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SYMPOSIUM

Public Health and Ethical Considerations in Planning for Quarantine

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Quarantine is one of the oldest, most effective, most feared, and most misunderstood methods of controlling communicable disease outbreaks. Its etymological roots are traceable to 14th century public health practices requiring ships arriving in Venice from plague-infected ports to sit at anchor for 40 days (hence, quar-antine) before disembarking their surviving passengers. While in recent times the use of quarantine has been more humane and scientifically based, the historical association with exile and death and the morally negative connotation of sacrifice of a few for the benefit of others remains as an undercurrent of public apprehension. Nevertheless, quarantine was recently implemented successfully in several countries as a socially acceptable measure during the SARS epidemic in 2003 [1]. It is an important component of the Department of Health and Human Services (HHS)† Pandemic Influenza Plan issued in November 2005 [2].‡

The purpose of this article is to review the modern public health approach to quarantine, outline highlights of current plans for its implementation in the event of an avian influenza pandemic, and consider the ethical principles that should be considered.

DEFINITIONS

Quarantine is the restriction of persons who are presumed to have been exposed to a contagious disease but are not ill. It may be applied at the individual, group, or community level and usually involves restriction to the home or designated facility. Quarantine may be voluntary or mandatory.

Isolation is the separation of ill persons with contagious diseases. It may be

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†Abbreviations: CDC, Center for Disease Control; HHS, Department of Health and Human Services.

‡This plan was issued after the Yale symposium on Ethical Aspects of Avian Influenza Pandemic Preparedness but is included in these published proceedings for completeness.

applied at the individual, group, or community level.

Quarantine of groups refers to quarantine of people who have been exposed to the same source of illness (e.g., at public gatherings, airline, school, workplace).

Working quarantine refers to persons who are at occupational risk of influenza infection, such as health care workers, who may be restricted to their homes or designated facilities during off-duty hours.

Community-wide quarantine refers to closing of community borders or the erection of a real or virtual barrier around a geographic area (cordon sanitaire).

Modern public health places quarantine within a broader spectrum of interventions generally referred to as "social distancing."

The effect of successful measures to increase social distance is to convert a dynamic of exponentiation in the spread of an infectious agent to one of suppression in which the number of secondary cases from exposed persons is reduced to a manageable level. Time is the key variable in the success or failure of social distancing strategies, including the duration of communicability, whether or not communicability occurs before onset of symptoms, the number of resulting contacts, and the efficiency of or delays in contact tracing.

Globalization of travel and trade and decreased travel time between distant places have further complicated these relationships. There are several hundred international ports of entry airports in the United States. Fortunately, 25 of these airports account for approximately 85 percent of international arrivals. Detailed recommendations for travel-related containment measures can be found in the full HHS report and will not be further elaborated here.

PRINCIPLES OF MODERN QUARANTINE

In the months before adequate supplies of vaccines and antiviral agents are expected to be available, quarantine and isolation are likely to be the mainstays of containment strategies.

> The HHS plan states that: The goal of quarantine is to protect the public by separating those exposed to dangerous communicable disease from the general population. It represents collective action for the common good that is predicated on aiding individuals who are already infected or exposed and protecting others from inadvertent exposure [3].

Principles of modern quarantine and social distancing limit their use to situations involving highly dangerous and contagious diseases and when resources are reliably available to implement and maintain the measures. It encompasses a wide range of strategies to reduce transmission that may be implemented along a continuum based on phase and intensity of an outbreak.

For example, at a stage when transmission of a novel influenza virus is still limited, either abroad or in the area, and local cases are either imported or have clear epidemiological links to other cases, individual quarantine of close contacts may be effective. At a more advanced phase of the pandemic, however, when virus transmission in the area is sustained and epidemiological links to other known cases is unclear, limiting quarantine to exposed individuals may be ineffective, and the strategy may need to expand to include community-based interventions that increase social distance. These include school closings, cancellation of public gatherings, encouraging non-essential workers to stay home, and reduced holiday transportation schedules. If these measures are believed to be ineffective, community-wide quarantine may need to be implemented.

The HHS guidelines cite two important principles designed to help ensure that those in quarantine are not placed at increased risk. First, quarantined individuals will be closely monitored, with daily visits as needed, in order to detect earliest

onset of symptoms and separation from those who are well. Second, persons in isolation will be among the first to receive any disease-prevention interventions. In addition, the HHS plan recommends that they should be provided with all needed support services, including psychological support, food and water, and household and medical supplies.

Home quarantine is the preferred method of separation, whenever possible. Designated quarantine facilities may have to be identified for potentially affected persons who do not have access to an appropriate home environment, such as persons living in dormitories, travelers, the homeless, or if the configuration of the home is not suitable for the protection of the potentially infected person and other occupants.

Voluntary quarantine is the preferred first option before resorting to mandatory orders or surveillance devices. In this connection, it is noteworthy that quarantine does not require 100 percent compliance to be effective. Toronto Public Health officials reported only 22 orders for mandatory detainment among the approximately 30,000 persons who were quarantined [4].

LEGAL AND ETHICAL CONSIDERATIONS

Primary responsibility for public health matters within their borders rests with state and local governments. This includes isolation and quarantine. Applicable state laws, regulations and procedures vary widely. A recently developed Model State Emergency Health Powers Act attempts to promote greater inter-state consistency in response to emergency public health situations [5]. In the section on isolation and quarantine, the Model Act covers the principles and conditions governing implementation of quarantine; authorization of public health authorities to impose temporary quarantine by directive, with rights of appeal within 10 days; imposition of quarantine with notice following a public health authority court petition and hearing; and legal procedures for release from quarantine or relief from violations of conditions of quarantine. Although it has been criticized by some as being overly broad in its coercive powers [6, 7] the Model Act has been adopted in whole or part in a number of jurisdictions.

The federal Public Health Service Act [8] gives the HHS secretary responsibility for preventing introduction, transmission, and spread of communicable diseases from foreign countries into the United States and within the United States and its territories/possessions. This authority is delegated to the Centers for Disease Control and Prevention (CDC), which are empowered to detain, medically examine, or conditionally release individuals reasonably believed to be carrying a communicable disease. The Public Health Service Act also provides that the list of diseases for which quarantine is authorized must first be specified in an executive order of the president, on recommendation of the HHS secretary. On April 5, 2005, influenza caused by a novel or reemergent strain that is causing or has the potential to cause a pandemic was added to that list [9].

Although the discipline of public health has its origins several centuries ago, it is only relatively recently that ethical principles and codes to guide public health practice and policy have been formulated. The ethical principles at the heart of the more fully developed fields of medical and research ethics are grounded in the primacy of individual autonomy in clinical decision-making in the therapeutic setting and in consent for participation in the setting of human subjects research. They are guided by a fundamental moral axiom that individual persons are valued as ends in themselves and should never be used merely as means to another's ends. Public health, on the other hand, emphasizes collective action for the good of the community.

The Principles of the Ethical Practice of Public Health, issued by the Public

Health Leadership Society in 2002 [10], states that community health should be achieved in a way that respects the rights of individuals and the community. Accompanying notes are instructive:

> This principle identifies the common need in public health to weigh the concerns of both the individual and the community. There is no ethical principle that can provide a solution to this perennial tension in public health. We can highlight, however, that the interest of the community is part of the equation, and for public health it is the starting place in the equation; it is the primary interest of public health. Still, there remains the need to pay attention to the rights of individuals when exercising the police powers of public health [10].

To address this potential dichotomy, the principles require ensuring opportunity for informed community participation in the development of policies, programs, and priorities, accessibility to basic resources and conditions necessary for health, and protection of confidentiality.

Principles of practice, law and ethics in the containment of outbreaks of infectious disease, especially use of quarantine, confront a common underlying concern, namely,

> The individual fear and community panic associated with infectious diseases often leads to rapid, emotionally driven decision making about public health policies needed to protect the community that may be in conflict with current bioethical principles regarding care of individual patients [11].

In November 2005, the Council on Ethical and Judicial Affairs of the American Medical Association issued recommendations for the medical profession in the use of quarantine and isolation as public health interventions. Again, the tensions between the ethical imperatives of therapeutic medicine and public health are reflected in the following excerpts:

> Quarantine and isolation to protect the population's health potentially conflict with the individual rights of liberty and self-determination. The medical profession, in collaboration with public health colleagues, must take an active role in ensuring that those interventions are based on science and are applied according to certain ethical considerations ... Individual physicians should participate in the implementation of appropriate quarantine and isolation measures as part of their obligation to provide medical care during epidemics ... In doing so, advocacy for their individual patients' interests remain paramount [12].

An important rationale for acknowledging and attempting to ameliorate this tension in pandemic preparedness planning, including quarantine measures, is to reduce the potential for unfair distribution of burdens and benefits among various segments of society [13]. In an important contribution, Nancy Kass has developed a six-step framework for ethical analysis specifically for public health [14]. The application of this general framework to quarantine is discussed in detail elsewhere in these proceedings.

Ross Upshur has outlined four principles that must be met to justify quarantine [15]:

> First, under the harm principle there must be clear scientific evidence of person-to-person spread of the disease and the necessity of quarantine as a containment measure. Second, the least restrictive means should be implemented. Third, upholding the principle of reciprocity points to the community's obligation to provide necessary support services for those in quarantine. Fourth, the obligation of public health authorities is to communicate the reasons for their actions and to allow for a process of appeal. In November 2004, the World Health Organization issued a checklist for influenza pandemic preparedness. It encourages planners to "consider the ethical issues related to limiting personal freedom, such as may occur with isolation and quarantine [16].

An instructive example of how ethical considerations can be incorporated into pandemic preparedness plans can be found in the Ontario Health Plan for an Influenza Pandemic [17]. The development of this plan included a collaboration with the Toronto Joint Centre for Bioethics, which

produced a 15-point ethical guide for decision making for a pandemic [18]. The guide identified four key ethical issues in pandemic preparedness planning, one of which was "restricting liberty in the interest of public health by measures such as quarantine. " The guide describes the following substantive and procedural ethical values at stake in addressing this issue:

1. Individual liberty: Isolation and quarantine should be proportional, necessary, relevant, equitably applied, and done by least restrictive means.

2. Protection of public from harm: Officials must weigh the imperative for compliance and review decisions.

3. Proportionality: Restrictive interventions should be limited to the actual level of risk to community.

4. Privacy: There must be a necessity for overriding the public's protection.

5. Reciprocity: Support is needed for those facing a disproportionate burden in protecting public health, individual liberty (proportional, necessary, relevant, least restrictive means, equitably applied), protection of public from harm (weigh the imperative for compliance, review decisions), proportionality (restrictive interventions limited to actual level of risk to community), privacy (necessity for overriding for public's protection), and reciprocity (support for those facing disproportionate burden in protecting public health).

Procedures should be reasonable, with reasons for decisions shared with stakeholders; open and transparent; inclusive, with stakeholder participation; responsive, subject to review and revision with experience; and accountable.

Based on these principles, the guide recommended that:

1. Governments and the health care sector should ensure that pandemic influenza response plans include a comprehensive and transparent protocol for the implementation of restrictive measures. The protocol should be founded upon the principles of proportionality and least restrictive means, should balance individual liberties with protection of public from harm, and should build safeguards such as the right of appeal.

2. Governments and the health care sector should ensure that the public is aware of a) the rationale for restrictive measures, b) the benefits of compliance, and c) the consequences of non-compliance.

3. Governments and the health sector should include measures in their pandemic influenza preparedness plans to protect against stigmatization and to safeguard the privacy of individuals and/or communities affected by quarantine or other restrictive measures.

4. Governments and the health care sector should institute measures and processes to guarantee provisions and support services to individuals and/or communities affected by restrictive measures, such as quarantine orders during a pandemic influenza emergency. Plans should state in advance what backup support will be available to help those who are quarantined (e.g., who will do their shopping, pay the bills, and provide financial support in lieu of lost income). Governments should have public discussions of appropriate levels of compensation in advance, including who is responsible for compensation.

Past experience has shown that voluntary cooperation and public trust are key ingredients of successful response to a public health emergency. They may be important antidotes to individual fear and community panic that may be engendered by infectious disease outbreaks. Careful attention to the ethical values at stake in public health decision making can help foster voluntary cooperation and public trust and should be a part of state and federal pandemic preparedness planning.

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