

Pregnancy and Emerging Diseases

To the Editor: The November 2006 issue of *Emerging Infectious Diseases* featured 2 perspectives (1,2) that highlighted the need for strategies to prevent and treat pregnant patients during outbreaks of new or emerging diseases or during bioterrorist attacks. However, neither article discussed implications for a surveillance strategy.

Based on my previous experience at the World Health Organization (WHO) with the severe acute respiratory syndrome (SARS) outbreak, I propose several practical steps for such a strategy: 1) systematic identification and reporting of cases in pregnant women, 2) estimation of the number of cases in pregnant women, 3) international clinical networks to share treatment and infection control experience, and 4) standard protocols for sharing clinical and treatment information between nations.

First, cases in pregnant patients should be systematically identified and reported during outbreaks, by including information on pregnancy status and duration of the pregnancy in case-report forms for new diseases. This is important for several reasons. First, case-patients that come to attention in an ad hoc fashion may provide a biased view of outcome, since those with a poor outcome are more likely to draw attention. Second, although pregnancy is not rare, the number of cases in pregnant women in outbreaks of new or emerging diseases in any 1 location may be too small for meaningful analysis.

Unfortunately, during the SARS epidemic, pregnancy status was not included on the international case-reporting forms. Although some countries systematically tested for and recorded pregnancy status, other countries did not. As a result, valuable information was lost, and outcomes

Table. Pregnant patients with severe acute respiratory syndrome (SARS), by country

Country	Estimated no. pregnant SARS patients*	No. pregnant SARS patients reported in scientific literature†	No. SARS cases identified through informal sources‡
China	84§	5	0
Taiwan	6	0	2
Hong Kong	17	12	0
Singapore	5	0	4
Vietnam	1	0	1
Canada	4§	1	0
All other	2§	2¶	0
Total	119	20	7

*National estimate equal 3/4 of the sum over all 5-y age groups of the product of the number of female patients in the 5-y age group by the age-specific fertility rate for that age group.

†Cases were found by author through intensive scientific literature search.

‡Identified through World Health Organization meetings, conference calls and emails.

§The country-specific age-sex distribution of cases was not available for this country; the combined age-sex distribution from all available patients from other countries was used in this estimate. For this reason estimate for this country may be less precise.

¶Both patients were from the United States.

for pregnant women could not be properly assessed.

A rough estimate can be made of the number of pregnant women in a particular country likely to have a particular disease such as SARS. Assuming equal attack rates for pregnant and nonpregnant women, the number of pregnant women having a disease can be estimated as equal to three fourths of the sum over 5-year age groups of the product of the number of female patients in the 5-year age group by the age-specific fertility rate for that age group.^{1,2,3} While the assumption of equal attack rates does not hold for all infectious diseases, it is a good starting point for a new disease about which there is little information.

Using this method for SARS resulted in an estimate of 119 cases in pregnant women (Table). For most countries, the estimated number of pregnant case-patients was reasonably close to the total number of pregnant case-patients that could be identified in the scientific literature through web searches (column 3) supplemented by

cases identified through informal sources, such as emails and at WHO meetings and conference calls (column 4). China was an exception; 84 pregnant case-patients were estimated for China, but only 5 case-patients were identified, all from the same hospital in China.

These estimates have limitations. They do not consider subnational differences in fertility, such as differences for specific ethnic or occupational groups, or rural-urban differences. Nonetheless, they provide a ballpark figure that can be used to assess the extent of pregnancy-related cases.

The estimates were useful during the SARS outbreak in raising awareness of the issues surrounding pregnancy and SARS. As a result of such awareness, WHO formed a clinical network to share clinical experiences regarding treatment of pregnant patients as well as experiences with infection control during obstetrical procedures. Although this network was established rather late during the SARS outbreak, it did result in useful

¹It is necessary to multiply by 3/4, because live births take 9 months, on average.

²The estimated number of pregnant women is based on expected number of live births, and the estimate does not take into consideration fetal loss, premature delivery, or multiple births.

³Estimates can be made by using an electronic spreadsheet. Age-specific fertility rates can be drawn from United Nations Population Division data available for all countries.

interchanges between nationals in different countries during conference calls.

The network discussed the establishment of a standardized database for sharing detailed clinical information on the course, outcome, and treatment of pregnant SARS patients. However, this database was never created. Although, fortunately, the scientific literature contains summaries of experiences with 20 case-patients, this is not a substitute for a systematic and reasonably complete database of experiences. To be sure that such a database is established for any new disease, protocols for data sharing should be prepared in advance, and all possible administrative barriers to sharing information should be addressed.

In conclusion, pregnant women are an important group at high risk for outbreaks of new diseases. This situation requires appropriate strategies for surveillance. I have identified several measures that I believe could be used in this regard.

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In response: We thank Ms. Anker for describing some of the surveillance challenges during the severe acute respiratory syndrome (SARS) pandemic and for supporting the idea that during an infectious disease outbreak or public health emergency, pregnant women are a population deserving special consideration (1). We also understand and appreciate the challenges she describes in systematically identifying and reporting pregnancies during a public health emergency response such as occurred with SARS. In the aftermath of Hurricane Katrina, we have recognized that it is critical that pregnancy information be collected systematically as part of the medical intake process. This can be accomplished by asking a simple, short question about pregnancy status (i.e., "Are you or do you think you could be pregnant?") as women are being evaluated and processed as part of an emergency response plan. Urine pregnancy testing may be used to verify pregnancy status for women who are unsure (2). Besides helping tailor the provision of healthcare in these settings, pregnancy status information should also be used to track pregnancy outcomes.

We agree with Ms. Anker regarding the importance of pregnancy surveillance efforts. In June 2003 the Centers for Disease Control and Prevention (CDC) announced the first evidence of community-acquired monkeypox in the United States. Because this outbreak was linked to infected prairie dogs often kept as pets by small children, exposed household members included mothers, some of whom were pregnant. Unfortunately, although outbreaks of monkeypox in Africa had previously been well described, these descriptions did not include much information on the natural history of monkeypox among pregnant women (3). This example highlights the importance of ensuring that pregnancy information is systematically collected to plan and respond to future outbreaks.

In addition to surveillance of pregnant women in a known outbreak or emergency response, pregnant women should be included in efforts to detect novel disease threats. Unusual patterns of disease among pregnant women may be an early sign of emerging disease in the general population. In their role as frontline physicians, obstetrician-gynecologists and other healthcare providers who care for pregnant women may be among the first to encounter patients with novel infectious disease threats (4).

Finally, with Ms. Anker, we support coordinated international efforts to collect and monitor the pregnancy status of affected women during an outbreak or emergency response and are working on ways at CDC to prepare for future threats.

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