WORLD HEALTH ORGANIZATION

DROP IN WORLD CHILD MORTALITY REACHES TARGET, NEW STUDY SHOWS BUT MANY COUNTRIES LAGGING

The global death toll in young children has fallen dramatically in the past half-century and has even dropped below the target set a decade ago by world leaders. But the pace of decline has been slowing in recent years, and in some countries the downward curve has levelled out or is even starting to rise, according to a new study published in the latest issue of ***The Bulletin of the World Health Organization***. A large number of countries, the study shows, have still a long way to go to reach the target.

"The slowdown is of particular concern in the case of Africa and south-east Asia because it is occurring at relatively high levels of mortality and in countries with severe economic dislocations," the researchers write. "As the HIV/AIDS epidemic continues to unfold in Africa and parts of Asia, further reductions in child mortality will become increasingly unlikely until substantial progress in controlling the spread of HIV is achieved."

The study traces the dramatic fall of almost 60 per cent in child mortality during the second half of the 20th century. It shows that about 10.5 million children under five died last year, 2.2 million less than in 1990. Of these 10.5 million deaths, 3.8 million occurred in Africa, with a further 2.5 million in India and 750,000 in China.

The fall in child mortality means a reduction in the likelihood of a baby dying before its fifth birthday. Today, the probability of a newborn baby dying before the age of five is, globally, about 7%, compared with 10% in 1990, 12% in 1980 and 25% in 1950.

The drop in child mortality also brings the world's average rate down to an estimated 67 deaths per 1,000 live births. At the World Summit for Children in New York in 1990, leaders of more than 150 countries set a target of 70 deaths per 1,000 live births that all countries of the world were to reach by the year 2000. At that time the global rate averaged about 85 per 1000 live births, already a striking drop from the 180 deaths per 1,000 live births in 1950.

At least 57 countries have not reached the 70 per 1,000 target, the *Bulletin* article points out. Some countries have child mortality rates estimated to be above 200 per 1,000 live births. They include, in order of descending rates, Niger (335), Sierra Leone (312), Afghanistan (264), Malawi (219), Guinea and Liberia (205), Guinea-Bissau (202) and Somalia (201). Seven of these eight countries are in WHO's African region, which has an average rate of about 150, vs. 88 for South-East Asia, 67 for the Eastern Mediterranean, 46 for the Western Pacific, 34 for the Americas and 18 for Europe.

What's more, the pace of the decline in child mortality is slowing. Seven countries, all in Africa, have seen little or no change in their child mortality rates over the past 50 years. They are Burundi, Lesotho, Madagascar, Mauritania, Nigeria, Sierra Leone and Tanzania.

A further seven countries have even experienced increases in child mortality: five in Africa- Botswana, Namibia, Niger, Zambia and Zimbabwe; one in South-East Asia - Democratic People's Republic of Korea; and one in the Western Pacific - Papua New Guinea.

Africa as a whole recorded the most sluggish decline in child mortality among the six WHO regions—42%, compared with 60-72% for other regions. And in Africa, about 15% of newborns are likely to die before reaching age five, compared to under 2% in Europe.

The reasons for the slump are unclear but in some countries, economic problems, civil strife and a poor choice of interventions used to try to reduce deaths among children are among the underlying factors. The authors of the study warn that the full impact of the HIV/AIDS epidemic on child death rates has not yet been felt. They say the disease has the potential to slow down dramatically, if not reverse, gains in childhood survival in some African and Asian countries.

"It is important," they add, "to recognize that reversals in public health are possible and can substantially alter long-term declines in mortality. Two examples are the dramatic increase in adult mortality in Russia and several other eastern European countries in the late 1980s-early 1990s, and the emergence of HIV/AIDS as a leading cause of adult death (and the leading cause in Africa)."

The authors of the study are Omar Ahmad, Alan Lopez and Mie Inoue, of the Burden of Disease Unit of WHO's Global Programme on Evidence for Health Policy.

Not one but many magic bullets spur child survival

In an attempt to find out which factors might be responsible for the declining child mortality rates that have been observed in most countries over the past 50 years, Rutstein (pages 1256–1270) studied data from 89 health surveys conducted in 56 developing countries. The factors most strongly linked to declining child mortality were better nutritional status and environmental conditions (better water supply, sanitation and housing). Next came greater availability of medical care during pregnancy, at birth and for children with diarrhoea, followed by the availability of electricity and education of mothers.

Fewer stunted children but not everywhere

Growth retardation, or stunting, is a direct consequence of poor feeding and is associated with increased child mortality. A new study by de Onis et al. (pages 1222–1233) found that stunting in developing countries has dropped in prevalence from 47% in 1980 to 33% today and if these trends continue will fall to about 29% by 2005. That means that there are some 182 million stunted children in developing countries today, or 40 million fewer than two decades ago. Of the 182 million, 70% live in Asia, 26% in Africa and 4% in Latin America and the Caribbean. A downward trend is seen for all Regions, although Africa shows the smallest decline, down from 41% to only 35%. In Eastern Africa, stunting has been on an upcurve since 1980 and today affects 48% of pre-school children, or 22 million, vs. 12.9 million 20 years ago.

Oral rehydration therapy, a likely lifesaver

Better nutrition is not the only reason for the fall in child mortality over recent decades. Another, according to data presented by Victora et al. (pages 1246–1255), could be the increasingly widespread use of oral rehydration therapy (ORT) to manage diarrhoeal disease. Over the past decade, the estimated number of under-five-year-olds dying from diarrhoea fell precipitously—from 3.3 million to 1.5 million, a saving of 1.8 million young lives, while deaths from all causes in this age-group fell by 2.2 million. Over the same period, the proportion of diarrhoea episodes managed with ORT in developing countries soared, from 40% to 69%.

WASTES FROM HEALTH-CARE ACTIVITIES

Health-care activities - for instance, immunizations, diagnostic tests, medical treatments, and laboratory examinations - protect and restore health and save lives. But what about the wastes and by-products they generate?

From the total of wastes generated by health-care activities, almost 80% are general waste comparable to domestic waste. The remaining approximate 20% of wastes are considered hazardous materials that may be infectious, toxic or radioactive. The wastes and by-products cover a diverse range of materials, as the following list illustrates (percentages are approximate values):

- Infectious wastes – cultures and stocks of infectious agents, wastes from infected patients, wastes contaminated with blood and its derivatives, discarded diagnostic samples, infected animals from laboratories, and contaminated materials (swabs, bandages) and equipment (disposable medical devices etc.); and
- Anatomic - recognizable body parts and animal carcasses.

Infectious and anatomic wastes together represent the majority of the hazardous waste, up to 15% of the total waste from health-care activities.

- Sharps – syringes, disposable scalpels and blades etc.

Sharps represent about 1% of the total waste from health-care activities.

- Chemicals – for example solvents and disinfectants; and
- Pharmaceuticals – expired, unused, and contaminated; whether the drugs themselves (sometimes toxic and powerful chemicals) or their metabolites, vaccines and sera .

Chemicals and pharmaceuticals amount to about 3% of waste from health-care activities.

- Genotoxic waste – highly hazardous, mutagenic, teratogenic[1] or carcinogenic, such as cytotoxic drugs used in cancer treatment and their metabolites; and
- Radioactive matter, such as glassware contaminated with radioactive diagnostic material or radiotherapeutic materials;
- Wastes with high heavy metal content, such as broken mercury thermometers.

Genotoxic waste, radioactive matter and heavy metal content represent about 1% of the total waste from health-care activities.

The major sources of health-care waste are hospitals and other health-care establishments, laboratories and research centres, mortuary and autopsy centres, animal research and testing laboratories, blood banks and collection services, and nursing homes for the elderly.

High-income countries can generate up to 6 kg of hazardous waste per person per year. In the majority of low-income countries, health-care waste is usually not separated into hazardous or non-hazardous waste. In these countries, the total health-care waste per person per year is anywhere from 0.5 to 3 kg.

HEALTH IMPACTS

Health-care waste is a reservoir of potentially harmful micro-organisms which can infect hospital patients, health-care workers and the general public. Other potential infectious risks include the spread of, sometimes resistant, micro-organisms from health-care establishments into the environment. These risks have so far been only poorly investigated. Wastes and by-products can also cause injuries, for example radiation burns or sharps-inflicted injuries; poisoning and pollution, whether through the release of pharmaceutical products, in particular, antibiotics and cytotoxic drugs, through the waste water or by toxic elements or compounds such as mercury or dioxins.

[1] Teratogenic: capable of producing fetal malformation.

Sharps

Throughout the world every year an estimated 12 000 million injections are administered. And not all needles and syringes are properly disposed of, generating a considerable risk for injury and infection and opportunities for re-use.

- Worldwide, 8-16 million hepatitis B, 2.3 to 4.7 million hepatitis C and 80 000 to 160 000 HIV infections are estimated to occur yearly from re-use of syringe needles without sterilization[2]. Many of these infections could be avoided if syringes were disposed of safely. The re-use of disposable syringes and needles for injections is particularly common in certain African, Asian and Central and Eastern European countries.

- Regarding injection practices, public health authorities in West Bengal, India, have recommended a shift to re-usable glass syringes, as the disposal requirements for disposable syringes could not be enforced.

- In developing countries, additional hazards occur from scavenging on waste disposal sites and manual sorting of the waste recuperated at the back doors of health-care establishments. These practices are common in many regions of the world. The waste handlers are at immediate risk of needle-stick injuries and other exposures to toxic or infectious materials.

Vaccine waste

In June 2000, six children were diagnosed with a mild form of smallpox (vaccinia virus) after having played with glass ampoules containing expired smallpox vaccine at a garbage dump in Vladivostok (Russia). Although the infections were not life-threatening, the vaccine ampoules should have been treated before being discarded.

Radioactive wastes

The use of radiation sources in medical and other applications is widespread throughout the world. Occasionally, the public is exposed to radioactive waste, usually originating from radiotherapy treatments, that has not been properly disposed of. Serious accidents have been documented in Goiânia, Brazil in 1988 in which four people died from acute radiation syndrome and 28 suffered serious radiation burns. Similar accidents happened in Mexico City in 1962, Algeria in 1978, Morocco in 1983 and Ciudad Juárez in Mexico in 1983.

Risks associated with other fractions of health-care wastes, in particular blood waste and chemicals, have been relatively poorly assessed, and need to be strengthened. In the meantime, precautionary measures need to be taken.

RISKS ASSOCIATED WITH WASTE DISPOSAL

Although treatment and disposal of health-care wastes aim at reducing risks, indirect health risks may occur through the release of toxic pollutants into the environment through treatment or disposal.

- Landfilling can potentially result in contamination of drinking water. Occupational risks may be associated with the operation of certain disposal facilities. Inadequate incineration, or incineration of materials unsuitable for incineration can result in the release of pollutants into the air. The incineration of materials containing chlorine can generate dioxins and furans[3], which are classified as possible human carcinogens and have been associated with a range of adverse effects. Incineration of heavy

[2] Kane A et al. Bulletin of the World Health Organization, 1999; 77:pp 801-807.

[3] Furans: group of heterocyclic compounds similar to dioxins.

metals or materials with high metal contents (in particular lead, mercury and cadmium) can lead to the spread of heavy metals in the environment. Dioxins, furans and metals are persistent and accumulate in the environment. Materials containing chlorine or metal should therefore not be incinerated.

- Only modern incinerators are able to work at 800-1000 °C, with special emission-cleaning equipment, can ensure that no dioxins and furans (or only insignificant amounts) are produced. Smaller devices built with local materials and capable of operating at these high temperatures are currently being field-tested and implemented in a number of countries.

- At present, there are practically no environmentally-friendly, low-cost options for safe disposal of infectious wastes. Incineration of wastes has been widely practised, but alternatives are becoming available, such as autoclaving, chemical treatment and microwaving, and may be preferable under certain circumstances. Landfilling may also be a viable solution for parts of the waste stream if practised safely. However, action is necessary to prevent the important disease burden currently created by these wastes.

In addition, perceived risks related to health-care waste management may be significant. In most cultures, disposal of health-care wastes is a sensitive issue and also has ethical dimensions.

WASTE MANAGEMENT – REASONS FOR FAILURE

The absence of waste management, lack of awareness about the health hazards, insufficient financial and human resources and poor control of waste disposal are the most common problems connected with health-care wastes. Many countries do not have appropriate regulations, or do not enforce them. An essential issue is the clear attribution of responsibility of appropriate handling and disposal of waste. According to the 'polluter pays' principle, this responsibility lies with the waste producer, usually being the health-care provider, or the establishment involved in related activities.

STEPS TOWARDS IMPROVEMENT

Improvements in health-care waste management rely on the following key elements:

- The build-up of a comprehensive system, addressing responsibilities, resource allocation, handling and disposal. This is a long-term process, sustained by gradual improvements;
- Awareness raising and training about risks related to health-care waste, and safe and sound practices;
- Selection of safe and environmentally-friendly management options, to protect people from hazards when collecting, handling, storing, transporting, treating or disposing of waste.

Government commitment and support is needed to reach an overall and long-term improvement of the situation, although immediate action can be taken locally.

Health-care waste management is an integral part of health-care, and creating harm through inadequate waste management reduces the overall benefits of health-care.

WHO'S RESPONSE

The first global and comprehensive guidance document, *Safe Management of Wastes from Health-Care Activities*, released by WHO in 1999, addresses aspects such as regulatory framework, planning issues, waste minimization and recycling, handling, storage and transportation, treatment and disposal options, and training.

It is aimed at managers of hospitals and other health-care establishments, policy makers, public health professionals and managers involved in waste management. It is accompanied by a *Teacher's Guide*, which contains material for a three-day workshop aimed at the same audience.

The Interagency *Guidelines for the Safe Disposal of Unwanted Pharmaceuticals in and after Emergencies* provide practical guidance on the disposal of drugs in difficult situations in or after emergencies are also available.

The full text of these publications is available on the WHO web site:
http://www.who.int/water_sanitation_health under "health-care wastes".

Planned WHO products and activities include:

- The publication of a decision-maker's guide for health-care waste management in primary health care centres;
- The implementation of health-care waste systems at country level;
- The development of a database on practical options for health-care waste management, mainly targeted at developing country situations (soon on http://www.healthcarewaste.org);
- Testing of low-cost options for health-care waste management;
- The development of guidance for the disposal of blood and blood bags;
- An approach for promoting the use of products in health-care activities leading to reduced production of wastes or less harmful wastes.

Publications can be ordered from WHO, MDI/EIP (Marketing and Dissemination).
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