Letters

Maternal mortality estimates are useful

Editor – In the March 2001 issue of the *Bulletin*, Pierre Buekens asks "Is estimating maternal mortality useful?" (*1*). "Maternal mortality" can have at least three meanings: (i) total number of deaths of women from pregnancy-related causes in a given period; (ii) maternal mortality ratio: total number of deaths of women from pregnancy-related causes in a given period per 100 000 live births; the ratio measures the risk of death a woman faces each time she becomes pregnant; and (iii) maternal mortality rate: total number of deaths of women from pregnancy-related causes in a given period per 100 000 women of reproductive age. This measures both the obstetric risk and the frequency with which women are exposed to this risk.

In public health practice, how questions are posed is directly relevant to the definition of problems and why particular measures are selected. While the editorial by Buekens was written in relation to an article by Hill, AbouZahr & Wardlaw dealing with maternal mortality ratios (*2*), the question as actually posed has two broad interpretations. If concerned only with the ratio, it presupposes that we are dealing with women who are already pregnant. The focus then moves to major obstetric risk factors, namely: haemorrhage, sepsis, hypertensive disease of pregnancy or pre-eclampsia, prolonged or obstructed labour, and complications of unsafe abortion. These causes together are commonly said to account for up to 80% of all maternal deaths globally. However, if one is concerned with the rate, or simply the numerator alone, the frame of reference incorporates a more basic question: "Why do women get pregnant at the frequency they do?". If viewed as a function of fertility, in a country with a total fertility rate (TFR) in the vicinity of 7 (e.g. Uganda, Yemen), excess fertility accounts for >70% of all maternal deaths, taking replacement level as the criterion. (For illustrative purposes we are assuming 2.1 as the replacement level though a somewhat higher level could be justified, taking into account infant and child mortality rates depending on the setting.) With a TFR of 6, the attributable burden is approximately 65% (e.g. Oman, Rwanda), while at a TFR of 5 (e.g. Pakistan, Zambia), it is about 60%. The TFR is the number of children that would be born per woman if she were to live to the end of her childbearing years and bear children at each age in accordance with prevailing age-specific fertility rates (*3*). Clearly, efforts are required to deal with both excess fertility and pregnancy safety, and programming in both areas is actually taking place in most developing countries. Neither of these issues presents an easy challenge, and both have enormous sociocultural and political complexities that are beyond the present brief discussion.

The answer to Buekens's question must be "yes" — at least at the level of policy, priority setting and resource allocation. Only by assessing maternal mortality (MM) can one place this alongside other causes of death and determine its relative magnitude and public health importance. While Hill et al. emphasize that no valid conclusions can be drawn from MM trend analyses because of major imprecisions in the data (*2*), even imprecise data give useful orders of magnitude supporting both lines of intervention mentioned above. Estimates of MM (at least both the numerator and the ratio) comprise important components, therefore, of a health situation analysis for any country. While one can also agree that MM is too difficult to measure to be programmatically useful and that process indicators are more applicable at this level, this observation is not unique to reproductive health: mortality is a useful, even if still imprecise, measure of disease burden in many other areas of public health where process indicators are also critical for programmatic purposes (e.g. HIV, malaria, hypertension, diabetes). Across the spectrum in public health there is a great need to improve existing data and the measures of disease burden derived from them (including mortality) and also to develop process indicators for the planning and evaluation of intervention programmes. ■

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2. **Hill K, AbouZahr C, Wardlaw T.** Estimates of maternal mortality for 1995. *Bulletin of the World Health Organization*, 2001, **79**: 182–198.
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Aircraft disinsection

Editor – Gratz et al. (*1*) advocate the disinsection of aircraft flying from airports in tropical disease endemic areas into nonendemic areas. The authors reflect WHO's position in recommending the use of pyrethroid insecticides on the basis of efficacy, cost-effectiveness, and absence of adverse health effects to humans. Vector-borne diseases are global public health issues and their control is essential, but it is erroneous to state that the recommended pyrethroid insecticides are not of toxicological concern and are safe to use around humans.

The health effects of pyrethroids include dermal paresthesia, exacerbation of pre-existing asthma and, at high doses, excitatory neurotoxicity (*2*). Airline passengers may not associate the adverse effects they experience with pesticide exposure aboard aircraft because they are unaware of the exposure and do not recognize the signs and symptoms of pesticide-related illness, and several hours may elapse before the onset of symptoms (*3*). Children may be especially susceptible to such adverse effects.

WHO's statement (*4*) that pyrethroids on aircraft are unlikely to precipitate pre-existing diseases contradicts existing literature. Studies suggest that asthmatic patients respond to inhalation exposure to pyrethroids with airway hyper-responsiveness and that even "low irritant" aerosols may trigger nose and eye symptoms (*5*).

The California Department of Health Services (CDHS) conducts ongoing surveillance of occupational pesticide illness. Pyrethroid pesticides accounted for 119 of 776 (15%) occupational pesticide illness cases reported in 1998 and 1999 (*6*). Adverse health effects of pyrethroids were dermatological (22%), ocular (34%), respiratory (19%), gastrointestinal (69%), and neurological (73%). During this two-year period, permethrin, a pyrethroid recommended for aircraft disinsection, accounted for 16 cases (13%) of occupational pyrethroid illnesses reported.

CDHS has received reports of occupational illnesses among flight attendants. While dermal uptake of pyrethroids is low (*2*), exposure in an enclosed environment may enhance absorption by dermal exposure, inhalation, and ingestion. Furthermore, the half-life of pyrethroids may be prolonged by the absence of ultraviolet light aboard aircraft. Flight crew may have significant acute inhalation and dermal exposures because they are physically active and touch many surfaces during the course of their work. Both staff and passengers who fly frequently may incur significant cumulative exposures.

Solvents and other inert ingredients in pesticide formulations may contribute to the adverse effects of pyrethroids (*5*). There is little toxicological information available about these ingredients but, rather than constituting evidence that health effects are nonexistent, the absence of data identifies gaps that need to be filled prior to encouraging the continued practice of aircraft disinsection by pyrethroid application, especially while passengers and crew are on board.

With ample evidence to demonstrate that exposure to pyrethroid pesticides may result in adverse health effects, especially among sensitive subpopulations, there is insufficient information to determine that aircraft disinsection as currently practised is safe. We believe that reconsideration of the use of pesticides as described by Gratz et al. is warranted, in order to ensure the safety of passengers and crew while preventing transmission of vector-borne diseases through air travel. ■

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