News

Malaria deaths are the hardest to count

How do you count the number of people who die of malaria in sub-Saharan African countries, where data collection systems are often rudimentary, and where childhood fever and other illnesses are typically attributed to malaria?

In the early hours of the morning, Aurola Ngueve strapped her feverish daughter to her back and walked almost three kilometres to a tiny Angolan government health post, a white concrete structure sitting incongruously amid the mud huts of the village of Muinha in central Bié province.

In the rudimentary examination room, Aurola anxiously tells the *Bulletin* that 18-month-old Rosalina, who is screaming as a nurse takes a tiny blood sample from her finger, has had chronic diarrhoea for days. Fifteen minutes later, Aurola receives the dreaded, if not unexpected, news. Rosalina has malaria.

Malaria is believed to be one of the chief culprits behind Angola's appalling child mortality statistics. UNICEF estimates that one child in four in this south-western African country is unlikely to live beyond his or her fifth birthday.

Rosalina is one of the lucky ones. At this health post, run by the Health Ministry and supported by nongovernmental organization Médecins Sans Frontières, she has been accurately diagnosed and prescribed medication. Her personal details, symptoms, diagnosis and treatment have been entered into a logbook, and the nurse is confident that with the right care she will bounce back to health in a few days.

But just how many children will slip through the net? How many will never be properly diagnosed, and how many will eventually succumb to this mosquito-borne disease which is, in theory, easily preventable? If only we knew.

In the developed world, where causes of death are registered, collecting mortality data is relatively straightforward. In developing countries and particularly in sub-Saharan Africa, where malaria is believed to claim most of its victims, the process is far more complicated. And this process becomes more problematic still with a disease like malaria which typically afflicts children, whose immune systems are still underdeveloped, and whose symptoms — fever, vomiting, aches and pains, and diarrhoea — could be attributed to innumerable ailments.

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> *Allan Schapira, Coordinator in WHO's Global Malaria Programme.*

"The major problem with malaria is that it is very difficult to measure its burden, as it is so unspecific and most kids have parasites [in their blood] in high transmission areas," says Dr Kenji Shibuya, Coordinator of the Health Statistics and Evidence team at WHO.

Establishing "the burden" or in other words establishing just how many people die of this disease is crucial in light of the Roll Back Malaria campaign target to halve malaria mortality by 2010 and again by 2015 and the Millennium Development Goal to halt and reverse the incidence of malaria by 2015.

Yet both the statistics on which these goals stand and the methods for measuring progress towards them can be called into question.

"The fundamental problem of malaria control was the lack of good baseline data," Shibuya says, referring to the data against which changes in incidence and the number of deaths can be measured.

Often the issue is not malaria-specific. Getting data on all diseases in developing countries is challenging because large sections of the population never set foot inside a medical facility, their ailments and deaths going largely unexplained and unrecorded.

Even if they make it to a health post, persuading busy staff working in difficult conditions to fill in basic patient logs can be tough, especially if they view it as an administrative chore which prevents them from treating the sick or they have no paper or pencils to take down the details.

Then, analysts are often forced to adjust and harmonize already questionable numbers in an effort to make them internationally comparable or tally with other causes of death.

But gathering mortality data on malaria is more problematic than most diseases.

Given that the burden falls on young children — an estimated 90% of malaria deaths in Africa occur in children aged under five years — a principal indicator of the trend in malaria-related deaths recommended by the Roll Back Malaria Partnership is all-cause under-five mortality, routinely measured in malaria-endemic countries by nationally representative community-based demographic and health surveys (DHS).

In its favour, this method should capture so-called indirect, malaria-related mortality — or how malaria contributes to child mortality by exacerbating other common childhood illnesses, by contributing to low birth weight and generally weakening children as a result of repeated or chronic infections.

Angolan mother Aurola Ngueve holds Rosalina while the child is tested for malaria.

Karen Iley

As Bernard Nahlen of the Global Fund to fight AIDS, Tuberculosis and Malaria told the *Bulletin*: "In children in high-endemic areas, indirect, malaria-related mortality may be just as or even more important than the burden of acute, direct malaria-attributable mortality — but it is even more difficult to measure."

To further clarify the picture, WHO recommends that specific, direct, acute malaria-attributable mortality also be tracked. This is done mainly through demographic surveillance sites (DSS) where disease and deaths are continuously monitored in selected populations and cause of death is ascertained by interviewing bereaved relatives.

A synthesis of available data by WHO and the US Centers for Disease Control and Prevention (CDC) published in 2005, showed that direct malaria-attributable mortality in sub-Saharan Africa among children aged under five years accounted for about 18% of all deaths in this age-group, or between 700 000 and 900 000 children.

However, even these "latest" figures refer only to 2000. With surveys and precise longitudinal monitoring costly to implement and difficult for poor countries to sustain, it often takes a long time to collect and analyse enough data for a reliable estimate, while problems in data availability and interpretation make comparisons between subsequent estimates difficult. DSS are also typically small-scale, and extrapolation to the wider continent needs to make use of malaria risk maps.

Summing up the problem, Nahlen says that extrapolating malaria mortality rates to the wider continent is "fraught with difficulties".

Malaria is such a nebulous disease that the chances of getting the numbers wrong are great, and this may adversely affect decision-making.

"We must have accurate mortality and case data so we can evaluate programmes and see the effects of interventions," says Angus Spiers, UNDP's Global Fund Malaria Advisor in Angola.

How will WHO and governments know if funding is headed to the right areas? How will they know if interventions such as insecticide-treated mosquito nets are working? And how can they determine how much more money needs to be spent on combating the disease?

"We need reliable malaria statistics to be able to target control resources and evaluate their impact," says Dr Allan Schapira, Coordinator in WHO's Global Malaria Programme. "As long as the distribution of the problem is known and funding is available, the resources will be channelled to those in need, provided that the delivery systems can do the channelling. However, a gross underestimation in a particular area may cause insufficient funding of a given programme."

No one doubts that malaria places a heavy burden on the countries that can least afford it. But to know just how big a toll the disease takes and whether the projects that are currently in place to fight it are actually working, requires more ingenuity and investment than had perhaps been anticipated, when the Roll Back Malaria movement was initiated, Schapira says. ■

Karen Iley, *Lusaka*

Mexico's quest for a complete mortality data set

On 1 November cemeteries across Mexico are packed with the living. Death has a special place in Mexican culture, especially on the Day of the Dead — El Día de los Muertos. But while a culture that accepts death may smooth the task of collecting mortality data, poverty is a major obstacle for Mexico in its quest for a complete data set.

Mexico has been recording deaths in registers for more than 100 years, but it was not until the 1950s that the country developed a death certificate system.

"There are two moments when people die [on paper]," says Dr Rafael Lozano, General Director of Information at the Mexican Ministry of Health. "One is the certification of the death and the second is the registration. Before 1950 we only registered death without certification."

Certification means that a doctor examines the deceased and determines the cause of death. With registry, a person was often listed as dead, but without a cause of death, Lozano says: "So we have a long history with problems of quality before 1950, and also problems of quantity."

About 500 000 out of a population of 103 million die every year. Since the 1980s, more than 90% of the dead have been counted due to this switch to a death certification system. In the '50s, '60s and '70s mortality data was only 70% or 80% complete. In the WHO European Region coverage is about 100%, while in the WHO African Region it is less than 10%.

To help WHO's 35 Member States in the Americas improve their mortality data, the Pan American Health Organization (PAHO) launched the Regional Core Health Data and Country Profile Initiative in 1995.

> " The problem … is the gaps within the country. The difference [in life expectancy] between the poorest and the richest states in Mexico is something like 11 years. "
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> Dr Rafael Lozano, General Director of Information at the Mexican Ministry of Health.

Dr Roberto Becker, Regional Advisor on Diseases Classification at PAHO in Washington, DC, explains that although most deaths are logged with a civil registry, the cause of death — recorded in the certification process — is often missing. As part of the 1995 initiative, Becker travels to the countries in PAHO's region to teach health officials how to improve coverage in quality data.

"We don't have 100% coverage. But we are very close," Lozano says, citing a study published in the *Bulletin* [2005;83;171–77] that ranks Mexico among 23 countries with high quality data and 90% or more complete death registration. Venezuela was also in that group while the rest of the PAHO region had lower coverage.

Since 1950, Mexico has used the WHO-recommended death