Interventions to Mitigate the Reduced Ability and Willingness to Work of Health Care Workers During a Pandemic Influenza Public Health Emergency

Literature Review

Several widely publicized articles were released in the past two years which suggest that health care and public health employees may be unable or unwilling to report to work during a public health emergency involving contagion or contamination such as pandemic influenza, SARS, smallpox, or a terrorist attack using disease or radiation:

- A 2006 study of public health department workers, only 54% of those surveyed indicated that they would “likely report to work” during a pandemic influenza outbreak
- In 2005 a national survey of prehospital care workers indicated that only 65% of EMTs were willing to report for duty during a smallpox outbreak
- Also in 2005, only 48% of health care workers in the greater New York City area reported that they were “willing to work” during a widespread outbreak of SARS-like illness

Although a recurrence of pandemic influenza is inevitable, it was not until recently that there has been a very public acknowledgement of the impact it will potentially place upon society in terms of the delivery of medical care. Influenza pandemics occur several times each century, with a variable degree of severity. It is unknown when the next pandemic will strike, or how severe it will be. The most recent estimates made from extrapolating the data from the 1918-19 pandemic outbreak suggest that there could be as many as 50-80 million global fatalities, with 96 percent of the deaths occurring in developing countries in a worst-case scenario. It is

1 Balicer R, Omer S, Barnett D et al. Local Public Health Workers’ Perceptions Toward Responding to an Influenza Pandemic. *BMC Public Health* 2006;6(99)
unclear how many individuals would require outpatient or inpatient medical care, intensive care, and mechanical ventilation in the United States, but the CDC estimates are as follows:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Moderate (1958/68-like)</th>
<th>Severe (1918-like)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illness</td>
<td>90 million (30%)</td>
<td>90 million (30%)</td>
</tr>
<tr>
<td>Outpatient medical care</td>
<td>45 million (50%)</td>
<td>45 million (50%)</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>865,000</td>
<td>9,909,000</td>
</tr>
<tr>
<td>ICU care</td>
<td>128,750</td>
<td>1,485,000</td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>64,875</td>
<td>745,500</td>
</tr>
<tr>
<td>Deaths</td>
<td>209,000</td>
<td>1,903,000</td>
</tr>
</tbody>
</table>

Regardless of the severity of an upcoming pandemic illness, the impact it will have upon the current health care system in the U.S. is nothing short of ominous. This is true even without factoring in the issue of healthcare worker (HCW) willingness to work. On a “normal” day in non-pandemic times, U.S. emergency departments face an unprecedented demand for services. These facilities are facing extraordinary volume and staff shortages (especially nursing) on a day to day basis, and there is a routine stagnation of the throughput that allows hospitals to efficiently admit, treat and discharge patients. Additionally, emergency departments are increasingly serving as the sites of primary care for patients who do not have routine health care coverage (approximately 15% of the U.S. population). There are few industries that are as poorly positioned to respond to a surge in demand as the U.S. healthcare system. Even for a “moderate” pandemic, the prospect of accommodating nearly 900,000 additional patients is an overwhelming one.

Now imagine tackling this problem with only half of the staff that are typically present. As desperate as the situation appears in terms of meeting the staffing needs, it is conceivable that having a large number of health care workers not report for work could have a snowball effect, precipitating even larger numbers of no-shows. The end result during a “severe” pandemic could be as drastic as the collapse of the health care system, an important component of the fabric of society.

Further exploration of the issues are vital to expose the rationale that health care personnel give for not reporting for duty, and to develop and assess steps to mitigate this anticipated shortage of HCWs by clarifying and addressing the perceived or actual barriers that exist and by developing and testing interventions:

**Differentiating Ability and Willingness to Work**

Some authors have addressed this issue by differentiating between ability to report to work (i.e., logistics) and willingness (i.e., attitudes and ethical considerations). Qureshi et al describe factors that may render a HCW *unable* to report for work. Across multiple scenarios, the authors

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consistently reported that the following issues would make it logistically difficult for an individual to report during a catastrophe:

- Transportation Issues (34%)
- Child Care Responsibilities (29.1%)
- Personal Health Reasons (14.9%)
- Elder Care Responsibilities (10.7%)
- Pet Care Responsibilities (7.8%)
- Second Job Obligations (2.5%)

Similarly, they describe the barriers workers for HCWs’ willingness to report for work:

- Fear and Concern for Family (47.1%)
- Fear and Concern for Self (31.1%)
- Personal Health Problems (13.5%)
- Child or Elder Care Responsibilities (1.4%)

A small focus group study of nurses who would be expected to work during a public health crisis (specifically a bioterrorism event) determined that the following conditions would likely be factors for a clinical nurse making the decision to come to work or not. Many of these same issues would likely be a factor during a pandemic:

- An Expectation of Chaos in an Environment Without Adequate Information and Resources
  - Lack of Leadership
  - Unclear Chain of Command
  - Lack of Clarity re: Roles and Responsibilities
  - Organizational lack of preparedness
  - Difficulty Coping

- Concerns Regarding the Safety of the Clinical Environment
  - Personal Protective Equipment (PPE) (masks, gloves, etc.) Issues
    - Theft of PPE
    - Insufficient PPE
    - Inadequate Supplies for Patients
    - Fear of Transmission
    - Lack of Understanding re: Appropriate Isolation

- A Perceived Loss of Freedom
  - Will Not be Able to Leave Hospital
  - Inadequate Staffing

- The Limited Institutional Commitment to Nurse
  - Absence of Administrators and Physicians
  - Nurse/Patient Contract
  - Poor Compensation in the Event of Staff/Family Illness Due to Work

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Correlating Attitudes and Beliefs With the Willingness to Report During Disaster

Balicer et al. in their study of public health workers, did not differentiate between the ability and willingness to work, but rather took the approach that both co-exist. Rather than explore the barriers to reporting to work, the authors correlated attitudes and beliefs regarding pandemic preparedness with the projected likelihood of reporting to duty during a pandemic. For public health system workers, agreement with the following issues was positively correlated with reporting after adjustment for age, gender, and job classification (odds ratio in brackets):

- Existing Knowledge About Public Health Impact of Pandemic Influenza [OR 3.1 (1.8-5.5)]
- Confidence in Personal Safety [OR 4 (2.2-7.2)]
- Family Preparation [OR 2.1 (1.2-3.4)]
- Perceived Ability of Health Department to Provide Timely Information [OR 2.3 (1.3-3.8)]
- Perception of the Capacity to Effectively Communicate Risk [OR 6.6 (3.2-13.5)]
- Familiarity with One’s Role-Specific Response Requirements [OR 7.6 (3.4-16.9)]
- Perception of the Importance of One’s Role in the Agency’s Overall Response [OR 9.5 (4.6-19.9)]
- Perceived Importance of Preparedness Training and Education [OR 3.4 (1.6-7.1)]

This essentially emphasizes that a nursing staff that is educated to possible risks as well as confident in their employer and their role on the job is more likely to show up to work.

Risk Perception and Communication

Fear or concern for the well-being of self or family were two of the most significant reasons HCWs report as reasons for being unwilling to report to work. The perception of risk is likely integral to the HCWs decision-making process by HCWs under these conditions. As noted by Qureshi et al, among others, the threat of exposure to biological agents, such as an outbreak of SARS or smallpox, in particular, have been shown to reduce willingness to report to work and may cause increased fear and concern:

- A 2003 study conducted in Singapore (toward the end of the SARS epidemic) measured the risk perception of 15,025 HCWs from 9 major healthcare institutions and found that 66% perceived “a great risk of personal exposure”.
- The authors of the Singapore study noted concern, however, for those respondents that were least worried about the risk of personal exposure, emphasizing that all categories of HCWs need training and compliance monitoring with preventive measures
- Fear of infection during the SARS outbreak was in fact a realistic concern: 20% of the 8400 individuals infected were HCWs. Healthcare workers are common second-wave...

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victims of Ebola and SARS; HCWs can and do become infected with HIV due to needle-stick injuries; and numerous HCWs have contracted hepatitis B or C, tuberculosis, and other potentially deadly infections\(^9\).

To note, the following factors have been shown to influence perception of risk\(^{10}\), which may be of particular significance in preparing for an infectious disease outbreak:

- Risks perceived to be voluntary are more accepted than risks perceived to be imposed.
- Risks perceived to be under an individual's control are more accepted than risks perceived to be controlled by others.
- Risks perceived to have clear benefits are more accepted than risks perceived to have little or no benefit.
- Risks perceived to be fairly distributed are more accepted than risks perceived to be unfairly distributed.
- Risks perceived to be natural are more accepted than risks perceived to be manmade.
- Risks perceived to be familiar are more accepted than risks perceived to be exotic.
- Risks perceived to affect adults are more accepted than risks perceived to affect children.
- Risks perceived to be statistical are more accepted than risks perceived to be catastrophic.
- Risks perceived to be generated by a trusted source are more accepted than risks perceived to be generated by an untrusted source.

A pandemic would, by almost any measure, rank high on the dread-factor scale-- therefore effective risk communication in addition to implementing appropriate safety measures and considering preferential treatment for HCWs\(^9\), will be critical to mitigating unwillingness of HCWs to report to work in the event of a pandemic influenza outbreak.

**Ethics/Duty to Treat**

A conflict between the ethical and professional obligation to care for patients and concern for the well-being of themselves and their families is to be expected in HCWs when confronting the possibility of an influenza pandemic. Standards of the ethical duty to treat also vary among professions within the healthcare industry and none of the guidance specifies explicitly the degree of risk expected to be taken. Furthermore, the American Medical Association’s Code of Ethics has been modified several times, including and removing the clause stating that doctors have a responsibility to care for their patients “even at the jeopardy of their own lives.”\(^{11}\)

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Nonetheless, the potential for personal risk is an everyday component of providing medical care, and the long-standing professional obligation to treat sick people even at personal risk is considered to be a binding social contract with the public.

- A 2002 national random-sample physician survey showed that in response to a hypothetical “unknown but potentially deadly illness” 80% of respondents reported a willingness to treat affected patients, despite concern for personal well-being. Factors that were associated with a physicians’ willingness to treat patients included:
  - Belief in a duty to treat
  - Feeling prepared to play a role in responding to a bioterrorist attack
  - Being in a primary care practice

Only a narrow majority (55%), however, agreed that “physicians have an obligation to care for patients in epidemics even if doing so endangers the physicians’ health”.

- The 2003 Koh et al study on the SARS outbreak in Singapore showed that 69.5% of respondents accepted the risk of contracting SARS as part of their job, but interestingly:
  - Almost one-third (31%) of the HCWs reported perceptions of being stigmatized because of their jobs
  - 77% reported that they were heartened by the societal support they received (though this sentiment was more predominant among non-clinical staff, i.e., attendants, cleaners, administrative staff, which could possibly be explained by the tendency of doctors, nurses and ambulance crew seeing their roles as professional obligation rather than “heroic”)

- A 2006 report emphasizes that this type of conflict to work or not to work is not limited to physician groups. It details that nurses will also be required to determine which relationships demand the highest level of priority during a disaster: their duty to be with their family or community vs. their duty to care for their patients at work. The article emphasizes that there is no clear answer and that this decision must be made at the time using all of the available information available to the nurse. The Nursing Code of Ethics does not specify which relationship should take the highest priority.

Review of professional stances and a reinforcement of the ethical duty to treat, in addition to preparedness training, efforts at minimizing stigmatization, and enhancing societal support for HCWs may be measurements that can increase willingness to report to work in the event of a pandemic influenza outbreak.

Opportunities for Intervention
These studies provide insight into what may be substantial barrier to the nation’s ability to protect the public during an emergency such as pandemic flu. They also suggest that the same issues facing the HCW population are duplicated in the prehospital and public health setting—all

three are critical components to providing routine, emergency, and surge intrapandemic medical care.

As an important follow-up to the Qureshi et al study, an important next step will be to explore the mitigation of this issue through the evaluation of interventions that are tailored to the barriers described above, including issues that exist across the boundaries of ability and willingness to work during a catastrophe.

Pandemic flu has been determined to be an “inevitable and possibly imminent” disaster by the World Health Organization. The pan-governmental response to Hurricane Katrina was appropriately criticized for a lack of action on preparedness shortfalls that were confirmed long before the autumn of 2005. This is a similar situation— we can be reasonably assured of severe staffing problems in the medical and public health arenas if a pandemic were to strike. It is in our best interest to explore options for ameliorating the anticipated shortfalls well before it becomes a disaster in progress.

Candidates for interventions exist, unevaluated, in many state, regional, and local plans for pandemic influenza. There are many others that have been discussed or implied in the literature but have yet to be tested and promulgated.

As an important next step our project will survey a population of HCWs (doctors, nurses, hospital administrators, and support personnel) from across the New York City area and establish their baseline willingness to work during a hypothetical “severe” pandemic influenza scenario given a number of facilitating interventions.

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**Research Design**

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February 9, 2007

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As described above, a number of studies have highlighted the concerning rates of ability and willingness to work and the potential barriers expressed by various workers. The objective of this research project is to identify interventions and policies that would increase the ability and
willingness of healthcare professional to come to work during a period of pandemic influenza. Several major surveys have already established the presumed ability and willingness of healthcare workers and the general population to work during major emergencies or disaster events. The principal barriers to coming to work have also been fairly well established—concerns about personal health and safety; competing caretaking needs of the young, elderly, or disabled; mistrust of authorities (public and employer) regarding safety, risk and exposure, operational business practices (such as compensation and mandatory holdover), and value of interventions.

An outline of the major steps includes:

1. **Identify potential interventions**
   a. Through literature review
   b. Key informant interviews

2. **Test acceptability of interventions through blended focus groups**
   a. Develop focus group plan encompassing five strata of HCWs (physicians, nurses, administrators, critical support infrastructure, non-critical support infrastructure). Each focus group of ten individuals would be composed of two from each stratum; if focus group participants are drawn from the employees of a large vertically-integrated health system care would be taken that no two employees would be from the same facility.
   
   b. The focus group moderator would present a basic pandemic flu situational scenario and introduce the potential interventions, and then guide the discussion around acceptability and unanticipated consequences of the proposed interventions.
   
   c. Four focus groups would be conducted with a convenience sample of participants, in order to minimize the bias introduced in a single focus group.
   
   d. Focus group discussions would be transcribed and analyzed.

3. **Test potential impact and efficacy of interventions on ability/willingness to work**
   a. Conduct web-based survey of all employees of a large urban integrated health care system. Five-minute survey will present a basic pandemic flu scenario, establish baseline willingness to work rating (using a “thermometer” scale that allows each respondent to select a number along a gradient that marks their willingness to go to work during a pandemic), asks respondents to rank order any barriers they might imagine (from a specified list), and then presents a limited set of targeted interventions for the top three ranked barriers and asks the respondent to use the thermometer to rate their willingness to work given the policy intervention. This allows for an individual change score that is more comparable than an absolute categorical measure, and also reveals the presence of a “ceiling effect,” in which specific types of HCWs may be 90% willing to go to work, so interventions may only increase their willingness slightly, compared to other types who may be 40% willing, and who have more potential room to increase their willingness.
   
   b. In order to partially mitigate potential bias inherent in a web-based survey (i.e., restricted to higher socioeconomic groups, or only those with internet access), a supplementary on-site survey would be conducted in selected sites among specific HCW strata in order to correct for the potential bias. The on-site surveys would
either be self-administered or interviewer-administered using an NCDP internet-ready laptop and access to the web survey portal.

c. The main items captured in the survey will include:
   i. Barriers to willingness to work
   ii. Baseline willingness rating
   iii. Willingness rating change based on selected interventions
   iv. Socio-Demographics
      (1) age
      (2) gender
      (3) caretaker responsibilities (child, senior, other adult)
      (4) transportation access
Health Care Worker Willingness to Work Mitigation Project

**GOAL**: To quantify the effect and acceptability of hypothetical interventions intended to mitigate the anticipated shortage of health care industry workers during a pandemic influenza outbreak.

### Methodology

1. **Demographic info** → **Present pan flu scenario** → **Ask willingness to work on thermometer scale** → **Forced rank of top 3 issues** → **Develop “top 10” list of barriers to willingness to work from literature review** → **Assume intervention “x” was made** → **Repeat for intervention “y” and “z”** → **Repeat for issues ranked #2 and #3**

For issue #1:
- Assume intervention “x” was made
- Present interventions specific to barrier
- Develop via multi-disciplinary focus group and lit/policy search
- Ask willingness to work on thermometer scale

**For issues ranked #2 and #3**:
- Repeat the process for interventions “y” and “z”