



Schools for Health: Focus on Health, Education and the School-age Child

D.A.P. Bundy and H.L. Guyatt

Mortality in children under five years old has been dramatically reduced through successful programmes of immunization and control of diarrhoeal diseases. UNICEF estimates that some 90% of children in developing regions now survive to reach school age. These survivors face new and continuing threats to their health, which can affect their physical development and may also prevent them taking full advantage of their only opportunity for formal education. The physical and mental growth of the 1000 million school-age children today will influence how the world is shaped for coming generations. Yet the health problems of this age group have received little attention.

Recognizing the importance of this age group, a workshop funded by the Edna McConnell Clark Foundation was held 10–13 November 1994 in Fort Mitchell, Kentucky, USA, to review what is known about the health of school-age children, what is or can be done to improve their health, and what steps must be taken to find ways to improve the health and educational achievement of this important segment of the world's population. Don Bundy* and Helen Guyatt here report on the workshop, which had three major conclusions: (1) the school-age children of developing countries face health problems that remain neglected and poorly understood; (2) an important research need is to develop simpler means of monitoring the health status of school-age children and evaluating the impact of public health interventions in this age group; and (3) two strategies are available to address this public health problem. The first is to develop further and test programmes that appear, from available evidence and pilot studies, to offer effective means of improving the health of this age group at reasonable cost, and to be sustainable; and the second is, over a longer term, to develop the capacity within countries to assess the health problems of school-age children and devise cost-effective strategies to address these problems.

This report attempts, in brief form, to survey what is known about the health status of school-age children, to discuss the possible benefits to health and learning that accrue from health interventions, and to suggest some avenues currently available for both research and application.

Major international efforts to improve the health of infants and pre-school children now ensure that almost 90% of the world's children survive beyond their fifth birthday¹. Increasing efforts by the educational authorities of the developing world also ensure that more and more of these children have the opportunity to attend school, and it is anticipated that, by the year 2000, some 80% will be enrolled in school. There are already more children of school age, and a greater proportion attending school, than ever before.

These successes have given old problems a new prominence. While child mortality rates have declined, there is evidence that levels of ill health and malnutrition have failed to decline as quickly: many children still face health problems that compromise their physical development, their attendance at school and their ability to learn. The children have survived, but if their quality of life is compromised by ill health, they may be unable to take full advantage of what, in most developing countries, is the only educational opportunity they will ever be offered.

Ill health at school age can also have longer-term physical and socioeconomic consequences². For example, stunted children are likely to become stunted adults, and stunting is associated with overall under-achievement in education and in adult life, not least in income-earning potential. Ill health when school aged may also influence subsequent generations since,

in many developing societies, adolescent females soon become mothers, and poor health in adolescence can lead to compromised maternal health and complicated pregnancy.

The success of child-survival programmes has therefore created new challenges for the 1990s: to improve the quality of life of the survivors and to help children to realize their full potential through a reduction in their burden of disease. For school-age children, this implies the prevention of morbidity to promote not only physical but also intellectual development. Indeed, it is this combination of improving both health and educational achievement, simultaneously, that makes programmes aimed at school-age children so attractive.

The challenge in designing health strategies for school-age children is to ensure that the programmes can be sustained along with child survival programmes. Reducing mortality will, for the foreseeable future, remain the major priority for health budgets. Fortunately, many of the most prevalent health problems of the school-age child can be alleviated at remarkably low cost. Indeed, the 1993 World Development Report³ identifies school health programmes as among the most cost-effective of public health interventions, and includes such programmes in a short list of five global public health priorities. This potential for remarkable cost-effectiveness arises because

Don Bundy and Helen Guyatt are at the Centre for the Epidemiology of Infectious Disease, Department of Zoology, University of Oxford, South Parks Road, Oxford, UK OX1 3PS.
Tel: +44 1865 281 226, Fax: +44 1865 281 245,
e-mail: helen.guyatt@zoo.ox.ac.uk

* Don Bundy is the Scientific co-ordinator of the Partnership for Child Development, an International initiative of UNDP, WHO, and the Rockefeller, Edna McConnell Clark and James S. McDonnell Foundations, and the Wellcome Trust. School health strategies are currently being developed and evaluated by national teams in Ghana, Tanzania, Colombia, India, Indonesia and Vietnam.

Meeting Report

Box 1. List of Commissioned Papers

- (1) *Burden of Disease in School-Age Children* (Catherine Michaud and Chris Murray, Harvard University, USA)
- (2) *Health Education* (Joe Ascroft and Nancy Muturi, University of Iowa, USA)
- (3) *Potential Health Benefits* (Andrew Tomkins, Institute of Child Health, University of London, UK)
- (4) *Potential Educational/Cognitive Benefits* (Kate Nokes, Partnership for Child Development, Oxford, UK)
- (5) *Child Labour and Street Children* (Judith Ennew, J.E. Research, Cambridge, UK)
- (6) *Non-enrolled and Absentee Children* (Alicia Fentiman, University of Cambridge, UK)
- (7) *Adolescent Health* (Joanne Leslie and Kristen Kalla, Pacific Institute for Women's Health, Los Angeles, USA)
- (8) *Existing Control and Research Programmes* (Andrew Hall, Partnership for Child Development, Oxford, UK)

Box 2. List of Participants at the Workshop

Don Bundy, University of Oxford/Partnership for Child Development, Oxford, UK
Joseph Cook, Edna McConnell Clark Foundation, New York, USA
Bruce Dick, Youth Health Promotion, UNICEF, New York, USA
David Evans, TDR/WHO, Geneva, Switzerland
Helen Guyatt, University of Oxford, Oxford, UK
Ane Haaland, TDR/WHO, Geneva, Switzerland
Robert Howells, Wellcome Trust, London, UK
Adetokunbo Lucas, Harvard University, Boston, USA
Jeffrey Mccaskey, Edna McConnell Clark Foundation, New York, USA

of the effectiveness of the available interventions and because the school setting itself offers a pre-existing and comprehensive system for health delivery: there are more teachers than nurses, more schools than clinics.

These considerations suggest that the development of practical strategies for improving the physical and intellectual development of school-age children is an overdue yet feasible response to the new challenges faced by developing societies in the 1990s.

In November 1994, a workshop held to review what is known about the health of school-age children, and to identify areas in which additional research is required, focused not only on what can be done now with existing information and technology to improve the health and development of the school-age group, but also on what might be done in the future as additional information is obtained. The overall goal of the meeting was to identify a strategy for defining the actions necessary to improve the health and educational achievement of this important group.

Based on eight background papers prepared by experts in various aspects of school health and education (see Box 1), this document was developed by workshop participants (Box 2) to provide a framework for new thought and action for the health of the school-age child.

Disease burden in school-age children

The aim of this section is to help identify the principal causes of morbidity and mortality in school-age children. This analysis of disease burden is based on the global

burden of disease estimates presented in the 1993 World Development Report³. For the present purpose, the death and disability data for 5-9 year old and 10-14 year old children were disaggregated from the existing estimates for 5-14 year old children using a crude proxy method. The burden of disease is measured here in terms of disability-adjusted life years (DALYs). The DALY is the sum of years of life lost due to premature mortality and the years of life lived with a disability. A series of assumptions about social preferences are used as a guide to estimate (1) the duration of life lost due to premature death, (2) the value of each unit of healthy life lived at different ages, and (3) the preference for health benefits now, as opposed to in the future⁴.

In 1990, there were estimated to be 1080 million school-age children (here defined as 5-14 years of age) who shared a total burden of 150 million DALYs; 11% of the global burden of disease for all age groups. This proportion is likely to be a significant underestimate because the DALYs were calculated using an incidence approach: only DALYs lost to diseases or conditions that have their onset during the ages of 5-14 years are included in the estimates of the burden of disease among school-age children. This has two important consequences. First, lifetime DALYs lost to conditions such as malnutrition, which have their onset in infancy, are attributed to the burden of illness in children under five years old. Yet part of the burden of these conditions will be felt during the school-age years and may be alleviated by interventions at that age. This may be particularly important where the disease burden has consequences for educational achievement⁵. Second, health-related behaviours developed during school age influence the risk of developing subsequent illness and can be modified by interventions during the school-age years. Thus, the DALYs reported for school-age children underestimate the potential benefits from interventions in this age group.

Of the total DALYs in school-age children, 53% were lost from communicable disease, 28% from non-communicable disease and 18% from injuries. The burden of disease was overwhelmingly concentrated in the developing countries (97%), with sub-Saharan Africa and India suffering almost half of the total burden.

The DALY rates per 1000 population are highest in sub-Saharan Africa and Asia (excluding China) for both age groups (5-9 and 10-14) and both sexes. This rate in sub-Saharan Africa is more than ten times that for established market economies. In developing regions other than Africa, communicable disease contributes between 40% and 50% of the total burden, compared to less than 10% in the more developed economies. In sub-Saharan Africa, a striking 70% is

attributable to communicable disease. These preliminary data suggest that around half of the burden may be attributable to premature death.

Infectious and parasitic diseases represent the largest contributor to DALY loss in all developing regions, and the leading cause of death in most of these areas. Tuberculosis (TB), intestinal helminths, malaria, schistosomiasis and Chagas disease were shown to be particularly important among school-age children. Acute lower-respiratory tract infections and chronic respiratory disease (mostly asthma) were among the ten leading specific causes, and together were responsible for a greater amount of DALY loss than diarrhoeal diseases, suggesting that diseases of the respiratory system may have taken precedence over diarrhoeal diseases among school-age children. Nevertheless, diarrhoeal diseases were shown to be an important cause of DALY loss, ranking among the top five causes in all developing regions. Vaccine-preventable diseases were also an important cause of DALY and life lost in the developing regions, particularly in India and sub-Saharan Africa, where they ranked as the leading cause of DALY loss.

Injuries represented 18% of the DALY loss in the developing regions, with males having a consistently higher share of the burden than females. Motor vehicle accidents, drowning, poisoning, falls, fire, violence and war take a major toll on school-age children in many regions of the world. Neuro-psychiatric disorders were a prominent contributor to the burden of disease in all regions.

Available evidence suggests that HIV/AIDS and other sexually transmitted diseases (STDs) constitute a relatively modest portion of the burden in 5-14 year old children. A disproportionate share of this burden is found in females, who have almost two-thirds of the burden from STDs and 80% of that from HIV.

All these results should be interpreted with caution, not least because they have yet to be subjected to independent international review. The underlying data for 5-14 year old children are based largely on extrapolation rather than empirical determination, and here have the additional uncertainty of separation into narrower age bands by a crude estimation technique. Furthermore, it is apparent that some diseases of potential importance to the health of school-age children (eg. micronutrient deficiencies, scabies, conjunctivitis) have yet to be evaluated (see below).

There is also uncertainty in the assessment of disability for the school-age group. Although the DALY calculations incorporated a reduced quality of life due to poor educational achievement, the basis for these calculations is unclear. This is a burden that is specific to school-age children, and may be of at least the same order of magnitude as the burden arising from physical ill health. Questions of how cognitive deficits and educational impairment result from poor health, and the potential for reversibility after intervention, need clarification. More work is required to examine how quality adjustments can be made to correspond to community perceptions of the burden imposed by ill health and changes in well-being associated with intervention.

Estimation of global burden is of importance to policy development. However, the development of actual programmes for the health of children will require data on

a much more limited spatial scale in order to identify country- or locality-specific health needs.

Roundup

- There is a lack of empirical data on the health of school-age children, which reflects the general neglect of this age group and the traditional focus on children under five and on adults. There is a particular lack of data on a scale appropriate for the design of national programmes.
- DALYs lost in school-age children represent an estimated 11% of the global burden of disease for all age groups. This is an underestimate which does not capture either the disability that begins at an earlier age, or the longer-term consequences of behaviours established at school-age which have an adverse effect on health in adulthood.
- The burden of disease is concentrated in the developing world (97%), with sub-Saharan Africa and India suffering almost half of the total burden of disease in school-age children. Around a half of DALYs are lost due to premature death. More than 53% of DALYs are lost from communicable diseases, 28% from non-communicable diseases and 18% from injuries.
- Infectious and parasitic diseases are the leading cause of DALY loss in developing regions. Unintentional injuries, respiratory diseases and neuro-psychiatric disorders are a significant additional cause of loss.
- The DALY rate per 1000 population for school-age children in sub-Saharan Africa is ten times that in established market economies.
- The consequences of physical ill health for educational and intellectual development have yet to be adequately quantified, but are likely to constitute a major additional burden which is of particular relevance to the quality of life and development of school-age children.

Research priorities:

- *Reliable empirical estimation of the burden of disease in school-age children, including identification of the differing health problems of primary schoolchildren and adolescents.*
- *Identification of the major causes of morbidity and mortality in school-age children at the national level to assist the design of school health programmes.*
- *Assessment of the impact of physical ill health on school attendance, cognitive development and educational achievement, in order to assess the scale of this additional and age-specific burden on the school-age group.*
- *Assessment of the extent of perceived morbidity associated with common childhood conditions and their correlation with the quality of life adjustments used in estimating DALYs.*
- *Assessment of the extent of risk behaviours in school-age children and their consequences during school age and in adulthood.*

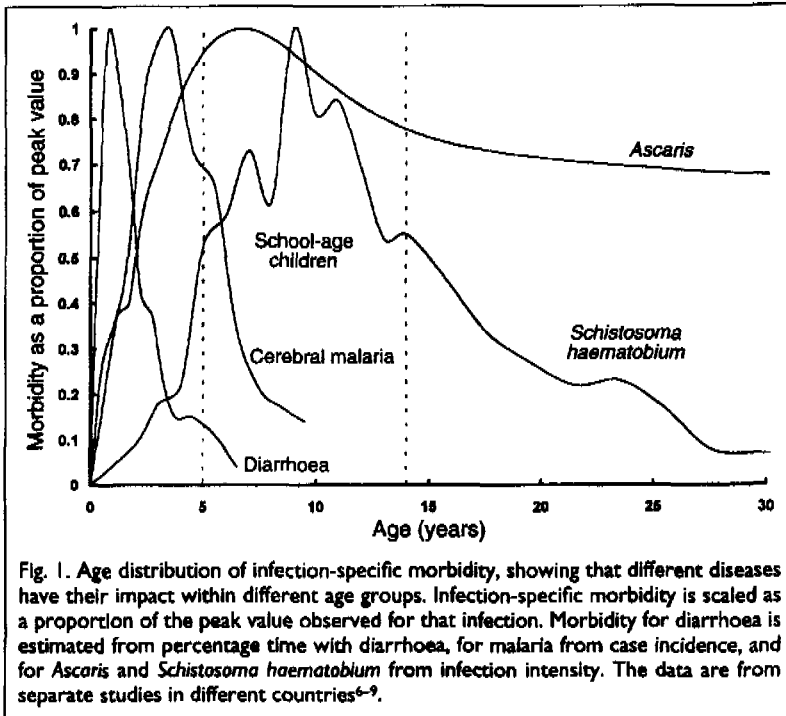
Potential benefits from improving the health of school-age children

This section examines whether the principal causes of ill health in children of school age are reversible using existing interventions, and whether the health improvements also have benefits for educational achievement.

Potential for health benefit

The major health burdens in school-age children have been outlined above. In identifying which of these

Scan and erase malaria + diarrhoea



conditions can be usefully alleviated, it is necessary to determine not only whether a practical intervention exists, but also whether it is affordable and sustainable in endemic countries. This implies the need for cost-effectiveness analysis which, in general, has not been applied to the interventions relevant to this age group.

Interventions, particularly curative and remedial approaches, will now be considered. These should be viewed, however, within the context of an overall preventative approach, supported by appropriate health education/communication (see below).

The discussion below attempts to focus on the major causes of disease in school-age children, the types of interventions available, and the evidence for an effect of intervention.

Infectious and parasitic diseases are the leading cause of disease burden in school-age children in developing countries. Of the infections identified as being particularly important in the school-age group (see Fig. 1)⁶⁻⁹, intestinal helminths and schistosomiasis can be treated using a low-cost, simple, oral therapy appropriate for delivery in school or community at infrequent intervals^{10,11}. Because school-age children typically harbour the most intense infections, treatment of this age group has been shown to reduce infection in the community as a whole¹². However, there remain the problems of the exclusion of females of child-bearing age from these treatment programmes (see below) and of the sustained prevention of reinfection. Malaria is a major problem in many developing societies, but the value of treatment of malaria on an individual basis within the school environment requires assessment. Tuberculosis requires more complex and prolonged treatment, but the teacher and the community could play a facilitating role in referral to the health care services, and possibly the supervision of compliance with treatment regimens¹³. Preventative measures, such as BCG vaccination in younger age groups, may prove more effective. There is no

treatment for Chagas disease, and its prevention would require a community-wide programme, which schools could help promote and sustain. Indeed, prevention of a broad range of communicable diseases, including all of the above, would be usefully supported by parallel integration of intervention with health education/communication.

Unintentional injuries were the second leading cause of DALYs in school-age children in developing regions. If there is a preventative intervention, within the existing battery available for this age group, it would be in the area of Life Skills training. There may also be a role for teachers or other community leaders to mitigate the effects of, for instance, falls and poisoning. This could be supported by the availability of First Aid Packs and teacher-instigated referrals to health-care services.

Respiratory infections ranked as one of the top five causes of DALYs and life lost in the developing regions. Acute lower-respiratory infections could be managed by referral to the Primary Health Care (PHC) system, where they should be treated according to WHO guidelines¹⁴. Chronic respiratory disease, particularly asthma, has no well-described management procedures appropriate to developing countries, although there may be a role for schools in promoting changes in harmful domestic practices, such as the burning of wood fires in poorly ventilated areas.

Diarrhoeal diseases were also shown to be important in this age group, and could be managed through health education and oral rehydration therapy (ORT). In addition, because intestinal nematode infections may cause diarrhoeal disease, there may also be a role for anthelmintic delivery. The contribution of intestinal protozoan infections to diarrhoea in this age group is unquantified.

Neuro-psychiatric disorders, epilepsy in particular, are also an important cause of disease burden in school-age children. There may be a role for health education and Life Skills in the management of unintentional injury resulting from such conditions, and in reducing the stigmatisation attached to these conditions in the community.

The childhood cluster includes the vaccine-preventable diseases, which are the major cause of DALY loss in sub-Saharan Africa and India. This reflects the low coverage of the Expanded Programme for Immunization (EPI) in younger children, suggesting a role for health education in promoting EPI uptake in the community as a whole¹⁵.

STDs and HIV are a consistently higher source of DALY loss in females than in males of this age group. STD treatment for females could be managed by referral to health-care services, although this raises issues of cultural sensitivity and the individual's right to confidentiality. These issues would also inform health educational efforts aimed at prevention.

Apart from the conditions outlined above, which were highlighted as being particularly important contributors to the disease burden, there are a number of other specific health problems in school-age children that warrant further attention, some of which are discussed below.

Some of the major forms of anaemia can be alleviated by the treatment of intestinal nematodes and schistosomiasis, by dietary fortification and by dietary diversification promoted by health education. Although iron supplementation is inexpensive, there may be problems of toxicity and compliance in the school setting. There is a need for simple, well-validated and community-based interventions. There is suggestive evidence for increased morbidity and mortality due to vitamin A deficiency in school-age children, although most studies have focused on the risks of deficiency in children under five years old. Iodine deficiency is also important in this group, with a particular risk of iodine-deficient women giving birth to cretinous children, and evidence that iodine supplementation can lead to an improvement in IQ¹⁶. Supplements of these micronutrients could be delivered through schools, although the more sustainable long-term intervention is the promotion of dietary diversification and fortification.

There is evidence for a specific vitamin A requirement in adolescent females, with a particular demand at puberty and during menstruation¹⁷. In addition, there is evidence that vitamin A facilitates iron metabolism and therefore has the potential to reduce anaemia, and also that vitamin A supplements reduce vertical transmission of HIV and possibly other infections. This implies that there may be a special need for vitamin A supplementation in female adolescents. Recent evidence also indicates that reproductive-tract infections may be a common, preventable and under-recognized health problem of adolescent children¹⁸.

Some highly prevalent but not life-threatening conditions may have particular importance for school-age children. Scabies is believed to have a significant effect on school participation, but the health impact is unquantified. The condition could be managed within the community. Similarly, schools serve as epidemic foci for conjunctivitis. Hygiene education could help alleviate this problem.

Some forms of harmful behaviours such as substance abuse typically become established during adolescence. Although much of the morbidity occurs in the adult population, preventative measures, such as Life Skills education, would be most appropriately initiated during school age. For similar reasons, Family Life Education in schools could provide longer-term benefits for improved reproductive health and avoiding unwanted early pregnancy.

Some of the conditions mentioned above, in particular micronutrient deficiencies and helminth infections, have been associated with cognitive deficits. These deficits are often perceived as having their main impact on educational achievement (see below), but are clearly also of relevance to the health and social development of the child.

In assessing the practical benefits of interventions one of the major omissions has been in the area of cost-effectiveness analysis¹⁹. Even when the effective-

ness of an intervention has been evaluated, there is rarely any attempt to attach costs.

Roundup

- Effective interventions are available for some of the major causes of mortality and morbidity in school-age children. They are also available for conditions that result in morbidity during school age, but that have their onset prior to the age of five; and for harmful behaviours that are established at school age, but result in morbidity and mortality later in life.
- For some other important causes of disease in this age group, such as malaria and anaemia, there is a need to assess the effectiveness of current approaches to intervention in school-age children.
- Health education, including Life Skills and Family Life Education, has a potentially important role in improving the health of school-age children, particularly adolescents.
- Some beneficial medical interventions, such as anthelmintics and micronutrient supplements, may be appropriate for delivery by school teachers, while others may require the participation of trained health personnel, in or out of the school setting.
- School-based delivery appears to be cost-effective, but there is a lack of empirical evidence of actual costs or effectiveness, and a lack of studies of the comparative cost-effectiveness of delivery in and out of school.

Research priorities:

- Assessment of the cost-effectiveness of intervention against some of the major causes of mortality and morbidity in school-age children, such as malaria and anaemia, for which there is current uncertainty as to the optimal approach.
- Assessment of the benefits of intervening against conditions of particular relevance to specific groups, such as scabies and conjunctivitis in primary schoolchildren, and vitamin A deficiency in adolescent females.
- Assessment of the comparative cost-effectiveness of intervention delivery through schools versus other community-based approaches.

Potential for educational benefit

There have been a wide range of conditions studied with respect to their impact on educational performance, including HIV/AIDS, alcoholism, under-nutrition, micronutrient deficiency and colds and influenza. Although there is some evidence that these conditions can affect cognitive functions, and that the effects can be reversed by interventions, there remains a substantial gap in our knowledge of the effect on educational achievement and of the potential for long-term reversibility.

There have been a number of studies on the short- and long-term effects of Protein Energy Malnutrition, but these have mostly been restricted to infants and young children. Although there have been problems in study design, they demonstrate consistent deficiencies in mental function, but little or no consistency in the type of function affected². There is evidence that food supplementation can improve mental development, and will have an additive effect if given alongside psycho-social stimulation²⁰. There is also evidence that short-term food deprivation, such as missing breakfast, can affect cognitive function in school-age

Meeting Report

children, particularly in those already suffering from undernutrition²¹.

The micronutrient deficiencies investigated include iron, iodine and vitamin A. There is a large body of evidence that iron deficiency can have an adverse effect on a wide range of mental and motor functions in school-age children, and that these can improve as little as 3–6 months after treatment^{22,23}. The effects of cretinism on the brain and neurological function are usually considered irreversible, or at best, the degree of improvement is slow and age-dependent. The effects of mild–moderate iodine deficiency on cognition and motor function are less clear and it is not known whether iodine supplements will improve or reverse any negative effects²⁴. There have been no studies on the psychological impact of the visual impairment resulting from vitamin A deficiency, or of the impact of vitamin A on school achievement. It is possible, however, that performance could be affected because of visual impairment, and that attendance could be affected because vitamin A deficiency can increase the susceptibility to respiratory infections.

Helminth infections are extremely common and occur at high intensities in school-age children. However, the effects on cognition and mental function are not well understood. Most of the early evidence is circumstantial; for instance, infected children are listless and suffer from diarrhoea and abdominal pain which could impair learning. Recent studies on helminth infections have established an effect on cognitive function and some studies suggest that these effects are reversible on anthelmintic treatment²⁵. A growing number of studies show clear differences in the cognitive abilities of uninfected and infected children, even when socio-economic status is controlled for statistically, which suggests an important role for a preventative approach.

In some regions, malaria is one of the most important diseases affecting this age group. It is a major cause of absenteeism, and cerebral malaria has long-term repercussions for mental development.

Deafness and visual impairment may be important contributors to underachievement in education. Moving affected children to the front of the classroom may be beneficial, even though more-effective remedies may be beyond local resources. More awareness among teachers of how to recognize these problems could reduce rates of absenteeism and drop-out among affected children.

Although a relationship between physical health and mental processing is generally accepted, it has proved difficult to demonstrate scientifically. One of the problems has been the lack of well-designed studies that not only carefully characterize both health status and mental function and control for confounding variables, but that also provide convincing evidence of causality. There is also a need to ensure that the tests used are culturally specific, and capture the type of mental function to be assessed. No study has examined whether the effects differ between females and males (although see below), and there has been no assessment of the multiplicative or additive effects of concurrent disease.

There is evidence that cognitive function is affected by ill health, and that educational achievement is influenced by cognitive ability, but there is a lack of

studies on the direct effects of physical health on educational achievement. Some conditions, including malaria, dracunculiasis and intestinal nematode infection, show correlation with absenteeism from school (see below), but it is not known whether these relationships are causal or whether they result in reduced educational achievement.

The evidence indicates that some of the most prevalent conditions of school-age children are associated with impaired cognitive ability and reduced school attendance, and that some of these effects can be partially reversed by simple health interventions. This implies that the burden of physical ill health may be accompanied by a similar burden of intellectual underdevelopment, and that both burdens may be simultaneously alleviated by improvements in health.

There is convincing evidence that pre-school programmes to improve early childhood development can improve the lives of low-income children and their families, and can enhance the quality of life for the community as a whole^{26,27}. Such programmes are increasingly being implemented in developing countries, often with World Bank support²⁸, with the aim of providing children with a head start on entering school. Programmes to improve the health and development of school-age children are the natural sequel to these activities.

Gains in educational achievement may have practical consequences for developing societies. Evidence suggests that even a few years of schooling is associated with important changes of economic value in individual skills²⁹. Investment in primary education yields a higher rate of return than in secondary or higher education³⁰.

Roundup

- Some highly prevalent conditions of school-age children, such as undernutrition, subclinical nutritional deficiencies of iodine, vitamin A and iron, and moderate intensity of helminthic infections, cause significant impairment of some aspects of cognitive function.
- For some of these conditions, the cognitive deficits can be at least partially reversed by simple health interventions, or can be largely avoided by preventative measures, which suggests that improvements in health may enhance the ability of children to learn in school.
- Ill health is a potentially important cause of absenteeism among school-age children, which suggests that health improvements may enhance school attendance.
- The long-term benefits of health interventions for mental development and educational achievement have not been quantified.
- Programmes to improve the health and development of school-age children can help build on the gains of early childhood development.

Research priorities:

- Assessment of the effects of prevalent and easily treatable conditions of school-age children (eg. iodine deficiency, vitamin A deficiency, anaemia and helminth infections) on school performance and attendance, and of the extent to which these effects can be reversed or avoided by health interventions.
- Analysis of the gender dependency of these effects, and of the extent to which multiple health insults result in multiplicative or additive consequences.

- Evaluation of the longer-term benefits of health interventions for educational achievement.

The health of school-age children who are not in school

The school-age group encompasses children both in and out of school. Children may be out of school for a variety of reasons. The aims of this section are to assess whether children not in school are likely to be neglected or excluded by school health programmes and whether their health status, relative to that of children in school, warrants particular efforts to reach beyond the school.

Although school enrolment rates have risen consistently in most countries over the past two decades, children out of school remain an important concern: one consideration being that the upward trend may not continue, particularly in the poorer countries of Africa where gross national product (GNP) per caput is continuing to fall, structural adjustment has resulted in a decline in government expenditure on education, user charges have risen and government may be disrupted by civil unrest and political transition.

Indicators of enrolment of children in school

In 1990, a total of 610.9 million children were enrolled at the primary level, with 82% (498.5 million) in developing regions. The Gross Enrolment Ratios (GER) for developing regions in 1990 were 98.4% at the primary level, 42.3% at secondary and 6.9% at tertiary; where the GER indicates the proportion of children in school, irrespective of their age. The primary level GER varied from a mean of 68% in Africa to 119.4% in East Asia. The ratio is typically lowest in African countries, but is highly variable: 103% in Cameroon; 77% in Ghana; 39% in Ethiopia. These data are from the 1993 UNESCO World Education Report³¹.

The Net Enrolment Rate (NER) is calculated using the enrolment of the level-appropriate age group. For Tanzania, the GER was 69% and the NER 51%, indicating a sizeable proportion of over-age children in school (see Fig. 2). In Indonesia, the comparable figures were 117% (GER) and 98% (NER).

Female children are typically under-represented in primary level enrolment. Globally, an average of 46% of enrolled children are female, varying from 42% in Southeast Asia to 49% in Latin America and the Caribbean. The inequality increases with education level (see Fig. 3). In developing regions, females represent 42% of enrolment at the secondary level and 38% at the tertiary.

Enrolment is dynamic, with the proportion decreasing with increasing school grade. For example, it is estimated that of a cohort of children entering primary school in Tanzania in 1989, 95% will still be present at Grade 2, 88% at Grade 4 and 73% will attain the final grade. The drop-out rate is typically higher in female children.

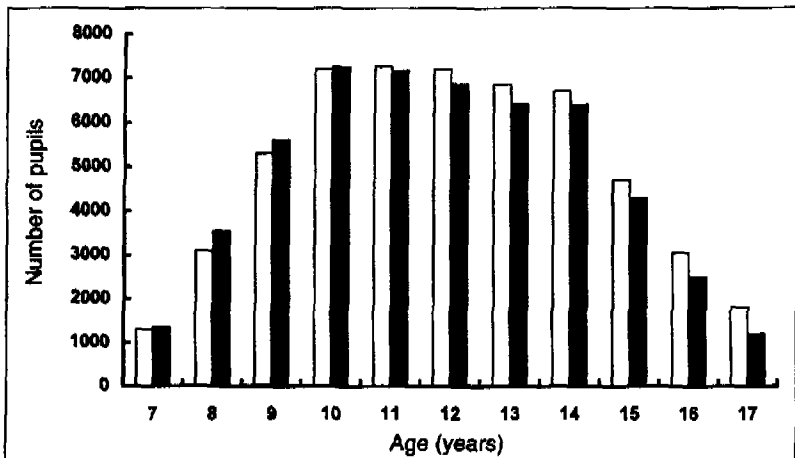


Fig. 2. The age distribution of primary school pupils in three districts of Tanzania (Tanga, Korogwe and Muheza): males, open bars; females, closed bars. This figure demonstrates that many children attending primary school are over-aged. The typical age range for primary school children is 6–12 years of age, though in practice, pupils may be as old as 17. Data source: Tanzania Partnership for Child Development (UKUMTA).

These factors suggest that the proportion of children benefiting from a school health programme will decline with increasing grade, and that female children will be increasingly disadvantaged. The data also indicate, however, that the majority of children of both sexes will continue to benefit.

The presence of a female teacher has been shown to correlate with higher attendance of female children. The proportion of female teachers at the primary level is remarkably region specific. Globally, 56% of primary level teachers are women. In industrialized countries the proportion is 75%, while it is 49% in developing regions. In Latin America and the Caribbean the proportion is 77%, but elsewhere in the developing world it varies from 28% to 50%.

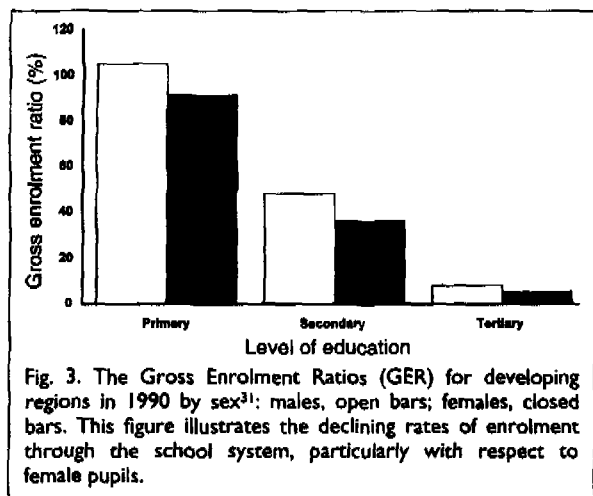
Overall, the enrolment data suggest that, in many countries, more than half of the school-age population could be reached through schools. Where primary health-care facilities are limited, this implies that schools may offer an important means of providing health care to a substantial proportion of the school-age population. On the other hand, the data imply that a significant proportion might not be reached, and there is evidence (see below) that the absentee and non-enrolled children have particular health needs.

Poor health as a cause and correlate of absenteeism and non-enrolment

The focus here is on school-age children who are not attending school. This includes children who are non-enrolled (not registered) and those who are enrolled but do not attend (absentees). Although there are data available on enrolment (see above), there are no centrally collated data available on attendance rates of those who are enrolled.

The main reason for non-enrolment is believed to be economic³². Families either cannot afford to send their child to school or, more commonly, need the income provided by a working child. Other reasons for non-enrolment include: the need for children to help with domestic or non-wage-earning activities at home; the poor accessibility of schools, particularly in

Meeting Report



rural areas where children have to walk long distances; parents not valuing education because they themselves are uneducated; parents considering western education as compromising their cultural and religious beliefs and values; and the lack of certain resources at school, particularly for females who may require private single-sex sanitary facilities, or who (in some countries) can only be taught by female teachers. Malnutrition, particularly stunting, is believed to be an important health-related cause of non-enrolment^{5,33}.

Female children have lower enrolment rates than males, particularly in the poorer countries of sub-Saharan Africa, South Asia and the Middle East, where females are often needed to help with domestic activities. In addition, when resources are scarce, a male child may be more likely to be sent to school, as this is perceived as a better investment³⁴.

Absenteeism is believed to be influenced by a number of factors including: ill health (either affecting the child directly, or another family member, such that the child either has to replace the role or work of the sick or has to care for them); undernutrition; psychosocial problems (eg. instability at home); and child labour (which is often seasonal), such as agricultural activities. Cultural and religious constraints may also stop females attending school because it interferes with their marriage plans and prospects. Females are more likely (than males) to be absent because they are often needed to help at home. There is a direct relationship between absenteeism and drop-out, and the double burden of school and domestic work often leads to females dropping out of school.

Absenteeism has been correlated with malaria, asthma, whipworm infection²⁵ and dracunculiasis²⁶, but there is no consistent pattern with schistosomiasis. Malaria treatment has been shown to enhance attendance²⁸.

Although out-of-school children may potentially be exposed to greater health risks than those in school, there is little information on how their health problems differ. One study in India of male children demonstrated that school-going children were healthier than out-of-school children, and that non-wage earners (those working for the family) were healthier than wage-earners³⁷. Information relating to female children is even more scarce, although it is thought that they may be at greater risk than males because

they work longer, and have a higher risk of anaemia, iodine deficiency, goitre and undernutrition. Studies in Egypt indicate that schistosomiasis haematobium occurs at higher prevalence and intensity in children not attending school.

It is assumed that school-based delivery of interventions is cost-effective because of the accessibility of schoolchildren. However, the discussion above indicates that a large proportion of children, particularly older children, are often absent from school, and this group is possibly more at risk of ill health. There is therefore a special need to examine ways of reaching these out-of-school youths. The timing of delivery may be important to both the seasonality of attendance and infection transmission.

Poor health as a cause of absenteeism and non-enrolment in adolescents

The outer age limits for the adolescent range between 10 and 18 years of age, which represents one-fifth of the world population. This age range represents the secondary school population, although in many developing countries children of this age are also found in primary schools. Although the gap is narrowing, secondary school enrolment is barely more than half that of the average primary school enrolment.

The health problems of the adolescent are also specialized, and include higher rates of iron deficiency anaemia, iodine dietary problems, schistosomiasis, substance abuse, greater exposure to STDs, and greater exposure to violence. Female adolescents are at a higher risk from iodine and iron deficiencies³⁸, and also have risks associated with pregnancy, childbirth, unsafe abortions and taboos related to menarche^{39,40}. In addition, some studies have shown that females have higher rates of dental caries⁴¹, lower-respiratory tract infections⁴², malaria⁴³ and mental health problems (see, for example, Ref. 44).

Some two-thirds of females are not enrolled at secondary schools, and those that are enrolled often either do not attend or drop out. The reasons for the low enrolment rate for adolescent females include their involvement in waged labour, the high direct and opportunity costs of schooling, gender-biased curriculum and premature fertility. Of all of these, premature fertility has been given the most research attention as a determinant of enrolment, attendance and drop-out⁴⁵. Adolescent fertility has increased recently because of the longer period of sexual activity before marriage, combined with poor knowledge and limited access to contraception. Adolescent females also have higher rates of abortion complications, and of pregnancy and delivery complications than do adults. In addition, early sexual activity, and multiple partners, can lead to a high risk of STDs.

Evidence for an effect of ill health on school performance is mostly limited to primary school children. However, iron deficiency has been shown to affect cognitive function negatively. Because this health problem increases in adolescents, it can be assumed that schooling is negatively affected, particularly in females, where these health risks are highest. Studies have also shown that treatment of these health conditions can have a greater impact on females than on males. For example, one study demonstrated a greater relationship between goitre and improvement

in IQ in adolescent females than in adolescent males⁴⁶, and some school feeding programmes have been shown to have a greater impact on female attendance and performance than on that of males⁴⁷.

Of the few studies that have investigated the health factors affecting school attendance by adolescents, most have focused on females. These studies show that guinea worm infection⁴⁸ and short-term hunger are both associated with absenteeism. They also indicate the importance of reproductive health. Being sexually active is a negative determinant of school attendance. Many young women are absent during menstruation, relating to the lack of privacy in many schools⁴⁵.

There is a particular lack of information on adolescent males, and it is uncertain to what extent the problems of substance abuse and violence that have been shown to affect male schooling in industrialized countries are relevant to developing countries.

The health of working children

Working children are a special subgroup of school-age children. They include schoolchildren who also work, children who work and do not attend school, and street children, who may both work and attend school.

Although children have to be 15 years old before they can join the legal work force, a large proportion of eight year olds and over are economically active. Although the largest sector of child employment is in agriculture, followed by domestic service, there has been no research on the health issues associated with these types of work. Of the little research that has been undertaken, most has been limited to specific activities, such as carpet weaving, or to particular categories of children, such as street children. It is simplest to consider street children as working children who have the additional problem of homelessness and lawlessness. Although there has been a great deal of media attention given to street children, research into their health has focused mainly on their psychological problems. Despite the higher numbers of working children who are not street children, less attention has been given to this group. Both street children and working children can be found as subsets of enrolled and non-enrolled school-age children.

There are no official data on the numbers of working children, but estimates range between 55 million and 300 million. These children have the characteristic diseases of childhood (such as malnutrition, worms and respiratory infections), but these can appear at abnormally high rates and intensities. Living and working on the street also has its own particular health hazards (eg. traffic accidents, burns)⁴⁹, as does working in specific industries. There is, however, no conclusive evidence on work conditions that are harmful to children, nor the short- and long-term effects at particular ages and stages of childhood. Most of the data available are based on secondary sources, are largely anecdotal and focus on the effects of obviously harmful types of work. There is little or no information on, for example, the effect of repetitive or heavy tasks, using tools intended for adults or contact with pollutants and toxic substances.

Working children may be considered under the following categories: (1) tied and bonded labour; (2) waged employment; and (3) marginal economic activities.

Although the health hazards for children in tied or bonded labour are comparable to those of children doing similar work in non-bonded situations, they are likely to be more at risk because they are less able to seek or obtain health care, and their health status is likely to be poorer before entering the work place.

Children in waged labour are likely to be subject to similar dangers whether working for the family or a third-party employer, although the informal sector working environment is likely to be more unhealthy than the formal sector because it is unregulated. There is anecdotal evidence available on the health hazards associated with different types of waged labour, but apart from two studies that showed that the health (in terms of height and weight, nutritional deficits and general complaints) of carpet weavers is worse than that of school-going children^{50,51}, there have been few comparative studies.

Children involved in marginal economic activities include street vendors, who often also attend school. Studies have shown that schoolchildren who are also street vendors demonstrate higher levels of responsibility and initiative than their non-working counterparts⁵². Although there is some evidence to suggest that street children can actually be less malnourished than school-going children, street children are likely to be more exposed to certain health risks, such as substance abuse and prostitution.

Female working children have fewer employment opportunities, and are largely restricted to domestic or household work. However, this does not necessarily imply that females are more likely to be kept at home rather than sent to school; males may be told to leave school to find work because of their greater work opportunities. Whether a child goes to school or not is also affected by birth order. For instance, boys under the age of 15 may stay at home to look after younger siblings and carry out household chores in order to free adults for waged labour outside the home⁵³. If females are at home, they may be less exposed to physical danger, but may be more malnourished than a working male. Indeed, a wage earner of any gender may be considered more important to feed than one at home producing no income.

There are markedly fewer female (an estimated 10%) than male street children and much less is known about them. One of the problems is that female street children are largely considered synonymous with prostitution. There is, however, no evidence to suggest that females are more at risk (than males) from sexual exploitation, although they do have the additional risk of pregnancy, and have greater problems of access to health care.

Roundup

- The majority of school-age children could be reached by school-based health programmes, but in many countries a significant proportion are not enrolled in school, and many of those enrolled are often absent. Female children are less likely to be enrolled, more likely to be absent if enrolled, more likely to drop out and are at a higher risk of many health problems. This sex bias increases with age and is most marked in adolescents.
- There is a need for health programmes to reach beyond the school, particularly with regard to adolescent and female health. Adolescents have special health problems,

Meeting Report

often related to sexual activity, and differ from children and adults biologically and in their social and economic roles.

- The health problems of non-enrolled and absentee children, and of working and street children, are potentially worse than those of school-going children, but there is a surprising lack of conclusive evidence.
- Although there are a number of factors thought to influence enrolment and absenteeism, there are few data on the relative contribution of ill health.
- Of all children, working children and street children appear to have the least access to health services.

Research priorities:

- *More precise measurement of attendance and enrolment rates is required to assess the proportion of children that could be reached by school-based health services. There is a particular need for information at the national level.*
- *There is a need for information on the health status of out-of-school children, particularly adolescent males, and for comparative studies with those in school. There is also a need for studies on the health problems of working and non-working children.*
- *Evaluation of the effects of health interventions on school attendance.*
- *Assessment of the most effective ways of improving health care for out-of-school children.*

Constraints on implementation

This section examines the initial conditions which enable the development of a health strategy for school-age children. These include the policy environment, the capacity of the education sector to participate in health delivery, and means by which the specific local conditions can be evaluated in practice.

Policy development

A supportive policy environment appears to be well established globally. Most governments have endorsed the Convention on the Rights of the Child, which includes the rights of children of school age to information and skills, health and education services, and a supportive and enabling environment. School health programmes, broadly defined, could provide governments with a practical opportunity to implement such policies.

There are a number of specific policy issues that require emphasis in the context of health services for children of school age. These include the protection of young girls against forced early marriage, the rights of girls who become pregnant to continue with their education, the protection of children against prostitution and sexual abuse from teachers and other adults, and the sale of alcohol and tobacco to minors. The development, monitoring and implementation of such policies will make an important link with the community that is served by the school and with the national policy-making processes, and will also raise dialogue and debate around societal values and norms that undermine young people's health and development.

Implementation of a school health programme will necessarily involve a multidisciplinary approach. At the most basic level, it will require the active co-

operation of the health and education sectors. In practice many other sectors are involved (see Fig. 4). For example, although schools and teaching are the responsibility of the government education agency, the salaries of teachers and the maintenance of government schools are often the responsibility of local government, while a substantial proportion of schools may be under private, often religion-based, management. This implies the need to develop broad consensus in policy making, including both governmental and non-governmental agencies.

Capacity of the education sector

In 1990, there were an estimated 23.94 million teachers at the primary level, globally, with 72% (17.31 million) in developing countries³¹. There were fewer secondary level teachers: 18.8 million globally, 62% (11.21 million) in developing regions. Pupil: teacher ratios for much of the developing world were in the range 20–30:1. This indicates the exceptional scale of human resource in the education sector.

Global public expenditure on education in 1991 was US\$1119 billion, but only 15% (US\$168 billion) was spent in developing countries, where 82% of the world's schoolchildren are enrolled. Average annual expenditure per pupil, at the primary level, was US\$168 in developing regions, and US\$42 in Africa.

These data indicate that the developing regions enrol 82% of the world's primary schoolchildren, and have 72% of the primary level teachers but only 15% of global economic resources for education. While the figures support the perception of the education sector as providing a very substantial infrastructure for reaching school-age children in developing countries, they also indicate the severe economic constraints on the sector. This suggests a particular need for careful planning if any additional role in health delivery is to avoid detracting from the primary role in education.

Situation analysis for programme planning and targeting

In order to develop health services for school-age children, countries will need the tools to identify a package of sustainable interventions of demonstrated impact that can reasonably be expected to go to scale, and which address specific local health needs. The lack of well-validated, rapid assessment methods to quantify disease burden and to assess patterns of disease at the local level may be an important constraint on programme development.

Deciding what needs to be done and how, may be facilitated by conducting a situation analysis. While this needs to be relatively rapid, at the same time it needs to provide adequate information about a number of key factors.

- Priority health problems of school-age children, including both mortality and morbidity and also behavioural issues relating to sex, substance abuse and nutrition – factors which may have their major impact in terms of death and disease later in life.
- The local education sector, including rates of enrolment, repetition, drop-out, and (where possible) details of the causes of wastage within the education system.

- Existing health and education programmes that focus on the health and development of school-age children, including opportunities and constraints to developing and strengthening what already exists and lessons learnt from past local efforts to develop services for school-age children through schools.

The information that is collected needs to take into consideration trends in the data as well as variations that may occur as a result of age, gender, seasonal, geographic, rural/urban and other epidemiological characteristics. The process of the situation analysis also needs to involve the target group, especially the children, and develop partnerships between key persons responsible for implementing the interventions.

A number of approaches to obtaining this information are available, including the review of routinely collected statistics and special surveys that have been carried out, interviews with key informants, and focus groups with pupils, parents, teachers and health workers to provide an overview of perspectives and experiences. However, simple and affordable approaches to collecting these data have yet to be developed.

Roundup

- The Convention on the Rights of the Child provides an appropriate policy environment for the development of school health programmes, but there may be a need to support these rights with legislation.
- School health programmes require a multidisciplinary approach that includes active collaboration between the health and education sectors, but also involves many other governmental and non-governmental agencies.
- The education sector of developing countries has an extensive infrastructure, but this is under-resourced, and care will be required to avoid overtaxing this sector by an inappropriate level of involvement in health delivery.
- The design and development of school health programmes will require information at the national and local levels on, for example, the major health burdens of the school-age group, the opportunities for intervention, and the appropriateness of the available infrastructure.

Research priorities:

- Identification at the national level of the policy needs for fuller implementation of the rights of children.
- Development of appropriate approaches to the conduct of a school health situation analysis at national and local levels.

Constraints on intervention

The following sections review current experiences of intervention in the school-age group, highlighting the problems that have been encountered and identifying areas for future research.

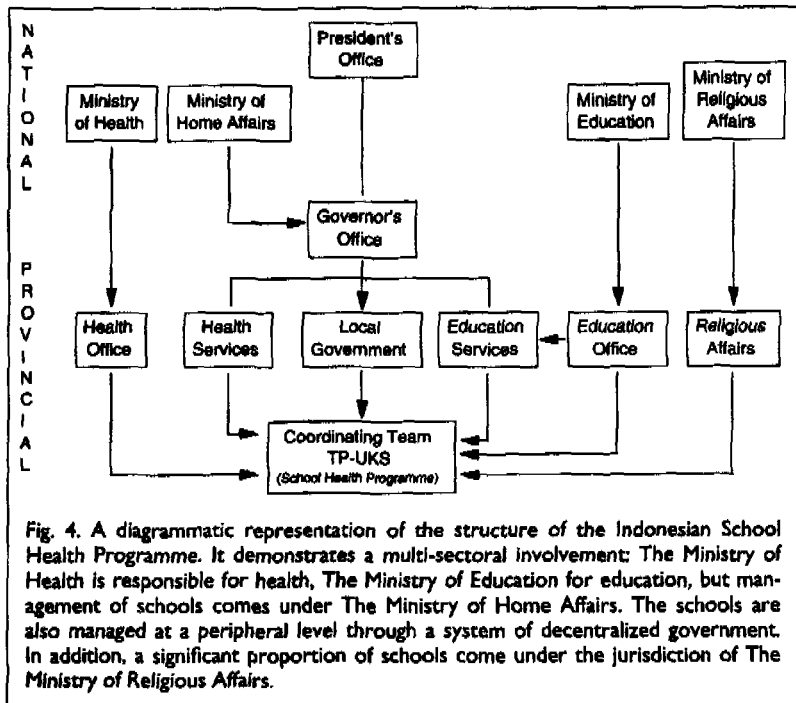


Fig. 4. A diagrammatic representation of the structure of the Indonesian School Health Programme. It demonstrates a multi-sectoral involvement: The Ministry of Health is responsible for health, The Ministry of Education for education, but management of schools comes under The Ministry of Home Affairs. The schools are also managed at a peripheral level through a system of decentralized government. In addition, a significant proportion of schools come under the jurisdiction of The Ministry of Religious Affairs.

Health education in schools

A major component of any health programme for school-age children will be health education and communication. Children need relevant knowledge that will help them understand their everyday health problems, and they need practical skills in how to recognize and protect themselves against disease. Such knowledge and skills are necessary to enable children to prevent ill health, thus making such investments in children more sustainable. The aims of health education directed at children should be to:

- Create awareness about the existence of diseases, and build a bridge between scientific understanding of disease and children's perception of disease in their everyday lives;
- Foster in children an understanding of what is healthy living, and what they can do to promote and practice this for themselves and their communities;
- Give children practical skills in recognition of disease in themselves and their families, and in how to protect themselves and the community against such diseases;
- Encourage children's sense of responsibility for their own health and that of their families in the future.

However, reality shows that the majority of health education activities for school-age children fall far short of such ideals. A review of health education programmes over the past decade reveals some common inadequacies⁵⁴:

- Health education is typically given low priority in the education sector;

Meeting Report

- Health education is seldom a separate curriculum subject but is integrated in subjects across the curriculum with varying degrees of success;
- Planning of health education is done centrally, with no consultation or involvement of teachers, health workers, parents or students, and is not based on needs assessment of communities;
- Content is focused on teaching facts, not on health-protective action; and contents are rarely related to local needs;
- Teaching methods are mostly didactic and teaching materials are often meagre;
- Teacher preparation and motivation are typically low;
- Health teaching was easier to implement in primary than in secondary schools, where the curriculum is often overloaded.

where?
 Very little research has been carried out on establishing criteria as to what is effective health education for school-age children, and on how to improve such education in existing institutions. There are indications from research that health-education programmes have a higher chance of success when they are implemented through schools and communities simultaneously.

It has been suggested that one focus for broad-based development might be to strengthen the role of the schools as the embodiment of a community's concern for health. The school and its yard or immediate environment would be seen and treated as a first priority of health-oriented development: a demonstration ground for many topics of health education. These could include safe water and clean latrines, fuel-efficient stoves, vegetable gardens, and instructions and advice on, for example, nutrition, hygiene and other relevant topics. The school yard could be one place where parents meet and discuss practical improvements to community life and well-being and how this can be achieved through co-operation between the school and the community – in short, a centre for social development. Such a strategy would require that the parents participated in the planning of the scheme, and it would require that the education sector co-operate with the health sector in the planning and execution of the plan.

Since the 1978 Alma-Ata Conference (WHO/UNICEF) there has been a move to promote active participation in the health education process. Such activities are variously described as participatory education, children as agents of change, and as the child-to-child approach. Participatory education implies the active involvement of the child in the learning process. Children can serve as agents of change through transferring health information to the community. The child-to-child concept has widened over the past decade to aim for outreach to the community beyond the school. The child-to-child approach now involves some 70 countries to varying degrees. This approach has not yet been adapted and implemented at the national level, and so there are questions regarding its sustainability.

In developing countries, health education, as most other subjects, is taught through didactic methods, where the focus is teaching children to retain facts.

Teachers are given some theoretical background in participatory methods in teacher training college, but are often given little encouragement or incentive to practice such methods in their classes. There is a concept that participatory methods take longer to teach, and that they erode or question the teacher's authority. In a system where fact-focused exam results are the major measure of success, participatory methods need to be introduced in a sensitive and practical manner, demonstrating that good results can be achieved in the same amount of time as with the traditional didactic methods.

Participatory methods are used to a large extent in schools, for example, in Europe, and it has been clearly demonstrated that in societies emphasizing a participatory approach to learning in their educational system, children do gain a deeper understanding of health issues. They also learn practical skills. However, there has been no systematic effort to assess the practical potential of such an approach to health education in schools in developing countries. We therefore lack data on the potential and actual impact of participatory methods on children's behaviour and on their health status.

A literature review on health education for school-age children, undertaken for the present analyses by Ascroft and Muturi (see Box 1), assesses 23 health-education projects. Where independent evaluation had been carried out (which was in the minority of the projects), it was found that: in some projects, children retained the health messages they had been taught; in two projects, children were found to pass on health messages to their families, but adults accepted the information only after independent confirmation by authorities (teachers, doctors); and outreach teaching was done in a few projects, but remained an extra-curricular activity with no plans for being integrated into regular teaching.

None of the projects measured biomedical improvement in children as an effect of health education. Two studies described an improvement in children's health, but provided no data as to the criteria for measuring such improvement.

It appears, therefore, that there is a lack of data available on the impact of school health education on children's health.

In the specific area of adolescent health and sex education, there is some evidence from four studies of skills-based health education in developed countries that programmes can change sexual risk-taking behaviours. Effective programmes were shown to have six common characteristics⁵⁵:

- (1) Theoretical grounding in social learning or social influence skills;
- (2) A narrow focus on reducing sexual risk-taking behaviours;
- (3) Experimental activities to convey the information on the risks of unprotected sex, and how to avoid those risks and to personalize that information;
- (4) Instruction on social influences and pressures;
- (5) Reinforcement of individual values and group norms against unprotected sex that are age and experience appropriate; and

- (6) Activities to increase relevant skills and confidence in those skills.

The development of a skills-based health-education programme requires an understanding of the health skills and information necessary to put these into practice. It is also apparent that some health-education messages require access to basic commodities and facilities, such as soap, water and sanitation, which are often unavailable in schools in developing countries.

Reaching children out of school might be achieved through school health clubs or through informal educational settings, but neither of these approaches appears to have been evaluated. The child-to-child approach is an outreach programme that overtly specifies out-of-school children as one of its primary targets.

Roundup

- Although school-based health education is widely promoted in developing countries, the subject has in practice an extremely low priority, and very little is known about how to plan and implement realistic programmes.
- Health education is easier to implement through primary schools, and therefore most studies focus on primary rather than secondary schools.
- Teachers need to be involved in developing practical participatory methods for health education; methods which will be experienced as compatible (rather than competitive) with the current exam focus in schools.
- Most studies have no systematic monitoring or evaluation procedures. It is important to measure not only changes in knowledge or short-term behaviour, but also any permanent effects on behaviour or improvements in health.
- There is a need to develop and evaluate strategies for reaching the children out of school with appropriate health education.

Research priorities:

- *Development of criteria for assessment of impact of health education on children's knowledge, perception, attitudes, practices and health standards.*
- *Comparison of cost and effectiveness of different health-education methods used in schools and in the community.*
- *Identification of effective health-education materials that can be used through schools, with more emphasis on linking principles of cognition and visual perception with health learning.*
- *Identification of factors influencing the link between school and community health intervention.*
- *Identification of channels and methods to reach out-of-school children with health education.*

School health services: delivery of specific interventions

This section briefly summarizes experiences of some programmes that have a focus on, or are relevant to, the health of school-age children, and that seek to deliver health interventions through the education sector. It also highlights some technical issues relating to health delivery through schools.

Almost all countries have a policy for some form of health provision in schools. The quality and content are highly variable, however, and there is an almost complete absence of formal evaluation. Anecdotal information suggests that the programmes are most comprehensive in urban, well-resourced schools, and are often completely absent from the poor, rural schools where they may be most needed.

The 1993 *World Development Report*³ recommends the delivery of an intervention package encompassing health education, anthelmintics and micronutrients to schools. However, practical experience of implementing programmes of this type is currently lacking. A consortium of countries, agencies and foundations, co-ordinated by the Partnership for Child Development, is currently evaluating the costs and effectiveness of this package in large-scale government-implemented programmes.

There are some experiences of school-based delivery of services, which at the least indicate the feasibility of the approach. In Venezuela, for example, the government mobile malaria teams also distribute anthelmintics to schools: 417 000 children in nine states are currently covered by this programme, which is being evaluated retrospectively in terms of both costs and effectiveness. In Indonesia, a NGO (non-government organization) is using mobile teams to deliver anthelmintics twice a year to schools, based on mass diagnosis. The programme is in Jakarta (a high-density, urban environment), and in 1992 served 713 schools with 207 598 students, of whom 39% provided a stool sample for examination, and 56% of these were found to be infected. Some of the costs of diagnosis and treatment are being recovered from parents (equivalent to US\$0.50 per pupil per year in 1993).

There are many global micronutrient programmes (delivering vitamin A and iodine), but these have primarily focused on children under five years old and on pregnant women. One exception to this is in India where, in 1994, the Government of Gujarat delivered vitamin A and iron supplements, as well as an anthelmintic, to three million schoolchildren taking part in its Mid-day Meals Programme. This is currently being evaluated. The global initiative to promote universal iodization of salt will also reach the school-age group¹⁶.

It has been suggested (see above) that schools might provide a point of referral to the health services provided by the primary health-care system. This approach might be of particular value for treating conditions that require a significant technical input (eg. TB and STDs) and that are considered inappropriate for mass treatment (eg. malaria). However, the use of schools as a referral system has not been evaluated empirically. The use of teachers rather than medical personnel to deliver interventions implies a need to ensure that the interventions are simple and safe.

There are specific gender-related issues regarding the safety of therapies in young women who may be pregnant. For example, high doses of vitamin A may be embryotoxic, and no therapy for intestinal helminths or schistosomiasis is currently recommended for lactating or pregnant women. The current practice is often to exclude all females of reproductive age from mass treatment.

There is a need for countries implementing a programme to evaluate the most efficient methods of

Meeting Report

organization and delivery. This could include an assessment of the cost-effectiveness of mass treatment for all schoolchildren versus the treatment of children shown to require treatment after prior screening. In most situations, mass treatment will be the most efficient option, although this depends on the cost of treatment, compared to the cost of screening, the prevalence of the condition and the willingness of teachers, students and health workers to participate⁵⁶.

There are also important unresolved issues regarding the funding of school-based health services. The 1993 World Development Report³ makes a case that school-based interventions are a cost-effective way of using public funds, and would achieve a greater impact on health status than many interventions currently funded by governments. It also argues that an important role of governments is to ensure that the poor and disadvantaged have access to a minimum level of clinical and public health services. These factors suggest that it would be legitimate for governments to decide to finance school health interventions entirely from public funds, even if it meant re-allocating funds from other uses. On the other hand, many governments may not be able to sustain school-based programmes from domestic funds in the long term, and it would be important to explore the extent of household willingness and ability to pay for various interventions, and the feasibility of different payment and collection mechanisms.

Roundup

- There is a body of experience in the delivery of health services to school-age children. This includes government programmes which suggest that some health interventions are affordable and sustainable.
- There is research evidence for a health impact of some simple interventions which appear appropriate for school-based delivery, but a lack of information of an impact at scale.
- There is evidence from theoretical and research studies that these approaches are cost-effective, but again there is a lack of evaluation at scale.
- For some conditions (eg. TB, STDs and malaria) it might be appropriate to develop strategies for referral, perhaps by teachers, to community-based health services.

Research priorities:

- *Evaluation of the health impact and cost-effectiveness of school-based health services at scale.*
- *Assessment of community willingness and ability to pay for these health interventions, and assessment of strategies for sustainable financing.*
- *Design of control approaches (eg. frequency of delivery and coverage) which optimize costs and effectiveness.*
- *Evaluation of the safety of intervention; for example, whether females of child-bearing age could safely be included in mass-treatment programs involving anthelmintic chemotherapy and micronutrient supplements.*

Reproductive health services for adolescents

Puberty and early reproductive maturity are important stages in development. The decisions children make at this age, and the habits they develop, have implications that not only affect the develop-

ment of the current generation but reach into that of the next. Appropriate health education and selected services would help to equip the current generation to take advantage of its educational options, to avoid life-threatening conditions and to prepare for future parenthood.

Approaches to address the reproductive health needs of the school-age population will necessarily be informed by local institutional and epidemiological considerations within the context of prevailing community standards. Often proscribed by community norms, early sexual activity does take place and can have important implications for education and health. Where maternal education is associated with reduced infant mortality and improved family welfare, adolescent pregnancy strongly correlates with early termination of formal education, further impinging upon the limited educational opportunity women face in much of the world. Many school-based services would focus on education and referral, with a major focus on prevention. In areas where community norms contradict national policy or internationally sanctioned rights, local definition of the problem would determine local solution.

Skills-based health education could assist in three aspects of adolescent reproductive health: reduction in teenage pregnancies (whether unintended or as a result of early marriage); prevention of STDs (including HIV/AIDS); and preparation for parenthood.

UNFPA and UNICEF, among others, are promoting and co-ordinating activities in schools in the context of skills based health education and Family Life Education. These are areas of potentially considerable political and social sensitivity. Other school-based activities in this area could include promoting access to health services for STDs (see above), and promoting the uptake of tetanus toxoid.

Micronutrient status in young women entering the child-bearing years may be of particular relevance to maternal and child health. There is clear evidence of benefit from iodine supplementation and from iron supplements, but no simple community-based delivery mechanism for iron supplements. There is suggestive evidence that vitamin A supplementation will provide special benefits for adolescent females (see above).

Research suggests that reproductive health is important for adolescent school attendance, and there is some evidence that Life Skills programmes influence adolescent behaviour (see above).

Roundup

- Reproductive health services may have an important role in reducing unwanted teenage pregnancy and in preventing STDs.
- Preparing adolescents for parenthood may have important consequences for the health of the next generation.

Research priorities:

- *Assessment of approaches that increase the access of adolescents to health-care services.*
- *Assessment of the health benefits of specific interventions (eg. vitamin A supplementation) for adolescents.*
- *Development and evaluation of interventions for modifying sexual behaviour.*

Water supply and sanitation

There are broad health benefits from improvements in water supply and sanitation (WSS), and a number of large-scale programmes seek to improve WSS in developing countries, although few specifically target schools. WHO promotes WSS in schools as part of national plans, and some UNICEF national programmes are co-ordinating activity to provide WSS to schools in specific countries (eg. Vietnam and Indonesia).

The availability of WSS in schools has direct health benefits and is also important as a support for health education among schoolchildren and the community. The provision of clean water and sanitation in schools may be a prerequisite of effective hygiene education, and can also serve as a point of entry for promoting demand for WSS in the community. However, the cost of providing WSS is a key issue. The provision in rural areas, for example, may be too expensive to be supported by the government or local community alone, and may require the involvement of NGOs. However, targeting schools rather than the community as a whole may offer a more achievable goal for national WSS programmes.

In addition to the health benefits, providing clean and effective sanitation facilities may promote school attendance. In particular, studies of female participation in schooling (see above) suggest that a lack of privacy at school during menstruation is an important cause of adolescent absenteeism.

Roundup

- Targeting schools for WSS improvement may provide a more achievable goal for national programmes, while also promoting demand in the wider community.
- Provision of WSS in schools has direct health benefits and may also enhance the effectiveness of hygiene education.
- Effective sanitation facilities in schools may contribute to participation in schooling.

Research priorities:

- Assessment of the impact of school-based WSS programmes as models for improved community sanitation.
- Assessment of the impact of health education on children's hygiene practices, with and without access to sanitation and clean water in schools.
- The effect of school-based sanitation programmes on school attendance.

Monitoring and evaluation

The issues here are essentially an extension of those discussed above in 'Situation analysis for programme planning and targeting'. It is necessary to monitor both the process and impact of health interventions, in order to refine and optimize the approach to health delivery. At present, there is a lack of simple tools for evaluating changes in health status. There is a particular need for rapid-assessment tools appropriate for use at the peripheral level.

An important element of evaluation is assessment of cost. At present, costs are rarely monitored outside of specific studies. The development of standardized indicators for effectiveness is also important to facilitate comparison of the cost-effectiveness of different approaches to health delivery⁵⁷.

Overall conclusions

Decrease in mortality rates for children under five years old provides an initial justification for considering how to address the needs of the school-age population more effectively. Recognizing this, and that an investment in the school-age group has long-term developmental implications as well as immediate returns, a growing number of countries and organizations has begun to consider what can be done to improve the health, education and development of school-age children.

Because of relative neglect in the past, there is a dearth of population-based information about the needs of the school-age population and about the opportunities to address these needs. Such information as is available points to a strategy of encouraging the application of existing knowledge in parallel with research to improve understanding of the problems, and to find means to address them.

Health services for school-age populations (whether school attenders or not) are likely to be country-specific and will necessarily be programmed at the country level in order to address local epidemiological, institutional and cultural factors. This implies that local public health officials will have to tailor specific health interventions to respond to local patterns of disease, and that the delivery of these interventions will depend on the local capacity of the school system and its relationship to the health system. Furthermore, the content and format of the school health programme will depend on local epidemiological patterns within the context of community cultural norms and beliefs.

Specific recommendations for the intensification of research efforts to meet the health and educational needs of school-age children include:

- Collection and analysis of population-based morbidity and mortality data on the school-age population; including exploration of the differential burden of disease in school attenders and non-attenders, and the influence of such factors as age and gender.
- Assessment of the costs, operational feasibility and acceptability of priority interventions; and the development and validation of rapid assessment techniques for establishing priorities.
- Evaluation of the impact of interventions, including health education, on health status, school enrolment, attendance and educational achievement.
- Examination of a set of gender issues related to selection of interventions, and to improvements in female health, school attendance and educational achievement.
- Assessment of whether poor health, *per se*, has an influence on school attendance or educational achievement; and the extent to which these effects are reversible or preventable.

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