Recent advances

Paediatrics

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During the past century, advances in hygiene, antibiotic development, and immunisations have resulted in cures for most childhood infections. Because access to medical care is not universally available, however, infectious diseases continue to be the main source of childhood mortality and morbidity. Increasingly, disparities in the health of children are linked to differences in socioeconomic status between industrialised and developing countries and between lower and higher income families within those countries. For example, diseases that are preventable by vaccination, such as polio, continue to flourish in parts of the world, and children are still becoming infected with HIV because identifying infected mothers and delivering effective drugs to them are formidable tasks.

In this review, we examine four prominent health issues influenced by social or economic conditions: vertical transmission of HIV, vaccines, obesity, and teenage smoking. The advances made in these areas are relevant to both industrialised and developing countries.

Methods

We searched Medline for relevant articles published since 1 January 1999 and reviewed recent government documents where relevant. We also identified additional educational resources related to each of the four topics that may be of interest to doctors and families.

Mother to child transmission of HIV

At the end of 1999, 1.3 million children worldwide were living with HIV and 3.8 million children had died since the beginning of the epidemic.¹ Currently, more than 95% of children with HIV live in developing countries. Almost all children with HIV under 15 years old acquired the infection through vertical transmission, at birth or postnatally. Although studies have shown that vertical transmission can be virtually eliminated with antiretroviral drugs, major questions and obstacles must be addressed before HIV in children can be successfully prevented and treated.

The most effective method for reducing vertical transmission of HIV is that used by the Pediatric AIDS Clinical Trials Group (PACTG—protocol 076) in 1994. This regimen consists of treating the mother with oral zidovudine antenatally and with intravenous zidovu-

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Simplified antiretroviral regimens can prevent the vertical transmission of HIV in developing countries

Public-private partnerships are helping to overcome the problems of low immunisation rates, poor sanitation, and political conflict that continue to hinder eradication of polio virus

New vaccines against pneumococcus have been developed that are effective in young children

Revised paediatric growth charts have been introduced that are based on larger samples of children

Decreasing television viewing among children may by itself reduce childhood obesity

Doctors can help prevent tobacco use among adolescents as well as other family members

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dine during delivery, and treating the infant with zidovudine orally for 6 weeks after birth.²

More recent studies have shown that transmission rates in industrialised countries can be below 2% when antiretroviral drugs are combined with elective caesarean section before labour and the rupture of membranes and the use of formula milk.^{3,4} A woman's risk of transmitting the virus is related both to her viral load and the complexity of antiretroviral treatment received.⁵ For example, if an HIV positive woman has a unquantifiable level of virus, a caesarean section is not indicated because operative risk outweighs risk of HIV transmission (L M Mofenson, personal communication, 11 Jan 2001).

The infrastructure and economic resources to reach, test, and treat pregnant women and their children are often lacking in developing countries. As a result, pharmaceutical companies have initiated programmes to provide drugs to pregnant women in Africa at greatly reduced or no cost.⁶ In addition, researchers are investigating simple and inexpensive antiretroviral regimens that may be easier to implement. For example, a 1999 study showed that a single

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Details of smoking rates, the stages of smoking in adolescents, and risk factors for progression are available on the BMJ's website

dose of 200 mg of nevirapine given to mothers at the onset of labour followed by 2 mg/kg given to their infants orally within 72 hours of birth cost only about \$4 (£2.60) and reduced transmission rates by nearly 50%.⁷ A randomised clinical trial in Thailand found that rates of vertical transmission were not affected when the zidovudine regimens for infants were shortened compared with the PACTG 076 regimen. Shortening maternal treatment, however, increased transmission rates.⁸

In industrialised countries, breast feeding is contraindicated when the mother has HIV infection. In the developing world, where clean formula milk and water may not be available, it is still unclear whether the risk of acquiring HIV infection from breast milk outweighs the protection against diarrhoeal infections. A recent study from Kenya examined whether the risk of transmitting HIV through breast milk exceeds the potential risk of formula associated diarrhoeal mortality in developing countries. The use of breast milk substitutes prevented 44% of mother to infant transmission and was associated with improved HIV free survival at 2 years of age, although the all cause mortality was similar in the two groups (about 20%).⁹ Some studies have shown an increased risk of HIV transmission in infants who received both breast milk and formula, possibly because mixed feeds allow both exposure to HIV and increased risk of gastrointestinal infections and disruption of mucosal integrity.^{10 11} Mastitis has also been associated with a twofold increase in the risk of HIV transmission.¹²

Improvements in vaccines

Polio

The annual number of confirmed cases of polio worldwide continues to fall, and global eradication is now targeted for 2005. By the end of 2000, only 20 countries still had polio infections.¹³ Several nations have successfully implemented vaccination programmes that deliver oral poliovirus vaccine to children using techniques such as national immunisation days and targeted house to house outreach in severely undervaccinated areas.¹⁴ Ongoing global surveillance for cases of acute flaccid paralysis is instru-

mental to efforts to identify polio infected areas and eventually certify the eradication of the disease.

Concerns remain highest about endemic poliomyelitis in 10 priority countries described by the World Health Organization as either "poliovirus reservoirs"—in which virus transmission is facilitated by low routine immunisation coverage and poor sanitation (Bangladesh, Ethiopia, India, Nigeria, and Pakistan)—or countries affected by political conflict, where vaccination and surveillance activities are particularly challenging (Afghanistan, Angola, the Democratic Republic of Congo, Somalia, and Sudan).¹³ Efforts to eradicate polio in such difficult circumstances are likely to benefit from organisations such as the Global Alliance for Vaccines and Immunization (GAVI). This is a public-private partnership established in 1999 to improve access to sustainable immunisation services and accelerate research and development of vaccines needed primarily in developing countries. By early 2001, GAVI had approved 25 countries' proposals for vaccination programs, totalling \$375 million over the next 5 years.¹⁵

Protecting against pneumococcus

For many years, immunisation against pneumococcus for children has depended on a 23-valent polysaccharide vaccine that is poorly immunogenic in children younger than 3 years old. In 2000, a heptavalent pneumococcal conjugate vaccine (Prevnar) was formally recommended in the United States for all children under 2 years.¹⁶ Following vaccination at 2, 4, and 6 months, and a fourth dose at 12-15 months, children in randomised controlled trials had significantly fewer episodes of invasive pneumococcal disease and cases of otitis media caused by pneumococcal serotypes included in the vaccine.^{17 18} A similar nine-valent conjugate vaccine was approved by the Committee for Proprietary Medicinal Products in November 2000, paving the way for final marketing authorisation in Europe in the near future.¹⁹

Vaccines and adverse events

Adverse events possibly linked to administration of vaccines have led to public concern and the withdrawal of some products from routine vaccine recommendations. Less than 12 months after a rotavirus vaccine was added to US vaccination recommendations, it was withdrawn after several cases of intussusception among infants who had received the vaccine.²⁰ After theoretical concerns were raised in 1999 about thimerosal—a mercury based preservative found in many vaccines—the US Public Health Service aims to ensure that all vaccines given to infants are free of thimerosal in the near future.²¹

Concerns have also arisen about a purported link between the combined measles, mumps, and rubella vaccine and autism. The epidemiological evidence to support this association is inconclusive.²²

Revised paediatric growth charts and childhood obesity

The original US National Center for Health Statistics growth charts from the 1970s have been used internationally by the WHO. Within the last year, the centre has released revised growth charts for

Worldwide, the number of cases of polio is falling, but the disease is not yet eradicated

children.²³ These charts are an improvement because they represent measurements of a greater number of young children from five national surveys (within the United States) and include infants who were both breast and formula fed. The WHO is currently gathering data in seven countries to develop growth references for children up to age five years that will reflect growth patterns in healthy, predominantly breastfed children.²⁴ Results are expected in 2003.

In addition to revising the growth charts, the National Center for Health Statistics also developed body mass index (kg/m^2) for age charts based on US data. These are eventually intended to replace the weight for height charts commonly in use. Some investigators have recommended that the standard definition for overweight and obesity be based on international surveys and linked to widely used adult cut-off points (body mass index ≥ 25 = overweight and ≥ 30 = obese).²⁵

Attempts to standardise the definition of obese and overweight are especially important because of the increase in the prevalence of obesity among adults and children over the past two decades. Investigators have defined obesity using different criteria, so the exact prevalence of overweight and obesity worldwide is difficult to determine (from 5-18% overweight and 0.1-4% obese at age 18 according to one study²⁵). Both industrialised²⁶ and developing countries²⁷ are affected, even in areas where malnutrition and undernutrition are common.

Reasons for the increases include fewer manual labour jobs, increased time spent in sedentary activities such as watching television and using computers, and increased access to high energy, low nutrient foods. Children from low income families are particularly at risk of obesity and its associated medical and psychological morbidities.²⁸ Obese children suffer from persistent obesity, adult cardiovascular disease, orthopaedic problems, non-insulin dependent diabetes, and obstructive sleep apnoea²⁹; they are also at increased risk of poor self esteem, which, in turn, is associated with increased sadness and greater use of alcohol and tobacco.³⁰

To combat obesity on a community and societal level, governments in Europe and the US have supported programmes in schools and worksites and encouraged the redesigning of neighbourhoods to make it easier for children to incorporate safe physical activity into their lifestyles. These interventions, however, have not yet been shown to reduce weight. Thus, individual doctors must continue to work with families, especially during the early childhood years when eating and exercise habits are formed and when interventions involving parents are most likely to be effective.³¹ Instead of prescribing intensive and difficult to sustain weight loss regimens, health professionals should try simpler interventions such as decreasing television viewing. A recent study suggests that this single intervention may be effective in preventing and treating obesity in children.³²

Smoking among adolescents

Rising rates of smoking among adolescents in industrialised and developing nations have contributed to recent WHO estimates that tobacco will be the single

Additional educational resources

HIV

International Association of Physicians in AIDS Care (www.iapac.org)
World Health Organization (www.who.int/health-topics/hiv.htm)
Mofenson LM, McIntyre JA. Advances and research directions in the prevention of mother-to-child HIV-1 transmission. *Lancet* 2000;355:2237-2244.

Immunisation

WHO general vaccine information (www.who.int/vaccines-diseases/service/immschedule.html)
Polio eradication efforts (www.polioeradication.org/strategies.html)
Pneumococcal conjugate vaccine (www.pneumo.com)

Childhood obesity

Obesity Evaluation and Treatment: Expert Committee Recommendations (www.pediatrics.org/cgi/content/full/102/3/e29)
National Center for Health Statistics clinical growth charts (www.cdc.gov/growthcharts/)
Dietz WH, Gortmaker SL. Preventing obesity in children and adolescents. *Annu Rev Public Health* 2001;22:337-53.
KidSource OnLine (www.kidsource.com/kidsource/content2/obesity.html)

Adolescent smoking

Special theme issue on tobacco. *Bulletin WHO* 2000;78.
Centers for Disease Control and Prevention Tobacco Information and Prevention Source (TIPS) (www.cdc.gov/tobacco)
Antismoking teen websites and teen antismoking resources (www.notobacco.org)

greatest cause of death worldwide by the year 2030.³³ The 1999 Global Youth Tobacco Survey project, conducted in 12 developing countries, found that 24% of 13-15 year olds had tried a cigarette and 9% were current smokers.³⁴ Among current smokers, over two thirds wanted to quit (see *BMJ*'s website for details).

Doctors caring for children can have an important role in reducing adolescent tobacco use. When counselling teenagers, doctors should take into account the progressive stages of acquiring a smoking habit and the biological, psychological, and social factors that influence transitions from stage to stage (see *BMJ*'s website for details).³⁵ For instance, the belief that smoking is common among peers encourages adolescents to advance from smoking the first cigarette (trying stage) to occasional use (experimental stage). By emphasising that smoking is not the norm for adolescents, doctors may prevent teenagers who have tried tobacco from progressing to levels of heavier use.

Parental smoking is an important predictor of adolescent smoking. Some doctors may be reluctant to engage parents about their health behaviours. However, recent evidence suggests that many parents of young children who smoke would welcome advice about stopping smoking from their children's doctors.³⁶ This implies that doctors could be trained to prevent use of tobacco among all family members.³⁷

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A memorable patient

Patient empowerment

He was 62 years old, a teacher by profession, and had recently had hypertension diagnosed. Metoprolol had been started two weeks ago and his next appointment was not for another two months, but this morning he had insisted on being seen.

He sat demurely opposite me and, just as I finished reviewing his case history, looked straight at me and said, "Doctor, I would like to have you know that for the past two weeks my corpus spongiosum has not been filling up adequately."

I was stumped. For about 20 seconds, which seemed like an eternity, my mind was a complete blank. I have forgotten much of my medical school anatomy. And then, by a miracle, I remembered. "Why don't you tell me you are not able to have an erection?" I asked defensively.

"I thought you doctors like to be technical," he retorted without meaning to be impolite. "Anyway, I read from the internet that metoprolol can cause impotence."

Knowledge is power. The internet, that maze of information, is becoming available to increasing numbers of Malaysians. Many of my patients are getting a profusion of medical information from the internet, some of it accurate and some totally unreliable.

I am a firm and passionate believer in patient empowerment, but that particular morning the impact of knowledge and patient

empowerment hit me like a ton of bricks. With that little discourse, I realised that the internet has provided this patient with the knowledge that his recently acquired impotence was drug induced. Without this information, he would probably have considered his erectile dysfunction as a normal part of ageing and never mentioned it to his doctor. Instead, patient empowerment made him feel comfortable about "confronting" his doctor with his suspicion, a behaviour that is not usual in Malaysian society, especially when the issue is sexual and so very personal.

I changed his antihypertensive medication. Two weeks later, he called to tell me that he had regained his sexual prowess. Had it not been for the internet and patient empowerment, an important aspect of his life would have vanished.

Today, when I run my clinic my computer is always on line in case a patient raises any query as a result of surfing the net, and when I explain anything to a patient I consciously use simple terms so as not to be "technical," and sitting on my table is a message to my patients: "Your health is as much your responsibility. Take charge."

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