PH1N1 is regarded as the greatest pandemic threat since the emergence of influenza A (H3N2) in 1968. In response, the U.S. government has unleashed its most ambitious vaccination program since the antipolio campaign in the 1950s. The World Health Organization initially projected that up to two billion people could become infected with the virus over the next 2 yrs (1). The label of the greatest pandemic threat is not hyperbole when one considers PH1N1 high infectivity rate and willing “vectors” of >2 billion air travelers a year. Furthermore, compared to previous pandemics, the 24/7 media updates, the ability to modify the disease with antibiotics and antiviral agents, and the supportive measures in intensive care units has increased public expectation, leading sometimes to unrealistic demands.

Experience, mostly in adults, predominantly from Canada, Australia, and New Zealand has revealed a mortality rate for PH1N1-infected patients admitted to intensive care units that ranges from 10% to 40% over the first months (2–6). Care of the critically ill is mainly supportive, and little is known of treatments that can modify the virulence of PH1N1, delay the host response, and improve outcomes. Although experience in caring for adults is accumulating, little pertaining to children has been reported. It is for this reason that the case series by Dr. Lockman and colleagues (7), in this issue of Pediatric Critical Care Medicine, of 13 consecutive children admitted between June and August 2009 to the intensive care unit at Johns Hopkins in Baltimore is important. This report adds to previous data from the United States in which 45% of 272 patients studied were children <18 yrs of age (8). Dr. Lockman and colleagues found that bacterial superinfection occurred frequently (23%), 46% of patients required mechanical ventilation, and 23% required inotropic support for hypotension. A common characteristic in both adults and children is the presence of significant comorbidities (pulmonary, hematologic, neurologic/neuromuscular, immunosuppression, and obesity) in almost all patients. However, PH1N1 infection seems to be milder in children with less severe acute respiratory distress syndrome (ARDS) (4) and need for mechanical ventilation. Limited experience in the United Kingdom suggested that PH1N1 is more severe than seasonal influenza (9, 10). A comparison of 58 cases of seasonal influenza with 13 cases of PH1N1 showed comorbidities of 55% vs. 76%, need for inotropic support of 29% vs. 53%, and a mortality rate of 15% vs. 38%, respectively (10).

The pediatric experience with PH1N1 in the United Kingdom reported a similar high prevalence of comorbidities as in Baltimore but also revealed several key differences with more severe lung disease, fulminant shock, and higher mortality in the United Kingdom (7, 10). The striking difference between the Baltimore and U.K. series is the severity of lung disease in the United Kingdom; nine patients had rapid onset, severe hypoxia with a PAO2/FIO2 ratio of <200; and three patients required high-frequency oscillatory ventilation. Even more surprising in the U.K. series is that 8 of 13 patients presented with shock, and all 5 patients in shock who were catecholamine and steroid resistant died (10). These differences are difficult to explain and may be due to our limited experience in small numbers of children or differences in host response to the virus.

If experience of severity proves to be more in keeping with the United Kingdom as compared with the Baltimore experience, the potential impact of this pandemic for those providing critical care for children raises several considerations to limit hospital and pediatric intensive care unit (PICU) needs. Bioevents, such as PH1N1, are different from conventional large-scale disasters (even Katrina). With conventional disasters, only one area of the country is involved, and the rest of the healthcare system remains intact. Furthermore, although conventional mass casualty events can triage on the basis of severity of presentation and do not consider exposure or infectiousness, bioevent triage management must be population-based with the goal of preventing secondary transmission. Hospital resources can be overwhelmed if triage for the entire population and subpopulations are not undertaken. Burkle has suggested phase 1 triage categorization for the entire population based on SEIRV (Susceptible, Exposed, Infectious, Removed, and Vaccinated), and a phase 2 triage to reduce the susceptible population (11). Even so, the predicted larger numbers of critically ill children may dictate that contemporary standards of care will need to be revised as the number of patients outstrips critical care resources.

Before we resort to decreasing levels of critical care, there is much we can do to protect vulnerable populations. Children with comorbidities (cardio respiratory disease, metabolic disease, immunosuppression, obesity and severe neuromuscular diseases) should be vaccinated as soon as possible and chemoprophylaxis with neuraminidase inhibitors should be given early if suspected of PH1N1 infection. PH1N1 patients may not outstrip PICU resources if we are fortunate. However, we should be prepared for a pandemic surge that requires ICU capabilities to be increased 3-fold (a tall order when one considers the stretched resources even at the best of times). Indeed it is predicted that even in limited disasters, pediatric intensive care capacity will be overwhelmed, and lack of PICU beds may lead to increased mortality (12). If a three-fold
or even a doubling of PICU capacity is needed there will, of necessity, be a decrease in the standard of care that was provided by the Baltimore and U.K. groups (13).

As a worse case scenario, if patient numbers outnumber PICU beds and ventilators, the blunt question that arises will be: Who gets the bed (previously normal child vs. those with comorbidities, adult vs. child, etc.)? Some institutions have crafted ethics triage protocols for making these decisions; however, there is also anxiety concerning how we make decisions when we do not have any robust, validated, and universally accepted scoring systems to predict outcomes in children and legal protection for healthcare workers when these protocols are used. Physicians have been lobbying provincial court authorities in Canada as well as expressing their anxiety in the lay press (14). The issue of legal protection is real and may derail the best plans if candid transparent discussions with the public and courts are not undertaken beforehand. The exoneration of a physician charged with euthanizing patients during Katrina has served to heighten, rather than decrease, fears of litigation (15).

Another issue is our role in conducting research. Critical care physicians are concerned that little is known about this pandemic or about treatment options in and outside the intensive care unit. Rigorous, relevant, timely, and ethical clinical research is crucial, therefore, to improve care and outcome. However, unique challenges in doing research arise in this PH1N1 because critical care resources may be limited (research staff may need to be deployed to provide clinical care for the critically ill), the disease has a high mortality that disproportionately affects young individuals, and patients need to be recruited within narrow time windows. The rapid onset and dissipation of a pandemic may also preclude coordinated research efforts. In addition, clinicians may be reluctant to enroll gravely ill patients into randomized trials and may even resort to unproven and even harmful treatments. These considerations beg for a different approach to research, and we have suggested a new paradigm of clinical research ethics for critically ill patients during the PH1N1 (16). In addition, in view of the different clinical experiences in different parts of the world, we believe that we need to harmonize regional databases and initiate collaborative randomized trials of treatment to reduce the consequences of severe PH1N1 infection in the developed as well as the developing world. To that extent, we are committed to promoting a scientifically rigorous, geopolitically inclusive, and academically collegial research response to the PH1N1 (17).

PH1N1 is challenging for critical care practitioners who face the possibility of having to provide mass critical care on an unprecedented scale. However, at no time in our history are we better equipped and coordinated to meet this challenge. Planning is vitally important—the words of General Eisenhower are relevant in preparing for this battle.

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