hour hotline and emergency response team that is fully integrated with the CDC Emergency Operations Center and has worked closely with the EPA, FEMA, FBI, Coast Guard, and other response agencies at the federal, state, and local level.

ATSDR also supports and maintains a national network of pediatric specialty clinics that provide expert consultation, training, and public education on chemical exposures in infants and children. Co-funded by the EPA as well as by local grants, these Pediatric Environmental Health Specialty Units (PEHSUs) proved instrumental after the terrorist attacks in 2001. They are training primary healthcare providers to recognize chemical "toxidromes" and triage and treat chemical exposures. They also provide community-based education and information on long-term health issues of concern.

The Substance Abuse and Mental Health Service Administration (SAMHSA) is currently funding the National Child Traumatic Stress Network. This program has three components: 1) National Center for Child Traumatic Stress; 2) Intervention

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Development and Evaluation Centers; and 3) Community Treatment and Service Centers.

The Agency of Health Care Research and Quality (AHRQ) provided the American Academy of Pediatrics with one year of funding for the development of a new Pediatric Terrorism Preparedness Resource. Currently in conceptual form, this Resource would include information such as equipment lists, medication dosages, protocols and training packages that could improve the ability of all health care professionals to undertake pediatric preparation and planning activities for hospitals, schools, EMS and their communities. The Resource also would include educational and training material that could be used by pediatricians and other health care professionals to guide government agencies, schools, EMS and other disaster preparedness efforts nationwide. The Pediatric Terrorism Preparedness Resource would take two years to complete and distribute. It is modeled after the successful TRIPP: Teaching Resource for Instructors in Pre-hospital Pediatrics program.

The Federal Drug Administration's (FDA) main public health mandate regarding counter-terrorism is facilitating the availability of safe and effective drugs, vaccines, and medical devices for individuals exposed to a biological, chemical, radiological or nuclear agent. The agency is working to get medical countermeasures off investigational and developmental status and approved with appropriate use information, including special populations such as children. There are several centers involved in this effort: Center for Drug Evaluation and Research (CDER) – drugs; Center for Biologic Evaluation and Research (CBER) - vaccines, blood products and other biologics; Center for Devices and Radiological Health (CDRH) – medical devices, diagnostics; and Center for Food Safety and Nutrition – foods. In addition, to working with other federal agencies such as NIH, CDC, DOD and DOE to get the necessary studies conducted so that medical countermeasures can be approved/licensed, the agency is funding some of these studies through inter-agency agreements and contracts. The agency is also working to obtain data on the use of some medical countermeasures in pregnant and lactating women and in the elderly.

In CDER, there is an entire office devoted to Counter-Terrorism and Pediatric Drug Development. Countermeasure activities for children include: approval of a 65 mg tablet of potassium iodide and home preparation instructions; the dosing of amoxicillin in adults and children for post-exposure inhalational anthrax; and doxycycline stability/palatability for home preparation. To ensure the ethical conduct of research done in children, the FDA incorporated Subpart D of the HHS regulations into the FDA regulations (Additional Safeguards for Children in Clinical Investigations) and worked on the International Conference on Harmonization document E11 – Clinical Investigation of Medicinal Products in the Pediatric Population.

The National Institutes of Health has many key roles in children's preparedness, under the auspices of the National Institute for Child Health and Development. (NICHD): In July of 2002, the NICHD hosted a research agenda-building workshop on Children Exposed to Violence, including domestic violence, community violence, and

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war/terrorism, in collaboration with nine other federal agencies. These included the National Institute of Mental Health (NIMH), the National Institute on Drug Abuse (NIDA), the Office of Behavioral and Social Sciences Research (OBSSR), and the Fogarty International Center (FIC) of the National Institutes of Health, the Centers for Disease Control (CDC), the Substance Abuse and Mental Health Services Administration (SAMHSA), the Office of Special Education Programs of the Department of Education, the Office of the Assistant Secretary for Planning and Evaluation (ASPE), and the National Institute of Justice (NIJ) in the Department of Justice. Based on recommendations from this workshop, the NICHD will be issuing a Program Announcement with a special "set-aside" on this topic in 2003. The Program Announcement will encourage research on the epidemiology of children exposed to violence, measurement and definitional issues, consequences and mediators of violence exposure, and services and interventions for children and families. The Program Announcement will be in effect for three years, with approximately \$3 million in set-aside per year to fund 8-9 new projects.

The National Institute for Mental Health (NIMH) supports a number of national health and mental health surveys that will provide a snapshot of mental health in the U.S. before and after the 9/11 terrorist acts. These will include information about associations between exposure to the attacks and levels of overall distress and function, mental disorder onset or recurrence, medication use, substance use, and need for and use of mental health services. Results of these benchmark surveys will aid in developing future studies that explore the causes and treatment of stress-related mental disorders. In addition, researchers will be able to test hypotheses generated from case-control studies within these larger, representative samples.

Promoting research is a public health essential service. NIMH is currently funding significant research that includes a special focus on childhood trauma.

The Health Resources and Services Administration (HRSA) is managing five programs, which are focused on bio-terrorism and other public health emergencies:

The ***Bioterrorism Hospital Preparedness Program*** will improve the capacity of the nation's hospitals and emergency departments to respond to biological terrorist attacks and large-scale epidemics. It will also promote state and regional planning among local hospitals, EMS systems, community health centers, poison control centers, and other health care facilities to improve their readiness to work together to combat terrorist attacks. In FY 2002, \$125 million was awarded for hospital preparedness to 56 States/territories and 3 municipalities in two phases:

- *Phase One* supported the State Health Departments to initiate a planning process to conduct a needs assessment and to develop a plan of action to respond to a bio-terrorist incidents. States and territories were asked to involve appropriate entities such as state hospital associations, individual hospitals, emergency medical systems, health centers and poison control centers.

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- *Phase Two* funds were awarded for implementation of approved plans submitted by States/territories/municipalities to upgrade the ability of health care entities to respond to biological events, develop a multi-tiered system in which local health care entities are prepared to triage, stabilize and refer multiple casualties of a terrorist event to identified centers of excellence, or develop multi-state or regional consortia to pool limited resources to accomplish these goals.

In FY 2003, funding is currently proposed at a level of \$518 million. HRSA will broaden the FY 2002 efforts by supporting the implementation of the approved State-based Hospital Preparedness plans for bio-terrorism to strengthen and upgrade the capacity of hospitals, outpatient facilities, emergency medical services systems and poison control centers to care for victims of bio-terrorism suffering from infectious disease epidemics.

During FY 2003, there will be increased emphasis on building and improving hospital infrastructure. One objective is to ensure adequate hospital laboratory capacity throughout the U.S. to diagnose and report on potential biological and chemical agents that might be used by terrorists. A second objective is to help hospitals improve their capabilities to control infection while treating individuals who have or are at risk for a communicable disease. A third objective is to assist hospitals with the purchase of personal protective equipment, decontamination facilities and other equipment for decontamination of biological and chemical agents.

HRSA Bioterrorism Health Professional Schools Curriculum Development and Training: The FY 2003 and FY 2004 budget includes a request for \$60 million for the development of the Bioterrorism Educational Incentives for Curriculum Development and Training Program. The goal of this program is the development of a healthcare workforce possessing the knowledge, skills and abilities to: (1) recognize indications of a terrorist event in their patients; (2) treat their patients in a safe and appropriate manner; and to (3) rapidly and effectively alert the public health system of such an event at the community, state and national level.

The program will focus on two particular areas: (1) the delivery of continuing education to health professionals already in practice; and (2) providing incentives for curricular reform in health professions schools and training. It will be designed to develop an interdisciplinary workforce of healthcare personnel to prepare for and respond to a bio-terrorist attack, as well as to address the crucial need for integration of healthcare professionals into the public health network.

HRSA Emergency Medical Services for Children (EMSC): This program supports the bioterrorism effort because it makes specific contributions to address the needs of the target population. The EMSC program, proposed at a level of \$18.94 million in FY 2004, will be able to assist states to improve emergency care for children, as well as enabling them to continue to promote regionalized care and make systems improvements to ensure that all components of an effective EMSC system are in place. Systems improvement grants to States will be maintained, a maintenance level of evaluation and data improvement will be funded, and continued development of an evidence-based

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research network will be supported. Each year over 31 million children and adolescents are seen in emergency departments. Fewer than half of all hospitals (46%) with emergency departments have the necessary equipment to stabilize ill and injured children. This will help assure that the broader emergency preparedness program accommodates the special needs of children.

HRSA Poison Control Centers (PCC): The Poison Control Centers (PCC) are proposed for a funding level of \$21.2 million in FY 2004 . They are an integral and vital part of the health system and part of the continuum of necessary emergency services that should be available to all Americans, particularly in light of the new bioterrorism threats. Funding will present an opportunity to broaden the mission of the PCC to serve as a source of public information for chemical and biological events. HRSA will work with CDC to maintain a national toll free number for poison control services.

Trauma/Emergency Medical Services Program: This program managed a National Assessment of Needs in State Trauma Systems in 2001-2002. The assessment identified the following five priorities that must be in place for state trauma system development to be able to effectively plan, communicate, and implement future statewide trauma system initiatives: (1) state assessment; (2) lead agency; (3) State level manager; (4) statewide stakeholder group; and (5) state plan for trauma care delivery. It is proposed that these activities be funded from the Maternal and Child Health Block grant in future years.

The Centers for Disease Control (CDC) has responded to public health emergencies for decades, and had been preparing for bio-terrorism since 1998. Current or future efforts include:

- CDC guidelines to the states will include specific recommendations for children.
- The CDC and the U.S. Department of Education are collaborating to help schools prepare for possible terrorism by providing state and local education, health, emergency management, law enforcement and homeland security agencies with updated information on biological, chemical, and radiological threats; answering questions about school preparedness and response; and describing roles of partnering agencies in the case of a terrorist threat.
- Information and fact sheets on children and terrorism are being made available on a CDC web site.
- The National Center for Injury Prevention and Control (NCIPC) is developing guidelines for rapid assessment of injuries and mental health, for children and adults, in the immediate aftermath of large-scale disasters and emergencies.
- The CDC gave technical assistance to a survey commissioned and sponsored by the New York City Board of Education that assessed the mental health effects of the September 11 attacks on over 8,000 school children in New York City public schools.

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The 2002-2003 CDC Preparedness Grant was a large step in getting states prepared for bio-terrorism events. Through the states, the CDC last year disseminated approximately \$918,000,000 to improve national, state and local health preparedness. It divided efforts into six focus areas, which did not specifically address children. It is believed that the next grant cycle will require an emphasis in each of the following areas regarding preventing or ameliorating the effects of terrorism on children:

1. **Emergency Preparedness:** State and local health departments will need to actively ensure careful planning for prevention of anti-biological and vaccines, treatment protocols, coordination between emergency response and public health and many other functions.

Recommendation: It is incumbent on the Secretary of HHS to ensure that each Emergency Preparedness Focus Area addresses the needs of children, including vaccines, emergency transport, biologicals, chemical protection and appropriate mass causality response.

2. **Surveillance:** Children's hospitals and child health providers must be included in both active and passive surveillance systems being developed at the state and local level. Increased stress must be placed on out-patient and syndromic surveillance methods that may detect community and specific patient threats early. Providers and public health providers need to interact frequently on common disease threats to make sure they have the ability to communicate and interact during a terrorist situation.

Recommendation: Surveillance and assessment is essential to detect disease threats and children's conditions must be monitored by both active and passive systems. Pediatricians and pediatric hospitals must be trained to report suspected cases of biological or chemical events to local health departments and/or law enforcement officials.

3. **Laboratory:** Laboratories are becoming better prepared to detect biological and chemical threats but it is unclear whether or not this is being stressed at children's hospitals.

Recommendations: Laboratories at children's hospitals should have referral mechanisms to laboratories capable of detecting highly dangerous biological and chemical threats.

4. **Chemical:** Not currently funded in most states.

Recommendation: We recommend that this should be funded and include funding for pre-measured antidotes for children, laboratory capacity, protective devices and training.

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5. **Health Alert Network (HAN): Recommendation:** We recommend that the HAN be linked in all states to HHS web sites on the children and terrorism and the Academy of Pediatrics. We also recommend that the information on the special needs of children in regards to anti-terrorism prevention be widely linked to portals to hospitals, local health, laboratories, and professional associations.
6. **Risk Communication: Recommendation:** We recommend that targeted resources be used to educate the public and providers on the special needs of children regarding terrorism preparedness.
7. **Education and Training:** Along with specific drug, equipment and hospital preparedness, this may be the current weakest link in preparedness for childhood terrorism on a widespread scale; despite current efforts, many providers would have no idea what to do with children in a terrorism scenario.

Recommendation: Local and state health workers, EMS personnel, laboratorians, hospital workers, providers, and community partners must get needed training on the special needs of children regarding preventing, treating, and ameliorating the physical and mental effects of terrorism. The CDC should mandate that all counties have trained personnel who can deal with terrorism preparedness for children at the provider and public health level. Tabletop and other exercises, courses and other methods of instruction should be used and repeated to sustain these competencies. The use of the HAN needs to become widespread by all those working to combat the effects of terrorism on children.

8. **Hospitals:** It is assumed that HRSA will continue to play the lead role here, working with the CDC, state and local public health and other partners. It is encouraging that funding for HRSA grants to state and hospitals has increased substantially. The CDC had considered the following draft language in its upcoming RFP to state health officials. However, it did not make the final RFP:

"Children: Emergency preparedness plans should pay special attention to the unique needs of children. Because of a host of special anatomical, physiological and psychological considerations, young children are more susceptible to the untoward consequences of disasters and acts of terrorism.

Planning should consider, but not be limited to, special treatment areas for mass pediatric casualties in hospitals, triage areas and health centers; development of pediatric response protocols paying special attention to appropriate medications and dosages; appropriate decontamination units that reduce the possibility of heat loss and shock while permitting young children to be held by caretakers; pediatric-specific training and drill procedures; and, provision of psychological support to children and families, including methods to ensure reunification of children with family

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members as needed. Furthermore plans should ensure inclusion of pediatric expertise in the development of overall disaster plans.

Many of the above tasks cannot be done by local or even state health departments in isolation. Rather they must work actively with community partners, hospitals, and key agencies such as the Red Cross to ensure that the guidelines of the RFP will be met."

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Some states produced web sites during the last year specifically to address children's terrorism needs from a public health perspective. For example, Maryland at the height of the anthrax scare set up a toll-free Youth Crisis hotline and links to other sites at <http://www.dhmd.state.md.us/html/terrorism.htm>.

Local health departments also placed information on the web; one fine example is the San Francisco Health Department, which shares how both adults and children are affected by terrorism at <http://www.dph.sf.ca.us/CopeTerror/CopeTerrorGenl.htm>.

We are pleased with these efforts, but they do not currently go far enough from a public health perspective. We are hopeful that the future federal grants to states have stronger language about community needs, which will bring sustained emphasis to this area and include an enforcement mechanism.

II. Disaster Planning for Children by Public Health

A. Mitigation

It is impossible to prepare children fully for the effects of terrorism from both a physical and emotional perspective. In the substantial ongoing literature regarding children and the effect of terrorism or crisis, one of the most interesting topics is resiliency, the idea that some children and communities seem better prepared to handle stressful events. There is a large body of literature suggesting that individuals, families, and even communities can prepare children for stressful events by ongoing awareness and preventive practices. Kiser, Ostojka and Pruitt emphasize building family awareness of resiliency factors to help overcome disasters or other stressful events. Severe unexpected stressors that place significant strain on family functioning include serious illness, death, violence, and both natural and man-made disasters. However, families and children that have learned to handle expected stresses usually deal better with these situations.⁹

B. Preparedness:

⁹ Kiser LJ, Ostojka E, Pruitt DB, Dealing with stress and trauma in families, Child Adolesc Psychiatr Clin N Am 1998 Jan;7(1):87-103

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Before commenting on the potential effects of the CDC and HRSA grants, which could go a long way towards local and state health preparedness to ameliorate the effects of terrorism, it is helpful to review an abbreviated testimony of Joseph L. Wright, MD, MPH, FAAP before the Senate Committee on Health, Education, Labor, and Pensions' Subcommittee on Children and Families on 11/02/01

Pediatricians are fond of saying "children are not little adults." But what precisely does this mean in relation to biological or chemical attack? Since children are smaller than adults, it is obvious that they may get sicker from the same amount of a harmful substance. The unique anatomic, physiologic and developmental characteristics of children place them at disproportionate risk from biologic and chemical agents in a number of specific ways.

First, children are particularly vulnerable to aerosolized biological or chemical agents because they breathe more times per minute than adults, meaning they would get relatively larger doses of the substance in the same period of time. Because some such agents, (e.g., chlorine and sarin) are heavier than air, they accumulate close to the ground, closer to the breathing zone of children.

Second, children are more vulnerable to agents that act on or through the skin because their skin is thinner and they have a larger surface-to-mass ratio than do adults. In other words, children have relatively more skin surface in relation to their total body mass.

Third, children are more vulnerable to the effects of agents that produce vomiting or diarrhea, because they have less fluid reserve than adults, increasing the risk of rapid dehydration. Also, children have smaller circulating blood volumes than adults, so without rapid intervention, relatively small amounts of blood loss from physical trauma can quickly tip the physiologic scale from reversible shock to profound, irreversible shock and death.

Fourth, children have significant developmental vulnerabilities not shared by adults. Infants, toddlers, and young children do not have the motor skills to escape from the site of a chemical, biological, or other terrorist incident. Even if they are able to walk, they do not have the cognitive ability to figure out how to flee from danger or to follow directions from others.

Like adults, all children are also at risk of psychological injury, such as posttraumatic stress disorder, from experiencing or living under the threat of biologic-chemical terrorism. In a mass casualty incident, children may witness injuries and deaths, possibly of their parents, which would produce both short- and long-term psychological trauma ("psychiatric casualties"). Unlike adults, however, children and adolescents may not have the cognitive or maturational capacity to fully comprehend what has happened. While parents would be psychologically devastated at the loss of a child, children who lose parents also lose emotional and financial support. If orphaned, a child would have to be

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placed in another home or institutional setting and suffer the trauma of dislocation, as well as parental loss and adjustment to new caretakers.

Finally, children are highly influenced by the emotional state of their caretakers. When the parents or other caretakers of a child are psychologically harmed by the events around them, it is likely to affect the psychological well-being of the child.

Once a child is critically ill or injured, his or her body will respond differently than that of an adult in a similar medical crisis. A child's condition can go from stable to life-threatening quite rapidly, since they have less blood and fluid reserves, are more sensitive to changes in body temperature, and have faster metabolisms. Therefore, pediatric treatment needs are special in a number of ways.

Unfortunately, even the most well-meaning planners are sometimes unprepared to meet pediatric needs. For example, after the terrorist attack on September 11, two Federal Disaster Medical Assistance Teams were dispatched from Washington to assist in New York. Appropriately, these teams included pediatric health experts. But, when these experts examined their equipment kits, they did not find all the supplies they would need to treat children. Fortunately, federal officials, in cooperation with the private sector, were able to get two pediatric emergency medical kits to Washington in time for the teams to take them to New York. These "Broselow-Luten" kits contain various sizes of medical equipment and pre-measured pediatric doses of medications, keyed by color to the size of the child as indicated on a special color-coded measuring tape.

In addition to special medical needs, children and/or their families will also have particular, psychosocial, logistical, and social services needs that may arise in a disaster situation. Some of these needs, gaps in meeting them, and recommendations for addressing the shortcomings, are discussed below.

Medications, Antidotes and Vaccines. Children need different dosages of medicine than adults, simply because they are smaller. In addition, drugs and biologicals may have effects on developing children that are not a concern for adults. For example, they can discolor a child's developing teeth, or cause growth retardation.

Equipment and Supplies. Obviously, children need different sized equipment than adults. Their veins are smaller, so small needles and tubing are needed. Smaller masks are needed to administer oxygen, and so on. At present, many ambulances and emergency departments do not have child-sized equipment and supplies, such as oxygen masks, IV-tubes, and neck braces. In fact, fewer than half of hospitals with emergency departments have the necessary equipment for stabilization of ill and injured children and few states require that advanced life-support ambulances, whose personnel can start IVs, administer medications, and insert airway tubes, carry all equipment needed to stabilize a child.

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Health Care Personnel. Health care workers taking care of children must be able to recognize the signs and symptoms that may indicate a life-threatening situation and intervene rapidly. This requires special training and, ideally, experience. Most emergency medical personnel, both in the field and in non-pediatric hospitals, treat relatively few children, which means that many of those who would respond to a terrorist attack or other disaster do not have well-honed skills in dealing with children.

Even pediatric health care experts are unfamiliar with the signs and symptoms of unusual biological, chemical or nuclear agents. For example, most pediatricians in this country have never seen a case of anthrax or smallpox. In addition, pediatricians, family physicians, and other health care providers must be encouraged to consider unusual causes of otherwise common symptoms (e.g., flu-like symptoms being caused by anthrax instead of the flu). They must be trained to recognize and treat the effects of the agents that might be unleashed by terrorists and to report suspicious cases to public health authorities. Methods for rapidly disseminating accurate information to health care personnel will be essential should a release of such substances occur.

Finally, health care workers who have treated children in a critical incident often suffer extraordinary stress, so the workers themselves may need special debriefing and psychological counseling.

Treatment Facilities and Transport. After a terrorist attack or other disaster, many children may need a high level of pediatric medical or surgical care. When there are many casualties, it will be important to ensure that resources are used in the most efficient manner possible, matching the patient's medical need with the capacity of the facilities available.

In 1993 the Institute of Medicine issued a report on emergency medical services for children, which recommended that local and regional systems be developed to identify hospitals that can provide advanced pediatric care and to ensure that ill or injured children are transported or transferred to a facility that provides the level of care needed.

Currently only 40% of hospitals with emergency departments have formal agreements to transfer children to a hospital with more advanced services, and few states have guidelines to identify hospitals with special resources for children, such as a trauma center or pediatric intensive care unit. Pediatric transport equipment and personnel may also be needed to accompany children in transit. In a large-scale terrorist attack, it is also likely that alternative health care sites (e.g., physicians' offices, community health centers, schools, and arenas), will need to be used to provide medical care, since hospitals themselves may be damaged, inaccessible, or unable to handle the number of people who need treatment. Therefore, it is important to ensure that these facilities have first-aid equipment and supplies appropriate for treating children.

Mental Health. As discussed above, children may suffer from posttraumatic stress disorder and other consequences of a terrorist attack, including those related to distressed caretakers. Many children will need mental health services. Yet, there is already a

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shortage of pediatric mental health professionals, and even children who are insured often do not have sufficient coverage for mental health services. In addition, it is important that information be disseminated about the various ways that post-traumatic stress disorder and other mental health problems may be manifested in children and adolescents.

Health Supervision in a Medical Home. Primary care providers, including pediatricians, may be the first line of defense in a bioterrorism or chemical attack because they can play a critical role in identifying sentinel cases of illness. In addition, they can quell the fears of the "worried well," recognize and respond to the psychosocial consequences of a terrorist incident or threat, and counsel families regarding preparation for and response to possible terrorist attacks or other disasters. Preparing for emergencies is particularly important for children with special health care needs who are on medications or dependent on medical technology.

Yet many children do not have adequate access to a primary care provider, or "medical home" that provides continuous, comprehensive, and coordinated preventive care and medical treatment. As a result, many families delay or forego care for their children. It is easy to imagine a delay in detecting an anthrax or salmonella release, for example, if the first few cases are among children whose families hesitate to seek medical care for financial reasons. Delays in detection can affect the health of the public at large. In addition, children who are uninsured or underinsured may strain the limited resources of emergency departments and public clinics with concerns about possible exposure to biological or chemical agents. They may not have access to physical rehabilitation and mental health services needed after terrorist incident. Also, when uninsured children are admitted to the hospital for expensive critical care, local taxpayers will bear the costs.

Thus, one of the ways in which this nation can prepare for and respond to a terrorist attack is make sure that every child has a "medical home" to provide preventive care, detect possible signs of an attack, provide necessary treatment, prescribe medications (e.g., prophylactic antibiotics for anthrax), and recognize mental health problems that may result from a terrorist attack or threat.

In addition, children need insurance coverage for the cost of health supervision, vaccinations, medications, and treatment, including mental health care. The official AAP position on this can be found at www.aap.org/advocacy/releases/medicalhome.htm.¹⁰

Out-of-Home Care and Activities. Most children spend much of their day in school, child care, after-school care facilities, and/or participating in athletic programs or other activities away from home. Public Health and Emergency Medicine should work together to assure that these settings are prepared to evacuate children (including those who are too young to walk and/or follow directions), take them to a safe place, notify parents, reunite children with their families, care for or arrange care for children whose parents are incapacitated or cannot reach them, and render first-aid.

¹⁰ Several members of the committee praised the State of New York and New York City for working with HHS to get Medicaid coverage for many children and families affected by 9/11. Such efforts should be commended and may be a short-term alternative, but do not replace the need for a permanent medical home for children.

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The CDC, due to funding limitations, has not been able to increase the number of state school health programs through federal programs, and it is believed that this agency should be given the resources to ensure that each state has a program, and that key staff are trained in bio-terrorism preparedness.

In addition, parents and those acting *in loco parentis* should make arrangements for authorization of medical treatment when parents cannot be reached, and share information about special health care needs, medications, or medication allergies. In addition, facilities where children congregate should always be vigilant about sanitation practices, so that biological contaminants are not spread among the children, bearing in mind that a biological attack may not be detectable until symptoms are expressed. Such facilities should also require or encourage children to be vaccinated against biological agents, if and when such vaccinations become available.

Social Services. Unlike adults, children need someone to take care of them. If their parents or guardians are killed or incapacitated in a terrorist attack or disaster, arrangements must be made for their care on a temporary or permanent basis. The Academy of Pediatrics recommends that federal, state, and local health agencies continue to develop coordinated plans for meeting the consequences of a chemical-biological event. These plans should include specific protocols for management of pediatric casualties, and should include pediatricians in planning at every organizational level (e.g., the Departments of Defense and Justice, Federal Emergency Management Agency, and state/local emergency medical services).

Pediatric health care facilities (e.g., children's hospitals, pediatric emergency departments, and pediatricians' offices) should also be included in all aspects of preparation since they are likely to become primary sites for managing child casualties. Financial support should be given to create specialized areas such as isolation zones and decontamination rooms.

Planning should also involve local health departments and poison control centers. Poison control centers should be used as resources and central clearinghouses for toxicological information to be given to the public and health care personnel. Information including antidotes and decontamination strategies may be rapidly distributed by poison centers to hospitals, police, and the public.

Government agencies should work to ensure that adequate supplies of antibiotics, antidotes, and vaccines are available to children, that they are safe and efficacious, and that pediatric doses are established. Resource allocation plans should ensure that these agents are readily available to pediatric health care sites.

It is not necessary for government to "reinvent the wheel" in order to prepare thoroughly for terrorist attacks or other disasters. There are many programs at the federal, state and

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local levels that have already been working on preparedness issues, or could make valuable contributions to this effort, particularly if their funding is enhanced.

The current CDC Preparedness Grant: Through the states, the CDC last year disseminated almost a billion dollars to improve preparedness in the six content areas noted above. The CDC should mandate that all counties have trained personnel who can deal with childhood terrorism preparedness at the provider and public health level. Tabletop and other exercises, courses and other methods of instruction should be used and repeated to sustain these competencies. As was noted above, the use of the HAN needs to become widespread to all affected “players” who are working to combat the effects of terrorism on children.

Hospitals: HRSA will play the lead role here, working with state and local public health and other partners. It is encouraging that funding for HRSA grants to state and hospitals has increased substantially.

Public health must assure that hospitals are prepared to deal with children in a surge or emergency situation with appropriate equipment, biologicals, and transport to triage facilities. Providers must be aware and recognize biological or chemical agents in children and be prepared to treat them in a calm and reassuring manner, keeping the families in the loop.

Public health must also ensure that hospital and other services are provided to temporary or permanent orphans from the terrorism event and that there is adequate access for all children for needed emergency and follow-up services, including mental health.

C. Response

The CDC at www.bt.cdc.gov informs the general public about the primary role of local public health departments and/or law enforcement as the primary contacts for concerns about chemical or biological attacks. Therefore, it is incumbent that the emergency preparedness efforts detailed above be robust, comprehensive and sufficiently funded to ensure that local health departments are prepared for this role throughout the US.

Enhanced preparedness for the population at large, with specific planning for children will help prevent and/or ameliorate the effects of terrorist acts.

As has been shown in the case of the anthrax cases and the smallpox vaccine distribution, local health departments rely on state health departments and the CDC for accurate information to deal with specific threats. The CDC has developed “Interim Recommended Notification Procedures for Local and State Public Health Department Leaders in the Event of a Bio-terrorist Incident,” which would also be applicable for chemical/environmental at www.bt.cdc.gov/EmContact/Protocols.asp.

Response General Recommendations:

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It is crucially important to train health care workers, hospitals, and local health departments beforehand in their reporting responsibilities. Just as crucial is for local and state public health leaders to continue to become fully integrated into city, county and state emergency preparedness plans through table top and other simulated exercises.

Pre-planning must ensure that all U.S. children have access to hospitals prepared to deal with the biological or chemical effects of terrorism with medications and the proper equipment to handle children's unique physiological needs, as well as the emotional after effects.

It will also be important to contact specific pediatric experts in the case of a terrorist attack on a large group of children, which means maintaining up-to-date rosters and relationships with pediatric organizations, pediatric mental health experts and pediatric specialty hospitals.

Finally, federal agencies need to establish a single web site where specific children's information in a threat event can be linked with others sites such as that of the OEP or the CDC.

D. Recovery:

Public health will have to help in the healing phase of any terrorist event that involves children. It is hoped that preexisting relationships with community partners like the Red Cross, the American Academy of Pediatrics local chapters, health care providers, and other governmental agencies will help in the healing of children at both the individual and population level. Substantial resources from federal, state and local funds may be needed to help communities and children heal.

Magne Raundalen and Atle Dyregrov from the Center for Crisis Psychology, Bergen, Norway have detailed how children recover emotionally from terrorism and how to help them on a website.¹¹ There are many potential models and studies in this area and further research should be encouraged.

As was pointed out earlier, it is crucial for public health to assure mechanisms to get primary care experts (in this case, pediatricians and family practitioners) to work with children and their families. Many researchers, including the Harvard Program in Refugee Trauma (HPRT), have found that the primary health care systems and providers are at the center of recovery and healing for a general population that has been victimized by mass violence and terrorism.

The Harvard Program states that Primary Care Providers (PCPs) are an essential part of the indigenous healing system of the local population. They can "ask the question" about the patient's traumatic life experiences, such as those resulting from terrorism, without opening up "Pandora's box." Through implementation of simple concrete steps, they can

¹¹ http://www.icisf.org/articles/Acrobat%20Documents/TerrorismIncident/Dyregrov_terrorism.html.

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support the healing process of human suffering caused by terrorism and inoculate their patients against the potential psychological and physical distress caused by possible future terrorist attacks. The HPRT gives information on its efforts at http://www.hppt-cambridge.org/Layer3.asp?page_id=41

Local and state public health workers need to be trained on how to advise parents to talk with children. Coordination with the local American Academy of Pediatrics Chapter and other public health providers is an excellent place to start in this regard.

Continued health care access for all exposed children at risk of and after a terrorist attack is also essential to ensure that adequate preventive and ameliorative measures are taken. This should include more provisions for expanded social and psychological care than currently allowed by most insurance programs.