

MORTALITY RATE OF CHILDREN AGED 0-4 YEARS DUE TO INSECT-BORNE DISEASES	
GENERAL CONSIDERATIONS	
<i>Issues</i>	Insect-borne diseases
<i>Type of indicator</i>	Health outcome
<i>Rationale</i>	<p>Insect-borne diseases are a major source of both illness and death amongst children, especially in the developing world. These diseases take many different forms, are transmitted by a wide range of different insects (e.g. mosquitoes, flies) and are associated with a wide range of different environments (though most show a close affinity for water). Young children are especially at risk, because of their poorly developed immunity or defence mechanisms.</p> <p>This indicator is intended to show the impact of insect-borne diseases on children.</p>
<i>Issues in indicator design</i>	<p>This indicator can be designed in many different ways, at different levels of specificity. A major issue is the definition of 'insect-borne diseases'. Common insect-borne diseases include malaria, yellow fever, dengue fever, river blindness (onchocerciasis), filariasis and sleeping sickness. Many of the most important insect-borne diseases are water-related, in that the insect vectors concerned breed or pass part of their lifecycle in or close to water. Insect-borne diseases have thus been exacerbated in many cases by inappropriate water-engineering (e.g. irrigation) or poor management of water resources and wastes (e.g. poor sanitation). Some insect-borne diseases are also animal-related (e.g. Lyme's disease), in that the insect vectors are associated with specific animal hosts. In these cases, land use and land cover are important factors in their distribution and prevalence. The activity of many insect vectors is dependent on climate, so marked variations may occur geographically, and from year to year, in response to climatic fluctuations. For general, global comparisons, the overall mortality rate amongst children from all forms of insect-borne diseases has some value. For more local application, however, it is usually more appropriate to define the indicator in terms of specific diseases of particular concern.</p> <p>Since young children tend to be the most vulnerable (especially in terms of mortality), the indicator is perhaps best based on the 0-4 year age group (though 0-1 years may be more appropriate in some cases). For some applications, however, it may be extended to include older children.</p>
SPECIFICATION	
<i>Definition</i>	Mortality rate of children aged 0-4 years of age due to insect-borne diseases.
<i>Terms and concepts</i>	<p><i>Insect-borne diseases:</i> vector-borne diseases for which insects act as a primary agent of transmission; these include malaria, dengue, yellow fever, onchocerciasis, leishmaniasis and trypanosomiasis.</p> <p><i>Total number of children aged 0-14 years:</i> total resident population of children aged 0-4 years at the time of survey.</p>
<i>Data needs</i>	<p>Number of deaths of children aged 0-4 years due to insect-borne diseases.</p> <p>Total number of children aged 0-4 years.</p>
<i>Data sources, availability and</i>	Data on the number of deaths due to insect-borne diseases can generally be obtained from routine health service sources, either nationally or locally. For some forms of insect-borne disease, mortality statistics are also collated as

<i>quality</i>	<p>part of national or international surveillance programmes. Where routine data do not exist, special surveys may be necessary. In all cases, data may be subject to some uncertainties, due to incomplete or inconsistent reporting as a result both of the complex disease syndromes and limitations in the reporting services.</p> <p>Data on the total number of children aged 0-4 years can usually be obtained from national censuses and should be reliable. Estimates for inter-censal years (or where census data are not available) may be made using population models or from births and deaths data.</p>
<i>Level of spatial aggregation</i>	Health district
<i>Averaging period</i>	Annual
<i>Computation</i>	<p>The indicator can be computed as a simple mortality rate:</p> $1000 * (Dibd / Ctot)$ <p>where: <i>Dibd</i> is the number of deaths due to insect-borne diseases of children aged 0-4 years within the survey period;</p> <p><i>Ctot</i> is the total population of children aged 0-4 years.</p>
<i>Units of measurement</i>	Number per thousand
<i>Worked example</i>	<p>Assume that during one year 1 320 deaths of children aged 0-4 years due to insect-borne diseases are reported in an area containing 26 630 children aged 0-4 years. In this case, the value of the indicator is:</p> $1\ 000 * (1\ 320 / 26\ 630) = 49.6 \text{ per thousand}$
<i>Interpretation</i>	<p>In general terms, this indicator provides a direct measure of the health effects on young children of insect-borne diseases: an increase in the mortality rate may be interpreted as evidence of an increase in the health impacts, a reduction the reverse. As a mortality indicator, however, it provides information only on the most severe effects of these diseases; it does not show the much larger burden of morbidity which exists. Mortality rates are also highly dependent on the quality of the health care service, and on factors such as remoteness and access to health care. Differences in mortality rate need to be interpreted in this context.</p> <p>When expressed as a general indicator of mortality through all insect-borne diseases, it also has limited interpretability: differences in mortality rates may clearly be due to many different types of vector and disease. For most applications, therefore, the indicator should be applied to a defined set of diseases or vectors.</p> <p>Some problems of data consistency and accuracy may occur, especially in remote or less developed areas where routine reporting is limited. Many insect-borne diseases also show natural periodicity (related, for example, to seasonal or inter-annual fluctuations in the vector population). Short-term trends, therefore, need to be interpreted with caution, and care is needed in inferring effects of intervention strategies over short periods.</p>
<i>Variations and alternatives</i>	<p>The main variations on this indicator relate to the definition of insect-borne diseases. As noted, it may be applied at a more or less specific level, though for most applications it is more appropriate to specify the indicator closely in terms of a single disease or insect vector. The indicator can also be applied to different ages of children (e.g. 0-1 years, 0-14 years), depending on the</p>

	<p>population of concern, and the demographic incidence of the disease. Where an assessment is required of the wider health burden on children, the indicator can be expressed in terms of morbidity or DALYs rather than mortality, though data on morbidity rates are often subject to major uncertainties.</p>
<i>Examples</i>	<p>WHO <i>Catalogue of health indicators</i></p> <ul style="list-style-type: none"> • Incidence rate of severe malaria <p>WHO <i>Environmental health indicators: framework and methodologies</i></p> <ul style="list-style-type: none"> • Mortality due to vector-borne diseases
<i>Useful references</i>	<p>WHO 1994 <i>Information systems for the evaluation of malaria control programmes, a practical guide</i>. AFRO/CTD/MAL/ 94.3. Brazzaville: World Health Organization Regional Office for Africa.</p> <p>WHO 1996 <i>Catalogue of health indicators: a selection of health indicators recommended by WHO programmes</i>. Geneva: World Health Organization (under revision).</p> <p>WHO 1999 <i>Environmental health indicators: framework and methodologies</i>. Geneva: World Health Organization. (Available at http://www.who.int/docstore/peh/archives/EHIndicators.pdf)</p>