

Health Evidence Network



Solid evidence for sound decisions

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Health Evidence Network

Solid evidence for sound decisions

About the Health Evidence Network

The Health Evidence Network (HEN) serves as a trustworthy source of evidence¹ for policy-makers in the 53 Member States in the WHO European Region. It provides timely, evidence-based answers to questions on policy issues in public health and health care, which decision-makers can use in building health policy.

HEN's two primary services provide:

- answers to policy concerns in the form of evidence-based reports, summaries or notes; and
- easy access to evidence and information from a number of web sites, databases and documents.

As a new initiative for 2007/2008, HEN and the European Observatory on Health Systems and Policies will launch a joint series of policy briefs addressing key questions of health systems policy. These expert-written briefs will focus on evidence-based policy options, with due consideration of knowledge transfer and uptake requirements.

The network

HEN is conceived as a virtual network of technical members and financial partners, developed with the involvement of a core group of United Nations agencies with a mandate related to health, other organizations working with evidence-based health policy and health technology assessment, and other institutions and governments interested in funding advanced projects related to public health issues. Currently, over 30 government agencies and other institutions in the field of public health are invited technical members of HEN.

Technical members

Institutions collaborate by sharing the evidence generated from their work and by contributing assets that they have already developed, such as methods for producing reviews designed for electronic access, knowledge of target users, etc. They also help to

¹ With advice and support from the high-level European Advisory Committee on Health Research, the WHO Regional Office for Europe has adopted a definition of evidence whose scope extends beyond the results from scientific research. Evidence is therefore defined as "findings from research and other knowledge that may serve as a useful basis for decision making in public health and health care" (Considerations in defining evidence for public health. *International Journal of Technology Assessment in Health Care*, 2003, 19(3):559–573).

identify relevant questions from policy-makers, and specialists and peer reviewers to work on HEN reports. HEN is always willing to consider adding new members.

Financial partners

Governments and institutions have been HEN's main funders since its establishment, supporting both the initial development of the concept and its implementation. HEN is interested in new financial partners at the national as well as the regional level.

Products

Reports, summaries, notes

HEN reports evaluate the scientific evidence available for certain fields of public health, and are presented as responses to questions on specific health issues; a policy-maker's question is often HEN's starting point. After review by the editorial team, specialists are commissioned to write responses. These are syntheses of the latest research findings, and each report is accompanied by a short summary (available in English, French, German and Russian) linked to the original documents. The full reports are currently available in English; most are also available in Russian. Both the reports and the related summaries are available on HEN's web site in HTML format, as well as in easily printable PDF.

Access to evidence

The HEN web site links to more than 40 selected agency web sites, selected from HEN's technical members and other sources of evidence. Descriptions of the aims, content and organization of information on each agency site are available in English, French, German and Russian. In addition, links to selected documents and databases are included.

How we work

The steps in HEN report production are:

- identification of topics, policy issues and specific questions from decision-makers, through proactive communication between the HEN team and its current Editorial Board, target groups and collaborators;
- commissioning of specialists to write reports;
- review of reports by the HEN team to ensure the quality of the content and the sources;
- peer review of reports by at least two independent reviewers, one from WHO and one from outside;
- writing of report summaries in a short, accessible style;
- editing and translating of peer-reviewed material;
- dissemination of the reports in several ways, including electronically and in hard copy; and
- systematic and regular updates of existing information.

Why use HEN?

HEN is a resource for policy-makers and researchers, and adds value by actively promoting the use of evidence in decision-making in the WHO European Region. More specifically, HEN:

- is impartial and independent as part of WHO and the United Nations system;
- bridges the gap between policy concerns in public health, health care and available evidence, and helps to bring evidence to bear in the policy-making process;
- by synthesizing and disseminating the evidence for use and impact on practice and policy, capitalizes on the work of many agencies and institutions in the field that take a research approach and generate evidence;
- makes evidence and selective information available to policy-makers at one single focal point; and
- operates as a network of resources available throughout the WHO European Region, including not only institutions generating evidence in the field of health care, but also agencies/institutions covering a broad range of issues within the broader public health perspective.

In 2006 the HEN web site averaged about 8000 visits per month with the most popular reports including those on empowerment, school health promotion, home-based support, mobile phones and quality safety tools.

Join HEN

Joining HEN means entering a collegial, modern and up-to-date network of evidence-based resources that are essential for public health issues. If you are interested in finding out more, please visit our web site (<http://www.euro.who.int/hen>).

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Is substitution treatment effective in preventing HIV in injecting opioid users?

The issue

Injecting drug users face a high risk of exposure to infection with human immunodeficiency virus (HIV) and other bloodborne viruses because of the shared use of injecting devices and because of risky sexual behaviour. In the year 2000, injecting drug use accounted for 61% of all HIV infections in the Russian Federation, 23% in the average of 10 west European countries, 22% in the United States, and 8% in Australia. The spread of HIV/acquired immunodeficiency syndrome (AIDS) among injecting drug users can foster transmission of the virus to the general population, through sexual contacts with people who are not drug users, and further along the chain to unborn children, through infected mothers. There is a widely held view that providing oral substitution treatment for injecting opioid users is an important part of containing the spread of HIV infections.

This report assesses the effectiveness of oral substitution treatment for opioid-dependent, injecting drug users. Effectiveness is assessed in terms of the rate of HIV infection, and the prevalence and frequency of behaviours associated with a high risk of HIV transmission. Such behaviours include injecting drug use, shared use of injecting devices, unprotected sexual intercourse and multiple sexual partners.

Findings

Treating opioid-dependent, injecting drug users orally with opioid agonist substitutes is associated with a statistically significant decrease in the percentage of people studied that reported injecting drug use and in their frequency of injection. It was not possible, however, to determine accurately the extent to which reduced drug injections contribute to the overall reduction in opioid use. The duration of the benefit of oral substitution treatment is unclear and the gain may not be sustained following cessation of treatment with opioid agonists, such as methadone, particularly if cessation of treatment is not voluntary. Also, because the diversity of study designs and diversity of means of assessing and reporting on injecting drug use prevent calculation of an overall quantitative estimate of the extent of the decrease, it was not possible to relate the decrease in injecting use to opioid use.

Substitution treatment is also associated with a significant decrease in sharing injecting devices. Reduced sharing may be due to fewer injections, but it is still unclear from the data available. Moreover, it seems that other types of substitutions can achieve similar reductions in the sharing of injecting devices, and reductions may be sustained even after cessation of substitution treatment.

Also, there is an association between substitution treatment and a lower incidence of multiple sexual partners and of trading sex for drugs or money. The data suggest, however, no change, or only a small one, in condom use and sex-related risk behaviour associated with substitution treatment. Since the data available was insufficient, the authors of this synthesis found it difficult to make definitive conclusions.

All the studies in the review found a significant reduction in the overall risk of acquiring HIV for participants, from baseline to follow-up, after initiating substitution treatment. This reduction was attributable largely to the significant reductions in the risk associated with using drugs.

Policy considerations

These findings add to the stronger evidence of the effectiveness of substitution treatment on drug use by other systematic reviews. However, the available data are limited, and the lack of data from randomized, controlled trials limits the strength of the evidence presented in this review. On this basis, this review indicates a need for:

- providing support for substitution treatment for opioid dependence in countries with emerging HIV and injecting drug use problems, as well as in countries with established populations of injecting drug users; and
- providing greater consistency in reporting injecting behaviour by reporting statistical information on the number of individuals sharing injecting devices and the frequency of sharing. (These measures are crucial for further research and development of health promotion in the field. In addition, it is desirable to have information on which drugs are being injected by those who continue to inject drugs, even while receiving substitution treatment.)

The full report including sources of information and methodologies, is available at:
http://www.euro.who.int/HEN/Syntheses/short/20060124_1

What is the evidence on effectiveness of empowerment to improve health?

The issue

Within the last decades, social exclusion, disparities, and absolute poverty – almost 3 billion people living on less than US \$2.00 per day – have grown despite globalization and rising per-capita income in many developing nations. Income ratios of the richest 20% of the population to the poorest 20% are now at 82 to 1 compared to 30 to 1 in 1960. World-wide health disparities are increasing due to vulnerability to disease from severe malnutrition, rapid re-emergence of water and blood-borne infectious diseases, environmental degradation, disinvestment in the health infrastructure and violence. Within this same period, empowerment strategies, participation, and other bottom-up approaches have become prominent paradigms within public health and the development aid for reducing these disparities. As “empowerment” increasingly enters mainstream discourse, those using the term need to clarify definitions, dimensions and outcomes of the range of interventions called empowering.

Findings

Research on the effectiveness of empowerment strategies has identified two major pathways: the processes by which it is generated and its effects in improving health and reducing health disparities. Empowerment is recognized both as an outcome by itself, and as an intermediate step to long-term health status and disparity outcomes. Within the first pathway, a range of outcomes have been identified on multiple levels and domains: psychological, organizational, and community-levels; and within household/family, economic, political, programs and services (such as health, water systems, education), and legal spheres. Only a few researchers have used designs resulting in evidence ranked as strong in the traditional evidence grading systems. Yet there is evidence based on multi-level research designs that empowering initiatives can lead to health outcomes and that empowerment is a viable public health strategy.

Much research has been focused on empowerment of socially excluded populations (e.g., women, youth, people at risk for HIV/AIDS, and the poor), though application of empowerment crosses to other populations and issues in public health. Youth empowerment interventions have produced multiple empowerment and health outcomes: strengthened self- and collective efficacy, stronger group bonding, formation of sustainable youth groups, increased participation in structured activities including youth social action, and policy changes, leading to improved mental health and school performance. Multi-level empowerment strategies for HIV/AIDS prevention which address gender inequities have improved health status and reduced HIV infection rates.

Women's empowering interventions, integrated with the economic, educational, and political sectors, have shown the greatest impact on women's quality of life, autonomy and authority and on policy changes, and on improved child and family health. Patient and family empowerment strategies have increased patients' abilities to manage their disease, adopt healthier behaviours, and use health services more effectively, as well as increasing care-giver coping skills and efficacy. Coalitions and inter-organizational partnerships that promote empowerment through enhanced participation and environmental and policy changes have led to diverse health outcomes.

Policy considerations

In light of the evidence and other information available up to now, effective empowerment strategies are needed for socially excluded populations. While participatory processes make up the base of empowerment, participation alone is insufficient if strategies do not also build capacity of community organizations and individuals in decision-making and advocacy. The policy considerations based on this narrative literature review include the following:

- Successful empowering interventions can not be fully shared or "standardized" across multiple populations, but must be created within or adapted to local contexts (e.g., culture and gender appropriateness).
- Specific population programmes to overcome the larger political, social, racial, and economic forces that produce and maintain inequities need to be developed and further evaluated.
- Structural barriers and facilitators to empowerment interventions need to be identified locally.
- Empowerment strategies, including community-wide participation, seem worthwhile to be integrated into local, regional and national policies and economic, legal, and human rights initiatives.
- Health promotion should address effective empowerment strategies, such as:
 - increasing citizens' skills, control over resources and access to information relevant to public health development;
 - using small group efforts, which enhance critical consciousness on public health issues, to build supportive environments and a deeper sense of community;
 - promoting community action through collective involvement in decision-making and participation in all phases of public health planning, implementation and evaluation, use of lay helpers and leaders, advocacy and leadership training and organizational capacity development;
 - strengthening healthy public policy by organizational and inter-organizational actions, transfer of power and decision-making authority to participants of

interventions, and promotion of governmental and institutional accountability and transparency; and

- being sensitive to the health care needs defined by community members themselves.
- The most effective empowerment strategies are those that build on and reinforce authentic participation ensuring autonomy in decision-making, sense of community and local bonding, and psychological empowerment of the community members themselves.
- Government investment in multiple-method research and evaluation designs to collect evidence on the impact of empowerment strategies over time is needed.

The full report including sources of information and methodologies, is available at:
<http://www.euro.who.int/Document/E88086.pdf>

What are the effects of air pollution on children's health and development?

The issue

The current level of air pollution in Europe adversely affects children's health. As a result of studies conducted around the world in recent decades, the knowledge and understanding of these effects have increased significantly. Reducing these effects is a priority of regional policies on health and the environment in the WHO European Region and is necessary for the achievement of the Millennium Development Goals on a global scale.

The review of accumulated evidence, published by WHO in 2005, considers the effects of air pollution in a number of areas. It considers the effects on the health and development of children during the prenatal period, on the development of the respiratory system and lung function (as well as respiratory morbidity), and on the incidence of childhood cancer. It also summarizes current knowledge about the links between air pollution and neurodevelopmental and behavioural effects.

The experts involved in preparing the report identified a hierarchy of health outcomes for which evidence: (a) is sufficient to infer a causal relationship with exposure to air pollution; (b) is suggestive of causality; or (c) is not sufficient or shows no association between outcomes and exposure.

Findings

Various periods of vulnerability characterize children. The intrauterine, perinatal and early childhood periods, during which the lungs are developing and maturing, are very vulnerable times. These are periods when the lungs are susceptible to injury by air pollutants. Exposure during these periods reduces the maximal functional capacity achieved in adult life and can lead to enhanced susceptibility during adulthood to infection and to the effects of such pollutants as tobacco smoke and those present in occupational exposures. Children with underlying chronic lung diseases, particularly asthma and cystic fibrosis, are especially vulnerable. These children are at greater risk of adverse effects from pollution than are healthy children. Also, children subject to higher exposures indoors – for example, from tobacco smoke or smoke from poorly maintained heating or cooking appliances – are at greater risk of being affected by outdoor pollutants.

Effects for which evidence is sufficient to infer a causal relationship with exposure to air pollution

There is now substantial evidence on the adverse effects of air pollution on different pregnancy outcomes and infant health. The evidence shows that air pollution, with

concentrations typical of many European cities, increases the risk of death from respiratory causes in the postneonatal period.

The evidence also shows a relationship between exposure to ambient air pollutants and adverse effects on the development of lung function. Reversible lung function deficits, chronically reduced lung growth rates and lower lung function levels are associated with exposure to air pollution. Moreover, the evidence shows clearer relationships for particulate matter and traffic-related air pollution (indicated by nitrogen dioxide) than for other pollutants. Based on current knowledge, air pollutants seem to interact with other environmental factors, such as allergens, viruses and diet, that influence the overall impact of air pollutants on children's health.

The report concludes that there is a causal relationship between exposure to air pollutants and aggravation of asthma. The evidence is also sufficient to assume a causal link between exposure to particulate matter and increased prevalence and incidence of cough and bronchitis.

In particular, such environmental contaminants as certain heavy metals and persistent organic pollutants show significant adverse effects on the development of the nervous system and behaviour in children. Also, there is sufficient evidence of a causal relationship between exposure to lead and neurobehavioral deficits in children, in terms of cognitive impairment.

Effects for which evidence is suggestive of causality

Studies on birth weight, preterm births and intrauterine growth retardation also suggest a link with air pollution, but these studies are still not sufficient to draw firm conclusions about the causality of the observed associations.

Although the report found little evidence for a causal link between the prevalence and incidence of asthma and air pollution in general, recent studies suggest that pollutants can enhance allergic sensitization in those genetically at risk, lending plausibility to the role of potentially injurious effects of ambient air pollutants in the causation of paediatric lung disease, including asthma. The mechanisms suggested for these effects need further research.

A significant body of evidence supports the view that much of the morbidity and mortality related to air pollution in children occurs via interactions with respiratory infections, which are very common among children. Evidence also suggests a causal relationship between exposure to ambient air pollution and increased incidence of upper and lower respiratory symptoms – many of them also being indicative of infections.

There is also evidence that suggests a causal link between adverse health effects and exposure to mercury, polychlorinated biphenyls and dioxins at current exposure levels.

Reduced exposure to air pollution seems to improve children's health. As of yet, however, relatively few studies have looked at the effects of reduced air pollution. Nevertheless, existing studies show that reduced exposure to air pollutants can lead to a decrease in hospital admissions for respiratory complaints, a lower prevalence of bronchitis and respiratory infections, and improvement in lung function growth rates.

Effects for which evidence is not sufficient or shows no association between outcomes and exposure

Accumulated epidemiological evidence is insufficient to infer a causal link between childhood cancer and the levels of outdoor air pollution typically found in Europe. However, the number of studies available is limited, and their results are only partially consistent.

Policy considerations

A reduction in children's current exposure to air pollutants, especially from motor vehicle exhausts, is recommended. A decrease in motor vehicle exhausts will substantially benefit the respiratory health of children.

Further research is needed in the field of air quality to clarify the effect of specific air pollutants on children's health, as well as the interaction of these pollutants with other environmental insults.

The full report including sources of information and methodologies, is available at:
http://www.euro.who.int/HEN/Syntheses/short/20060224_1

What is the evidence on school health promotion in improving health or preventing disease and, specifically, what is the effectiveness of the health promoting schools approach?

The issue

School health promotion, based on a wide range of research and practice, has evolved over the course of the last 50 years, alongside health promotion in other settings. During the 1990s, WHO, working jointly with the European Commission and the Council of Europe, developed the health promoting schools initiative. It is a multifactorial approach that covers teaching health knowledge and skills in the classroom, changing the social and physical environment of the school, and creating links with the wider community. This synthesis seeks to determine the effectiveness of health promotion in schools and, more specifically, the effectiveness of the “health promoting schools” approach. The synthesis builds on the last comprehensive review in this field, published in 1997.

Findings

This synthesis identified good quality systematic reviews that covered mental health, aggressive behaviour, healthy eating, physical activity, substance use and misuse, driver education, and peer approaches.

Reviews of programmes that promoted mental health in schools (including preventing violence and aggression) show these programmes to be among the most effective ones in promoting health. Of these programmes, the ones that were most effective were of long duration and high intensity, and involved the whole school. New reviews that focused on promoting healthy eating and physical activity confirmed an earlier review, which found that multifactorial interventions, particularly those involving changes to the school environment, were effective. Four new reviews of programmes that focused on promoting the prevention of substance use confirmed previous findings that these programmes are relatively ineffective. Also, programmes on preventing suicide reduced suicide potential, depression, stress and anger, but less rigorous studies suggested a potential harmful effect in young males. In some (but not all) studies, peer-delivered health promotion was found to be effective, compared with teacher-led interventions, and this approach was highly valued by the young people involved.

The systematic review, which evaluated health outcomes of programmes that used elements of the health promoting schools approach, included small studies of variable quality. It found apparent benefits to the social and physical environment of the school, and some studies found the programmes benefited health-related behaviour (dietary

intake and physical fitness). No reviews evaluated the cost-effectiveness of the programmes or interventions.

Policy considerations

Health promotion in schools can improve children's health and well-being. Among the most effective programmes are those that promote mental health, healthy eating and physical activity. Programmes on preventing substance abuse have not been shown to be effective and may be better addressed in a more holistic programme that promotes mental health. Programmes on preventing suicide can reduce suicide potential, but potential harmful effects in young males should be considered. Although programmes based on peer-delivered health promotion are highly valued by young people, their effectiveness varies.

Some evidence supports key components of the health promoting schools programme – namely, that programmes should be sustained, multifactorial, whole school approaches that provide appropriate training. However, there is a lack of evidence on all the elements that contribute to an effective health promotion programme, or to the health promoting schools approach as a whole. A holistic evaluation of programmes in local settings is needed.

The full report including sources of information and methodologies, is available at:
<http://www.euro.who.int/Document/E88185.pdf>

How effective and safe is semen washing for HIV-serodiscordant couples?

The issue

The prevalence of the human immunodeficiency virus (HIV) in people of reproductive age, together with improvements in life expectancy and quality of life in HIV-positive people receiving highly active antiretroviral treatment (HAART), have meant that more serodiscordant couples are considering having children.

Since semen is a vehicle for transmitting HIV, the options for parenthood of couples in which the man is HIV-positive and the woman HIV-negative theoretically are:

- adoption
- donor insemination
- biological children.

Adoption and donor insemination are alternative, safe options, but due to legal restrictions they are only offered in a few centres and countries. For couples who choose to have biological children, the present options are conception via unprotected sexual intercourse and conception via semen washing. The rate of HIV transmission for unprotected heterosexual intercourse (seropositive male to seronegative female) is estimated to be around one HIV transmission for every thousand contacts. The transmission rate may be higher in people with a high viral load or in the presence of other sexually transmittable infections. Usually, when attempting to have biological children, couples are advised against unprotected intercourse, as the priority is to prevent infection in the uninfected woman and her fetus.

The application of semen washing to reproduction assumes that spermatozoa are not a major reservoir for HIV. The method involves three-steps:

1. filtering the liquefied semen through a density gradient;
2. washing the recovered spermatozoa, to eliminate seminal plasma or non-spermatozoal cells; and
3. recovering the highly motile spermatozoa by using a swim-up method.

These steps can be combined or used separately. In either case, the resulting sperm sample is divided into two parts: one for HIV testing and, if the test proves negative, the other for assisted reproduction techniques (ART), such as intrauterine insemination, conventional in vitro fertilization and intracytoplasmic sperm injection.

Findings

A systematic review was conducted to analyse the effectiveness and safety of washing

the semen of HIV-positive men so that they can be used in ART. Twenty-three studies (16 clinical series and 7 before-and-after studies) were selected, most of which were performed in Europe, and the methodological limitations of the studies were identified.

Efficacy in reducing or eliminating HIV from semen samples

The range of results of the studies showed that between 0% and 20% of the semen samples tested positive for HIV after semen washing (70 positive cases in a total of 1279 samples). Various semen-washing methods and HIV-detection tests were used. Depending on the method of testing, the lowest limit of detection was 10 copies/ml. Since HIV can, theoretically, remain undetected, semen washing can greatly reduce the risk of infection, but cannot completely exclude it.

Efficacy and safety in preventing transmission to women and children

In 914 serodiscordant couples treated with semen washing, 1680 cycles of ART were performed (72.7% by assisted insemination and the remainder by in vitro fertilization). The studies did not report any HIV infections in the women using ART or in the resulting children.

Policy considerations

- While no semen-washing method fully guarantees elimination of HIV in motile spermatozoa, the methods do minimize the risk of transmission.
- There is sufficient evidence showing that semen washing in HIV-positive men to inseminate women has not produced any seroconversion in the women or in the children, but the strength of the evidence is limited by the number, quality or consistency of the findings of the individual studies. The quality of the evidence is attributed to the small sample size and uncontrolled study design.
- For an HIV-positive man, an undetectable viral load and HAART appear to improve the outcome of clinical pregnancy rate after semen washing.
- HIV-serodiscordant couples should be given suitable pre-conception counselling, including information about the available alternatives to having children and the benefits and risks of each one.
- The seminal viral load should be measured before enrolling an HIV-serodiscordant couple in a semen-washing protocol.
- Washed semen should always be screened for HIV before performing ART.
- A register of the women subjected to this technique (and any children that result) should be created to facilitate follow-up.

The full report including sources of information and methodologies, is available at:

http://www.euro.who.int/HEN/Syntheses/short/20060327_1

What evidence is there for the prevention and screening of osteoporosis?

The issue

Osteoporosis – an excessive decrease in bone mass – is more common in women than in men. It is a particularly common condition among elderly women in affluent countries. Osteoporosis is a risk factor for fractures, which occur most commonly at the wrist, spine and hip. Other important risk factors for fractures include those both related and unrelated to an excessive decrease in bone mass. Those related to an excessive decrease in bone mass include such causes as physical inactivity, smoking, low body weight, a history of fractures and the use of corticosteroids; those unrelated to bone mass loss include such causes as falls, high alcohol intake and visual impairment.

Osteoporosis and the fractures associated with it are a major public health concern, because of related morbidity and disability, diminished quality of life, and mortality. The condition is responsible for about 1700 fractures a day (about 650 000 a year) in the European Union alone. Measures to prevent osteoporosis usually focus on a healthy lifestyle, which includes being physically active, no smoking, and taking adequate amounts of calcium and vitamin D. Pharmaceutical treatment in high-risk groups (such as people with an elevated risk of fracture) and measures to prevent falls are also proposed as important interventions for preventing fractures. Screening for osteoporosis, by measuring bone density or other measures, is suggested to identify and treat people at risk for fracture.

Findings

Essentially all studies on osteoporosis focus on women. Virtually no study has addressed it in men.

Some of the most prominent preventable risk factors for fractures are: previous fractures, low bone density, inadequate physical activity, impaired vision, tendency to fall, smoking, and the use of corticosteroids. Several randomized controlled trials have demonstrated that the physical activity of walking increases the bone density of both the spine and the hip in postmenopausal women. Also, other physical activities, such as aerobics and weight-bearing exercises, increase the bone density of the spine. Moreover, several epidemiological studies have demonstrated that smoking decreases bone density and increases the risk of fractures in both men and women and that quitting smoking decreases the risk of fractures. An increased tendency to fall, due to many factors (such as impaired vision and poor body balance), may be effectively prevented – for example by doing T'ai Chi exercises, doing muscle and balance training, and reducing psychopharmacological treatments.

Strong evidence shows that many different pharmaceuticals are effective in both preventing (by increasing bone density) and treating (by decreasing fractures) osteoporosis in women with an increased risk of fractures after menopause. When taking the most prominent risk factors into account, a modeled cost–effectiveness analysis based on clinical trials suggests that pharmaceuticals can be cost effective also. For women without documented osteoporosis after menopause, there is no evidence that vitamin D alone prevents fractures related to osteoporosis. However, a combination of vitamin D and calcium may reduce the rate of fracture by about 30% – in particular, for people more than 60 years old and for those who show adherence to treatment. Also, the evidence base for the efficacy of preventing fractures in women more than 80 years of age needs to be strengthened.

Although there is no direct evidence that screening for osteoporosis reduces fractures, there is good indirect evidence that screening is effective in identifying postmenopausal women with low bone mineral density and that treating osteoporosis can reduce the risk of fractures (wrist and spine) in this population.

Policy considerations

Several measures for preventing osteoporosis show evidence of being effective. Such measures include moderate physical activity, an appropriate intake of calcium and vitamin D, a cessation of smoking, and pharmaceutical intervention in high-risk groups. Also, effective dissemination of findings from research should be used to increase the awareness of osteoporosis, both among the general population and in the health services, to increase early detection of risk factors and to motivate preventive measures.

Although there is some evidence for the indirect effectiveness of selective screening in reducing the risk of fractures (mainly in women over 65 years of age), by identifying and treating those at high risk, there are several questions that remain to be answered before such programmes can be recommended at the population level. Also, the total cost of a general screening programme for women more than 65 years of age may not be affordable or cost effective for many countries. Moreover, there is insufficient evidence of the effectiveness of treating low-risk populations. Furthermore, currently available findings from trials of pharmacological treatments are only relevant under controlled circumstances and to certain risk groups.

The full report including sources of information and methodologies, is available at:
<http://www.euro.who.int/Document/E88668.pdf>

What is known about the effectiveness of economic instruments to reduce consumption of foods high in saturated fats and other energy-dense foods for preventing and treating obesity?

The issue

Overweight and obesity are increasingly prevalent in Europe. In the European Region, the growing prevalence of overweight – a body mass index (BMI) over 25 kg/m² – ranges from about 25% to 75% of the adult population. Up to a third of the adult population, about 130 million people, are obese – with a BMI over 30 kg/m². Overweight and obesity are also increasingly prevalent among children. This synthesis summarizes the available evidence concerning the effectiveness of economic instruments (including taxes, price policies and incentives) in containing or reducing food consumption, particularly of foods high in saturated fats and other energy-dense foods.

Findings

This review found no direct scientific evidence of a causal relationship between policy-related economic instruments and food consumption, including foods high in saturated fats. Indirect evidence suggests that such a causal relationship is plausible, though it remains to be demonstrated by rigorous studies in community settings. The evidence includes a large longitudinal study conducted in China – under conditions substantially different than those in Europe – that found that increases in the prices of unhealthy foods were associated with decreased consumption of those foods. Another longitudinal study in the US found an association between differences in food prices and BMI of young children. These studies comprise indirect evidence for effects of price differences on food consumption or weight in large-scale community settings, but there are important limitations to the generalizability of their findings.

Modelling analyses drawing upon actual market data to track how food purchasing responds to changes in prices suggest that a combination of increased prices (in the form of taxes) for such nutrients as fat, saturated fat and sugar and subsidies on fibres could reduce consumption of the taxed nutrients as well as total energy intake. However, the findings of modelling studies do not comprise empirical evidence.

Studies of tax and price policies applied to tobacco and alcohol products in many countries provide persuasive evidence of their impact on decreasing consumption of those products. These policy interventions may serve as models for similar approaches for lowering consumption of highly saturated fats or other energy-dense foods. However, critical differences among these types of interventions may limit their

generalizability to food consumption.

A small body of evidence indicates that reducing the price of fruits, vegetables and other healthy snacks at the point of purchase (vending machines, cafeterias) increases their consumption. Another small body of evidence that includes several RCTs shows that financial incentives may result in temporary weight change.

Policy considerations

Evidence of food price elasticity (i.e., how much demand for food responds to changes in price) is limited. Food price inelasticity may dampen the effect of economic instruments, as many people – including those in the lower-income brackets – will neither reduce consumption of foods high in saturated fats at higher prices nor consume more healthful foods at lower prices. Any policies that raise prices of certain foods without complementary intervention, such as subsidies for healthful foods, may be viewed as inequitable.

Taxation and pricing policies have contributed to tobacco prevention and control. However, taxing and pricing policies for foods, most of which are not controlled substances or subjected to special restrictions for certain age groups, may be more difficult to implement. Tax revenues generated from the sale of foods high in saturated fats could be used to subsidize the cost of healthful foods or health promotion programmes. As in the instances of alcohol and tobacco control, the most effective approaches for preventing and managing the complex, multifactorial problem of obesity may involve a number of concurrent interventions.

The full report including sources of information and methodologies, is available at:
<http://www.euro.who.int/document/E88909.pdf>

How does health care system performance differ for stroke among 17 industrialized countries?

The issue

The burden from stroke in developed countries is large, both in terms of disease burden and health system costs. Meanwhile, general health care expenditures continue to grow with little evidence demonstrating the best value for resources invested. There is considerable variation in treatment trends and health outcomes for the same disease in different countries. This report focused on stroke, with its high prevalence and high cost among older people. It analysed issues that affect health system performance, including economic incentives, policies, prevention and treatment efforts, costs and health outcomes.

Findings

The results showed variations across the whole continuum of care among 17 countries from the Organisation for Economic Co-operation and Development (OECD) that participated in the study. Variations in health care were apparent in the prevention of stroke, the hospitalization of stroke patients and the frequency of diagnostic tests. First, in the area of prevention, countries differed in their approaches, their areas of emphasis and their success in reducing the risk of stroke by addressing its major determinants, including smoking and high blood pressure. It is widely acknowledged that countries that succeed in reducing the numbers of smokers in their population are likely to see improvements in stroke outcomes fairly quickly, as the evidence shows that quitting has both an immediate and a long-term effect on health outcomes and costs. Effective control of high blood pressure is another important component of stroke prevention, with drug treatment a major focus of this aspect of care.

Second, there appeared to be a strong link between hospitalization for ischaemic stroke and its corresponding incidence rate. There is, however, more of a discretionary element, and variation among countries, around the decision to admit patients with a “temporary” stroke event (known as a transient ischaemic attack, or TIA) to hospital. Third, differences were also observed in health outcomes, with some countries having higher case fatality rates than others. Finally, some countries clearly had higher expenditures on stroke care.

These results have clear implications for how health care systems treat stroke, showing that some countries may be treating stroke more efficiently, especially given the fact some countries had higher expenditures but relatively poor outcomes.

The reasons for these variations are not straightforward. Moreover, conclusions about the links between variations in treatments, costs and outcomes cannot be made without

more information about the relative severity of cases being treated. Nonetheless, the broad patterns found in this study reflect those found in other published studies.

Policy considerations

These results suggest there is room for improving the performance of health care systems in relation to stroke treatment. It identified two key implications. First, there is apparent benefit from a broad-based approach to managing stroke that includes prevention, acute care and rehabilitation. Second, the organization of treatment is a significant aspect of high-quality stroke care, and there appears to be specific benefit in using specialized stroke units – a benefit that may not be fully realized in most countries.

The full report including sources of information and methodologies, is available at:
http://www.euro.who.int/HEN/Syntheses/short/20060811_1

What are the effects on health of transport-related air pollution?

The issue

The effects on health of transport-related air pollution have become one of the leading concerns about transport. In the next few decades, road transport will remain a significant contributor to air pollution in cities across the European Region, and estimates indicate that 100 000 deaths a year in these cities could be linked to ambient air pollution, shortening life expectancy by an average of a year. A significant fraction of these deaths and a range of other adverse effects on health are attributable to transport-related air pollution.

In 2010, 90% of the urban population in the 15 countries that belonged to the European Union (EU) before 1 May 2004 are expected to be living in areas meeting the EU hourly air-quality limit value for nitrogen dioxide, carbon monoxide, benzene and lead. Also, exposure to particulate matter is expected to decrease, though it will still cause significant effects on health. The eastern half of the WHO European Region, however, is expected to have more difficulties in meeting air quality standards. In this part of the Region, the rapid increase in private cars and in goods transported by lorries, in combination with a decline in public transport, have turned road transport into an increasing contributor to air pollution.

The WHO 2005 report *Health effects of transport-related air pollution* provides the first comprehensive assessment of air pollution related to road transport and of the risks it presents to human health. Furthermore, it considers the entire chain of relevant issues: from patterns and trends in activities that determine the intensity of emissions from transport, to contribution of traffic to pollution levels, and finally to patterns of human exposure to such pollutants.

Findings

Emissions from the transport sector

The transport sector is an important source of emissions of a wide range of gaseous air pollutants and of suspended particulate matter (PM) of different sizes and compositions. Tailpipe emissions of primary particles from road transport account for up to 30% of fine PM (less than 2.5 μm in aerodynamic diameter: $\text{PM}_{2.5}$) in urban areas. Other emissions from road transport (such as those from resuspended road dust and the wear of tyres and brake linings) are important contributors to the coarse fraction of PM (2.5–10 μm in aerodynamic diameter: $\text{PM}_{10-2.5}$). Road transport is also the most important source of emissions of nitrogen dioxide and benzene in cities. In the future, alternative vehicle

technologies – such as fuel cells, electric vehicles and hybrid vehicles – are likely to play a major role in the market and to have a significant impact on emission of the pollutants, but this is not expected to happen in the next decade.

Human exposure to transport-related air pollutants

Exposure to transport-related air pollution varies, as some groups may be more exposed, depending on how long they stay in polluted areas and what they do while there. For most pollutants, exposure concentrations appear to be two to three times as high near busy roads as at background measurement sites. Also, exposures inside vehicles are especially high for primary exhaust gases and PM. Nevertheless, patterns of exposure are often complex and vary substantially, depending on the particular pollutant and the lifestyle and behaviour of the particular population group. Moreover, the intake of pollutants differs among drivers, bicyclists and pedestrians, but it is difficult to separate their exposure to transport-related air pollution from exposure to the pollution from other sources.

Effects on health of transport-related air pollutants

Evidence from epidemiological and toxicological studies indicates that transport-related air pollution affects a number of health outcomes. Such pollution contributes to an increased risk of death, particularly from cardiopulmonary causes, and it increases the risk of non-allergic respiratory symptoms and disease. Experimental research indicates that the effects are linked to changes in the formation of reactive oxygen species, to changes in antioxidant defences and to non-allergic inflammatory processes. Laboratory studies suggest that transport-related air pollution increases the risk of developing an allergy and can exacerbate symptoms – in particular, in susceptible subgroups. The evidence from population studies, however, does not consistently support this view.

Laboratory studies indicate that fine PM (especially the soot content) and ozone are associated with an increased risk of mortality and respiratory morbidity, while exposure to nitrogen dioxide, ozone and PM has been correlated with the development of allergic responses. Some studies indicate a significant increase in the risk of myocardial infarction caused by transport-related pollution; however, only a few studies have been conducted on the issue. Other studies and experimental evidence indicate that exposure results in changes in the regulation of the autonomic nervous system and in elicited inflammatory responses.

Studies also indicate an increased risk of various types of cancer in people with prolonged exposure to higher levels of transport-related air pollution. In particular, occupational long term exposure of professional drivers and railway workers, increases the incidence of (and mortality from) lung cancer. Furthermore, evidence shows adverse effects on pregnancy, as the fetuses are considered to be highly susceptible to a variety of toxicants present in transport-related air pollution. Birth outcomes, such as an increase in postneonatal infant mortality, and a decrease in male fertility also seem to be

affected by transport-related air pollution, although the number of studies addressing this hypothesis is small.

Only a few studies analyse the effects on health of specific interventions, and even fewer focus on transport-related air pollution. These studies indicate that reduced air pollution may directly reduce acute asthma attacks in children and also the medical care associated with these attacks. Long-term decreases in air pollution are associated with declines in bronchial hyperreactivity, in the average annual trend in deaths from all causes and in respiratory and cardiovascular diseases. Such decreases in air pollution appear to provide a gain in life expectancy.

Policy considerations

Implementation of technological improvements, such as particle traps, preheated catalytic converters and electronic vehicle controls, may have an impact on transport-related air pollution. Also, stricter exhaust-emission legislation (on PM and nitrogen oxides from conventional diesel and petrol engines) can also contribute to a decrease in transport-related air pollution. Alternative vehicle technologies and fuel substitutes may play an important role in substantially reducing the emission of hazardous air pollutants. However, many of the positive effects of technological improvements risk being offset by an increase in the number of vehicles, of the number of kilometres travelled, by a trend towards replacing smaller vehicles with more powerful engines and an increased use of diesel fuel. That is why technological improvements alone may be insufficient to bring concentrations of transport-related pollutants below levels that pose a threat to human health.

There is also a need to consider measures that influence the amount of travel. For example, integrated urban planning, such as zoning offices, green areas and non-residential functions around urban highways, separating pedestrians and bicyclists from road traffic, and introducing measures that provide disincentives to using private vehicles (such as parking fees and congestion charges) seem to contribute to lowering emission rates. Such measures encourage a shift in favour of public transport and increase bicycling and walking, which have additional positive effects on health. Moreover, control mechanisms, such as mandatory car inspections, are needed to eliminate gross polluters and avoid badly maintained vehicles.

As the association between adverse effects on health and exposure to transport-related air pollution still needs to be adequately quantified, more research is needed – for example, to clarify which constituents of traffic emissions are responsible for the observed adverse effects.

The full report including sources of information and methodologies, is available at:
http://www.euro.who.int/HEN/Syntheses/short/20060911_1

Which interventions modify sexual risk behaviour and prevent HIV infection in men who have sex with men, and what is their effectiveness?

The issue

Men who have sex with men (MSM) continue to be at great risk for human immunodeficiency virus (HIV) infection. They make up a large proportion of new acquired immunodeficiency syndrome (AIDS) cases and HIV infections every year in industrialized countries.

Previous reviews of HIV prevention efforts have examined the effects of behavioural interventions across a broad range of populations at risk. One of these reviews noted the lack of research on interventions for MSM of colour, young MSM and MSM who do not identify themselves as gay. The reviews of the research indicated that critical intervention components include information, motivation and skills training, with successful interventions having high attendance rates or including an extensive formative research component. One review found that effects of interventions diminish as the time from intervention to follow-up increased from 1 month to 6 months. An earlier review on MSM noted that community-level interventions have the capacity to reach people who would not participate in facility-based interventions and who may be at higher risk than those who enrol in small-group or individual interventions. Thus, several reviews have suggested hypotheses about characteristics of interventions. However, there is a need to summarize and analyse the lessons learned in HIV prevention for MSM. This systematic review examines and summarizes the behavioural effects of rigorously evaluated interventions for MSM.

Findings

An analysis of 12 rigorous controlled trials reported on the effects of interventions on risk reduction behaviour among MSM. The studies included for analysis examined small-group interventions and the effects of community-level approaches and individual-level interventions. Interventions to reduce unprotected sex included individual counselling, and social and behavioral support (such as peer education, assertiveness and relationship support, discussing attitudes and beliefs, and videos). Small-group and community interventions were also tried (such as group counselling or workshops, interventions in community areas, and training community leaders).

The results for the effectiveness of interventions for MSM show that HIV prevention efforts can reduce the risk of sexually transmitted infections. The summary effect of these diverse interventions indicates that 23% fewer men reported unprotected anal sex

(one of the riskiest behaviours for transmission of HIV and other sexually transmitted infections) after receiving intervention. The risk reduction observed across the trials occurred after relatively short interventions: the weighted median duration of the small-group interventions was only 3 hours; the community-level interventions, although being active in the communities for weeks or months, did not require extended time commitments from the individual recipients of the interventions. Findings suggest that community-level interventions reached and influenced substantial proportions of the study population, whether through direct exposure to the formal intervention mechanisms or by informal social diffusion, and these interventions were at least as favourable as those of small-group and individual-level interventions. The present analysis also confirmed that interventions that promote personal skills yielded clearly favourable effects.

Policy considerations

Efforts to prevent HIV can reduce sexual risk behaviour, which can be achieved with relatively brief interventions among MSM. Further reductions in unprotected anal sex and sexually transmitted diseases can have an important public health impact. Among interventions, community-level interventions, those that served populations in their twenties (rather than their thirties) and those that promoted interpersonal skills have yielded slightly more favourable results.

The reduction in risk would likely be even greater if intervention efforts could be guided towards the most effective strategies. There are a small number of rigorous controlled trials for MSM, which are not compensated by a large number of study group participants. Thus, more research is needed to ascertain the effects of specific intervention components, population characteristics and methodological features and to identify the best intervention strategies.

The full report including sources of information and methodologies, is available at:
http://www.euro.who.int/HEN/Syntheses/short/20060914_1

What effects do mobile phones have on people's health?

The issue

During recent years, the use of mobile phones has increased substantially and has been paralleled by a growing concern about the effects on health attributed to exposure to the electromagnetic fields produced by them and their base stations. Demonstrating that radiation causes adverse effects on health would signal a widespread public health problem.

Findings

Mobile phones have been in extensive use for a relatively short period of time, and their technology has progressively changed, from analogue to digital systems. Mobile phones and base stations emit radio frequency or microwave radiation. Exposure to such a radiation could affect health directly. The use of mobile phones also results in indirect effects, such as car accidents and interference with health equipment.

Experimental research on the effects of radio-frequency radiation is very broad and heterogeneous. It includes both studies of cell cultures and tissues (in vitro) and of laboratory animals (in vivo), as well as of people (volunteers). On one hand, these studies focus on functional changes in the brain and the resulting effects on cognition, and (to some extent) well-being – that is, the influence of exposure to radiation on the head. On the other hand, these studies focus on the possibility of a relationship between mobile phone use and carcinogenic processes, reproduction and development, the cardiovascular system and longevity – that is, exposure of the whole body. These studies found very small and reversible biological and physiological effects that do not necessary lead to diseases or injuries. Also, the research findings on the changes at the molecular level associated with the development of cancer are inconsistent and contradictory.

Epidemiological studies in general populations, such as communities, concentrate on a possible causal relationship between mobile phone use and the occurrence of brain tumours, acoustic neuromas, tumours of the salivary glands, and leukaemia and lymphomas. Although weak and inconclusive, most of the evidence available does not suggest that there are adverse effects on health attributable to long-term exposure to radio-frequency and microwave radiation from mobile phones. However, recent studies have reported an increased risk of acoustic neuroma and some brain tumours in people who use an analogue mobile phone for more than 10 years. Also, no data is available on the reproduction of these effects when digital mobile phones are used. Finally, there is good evidence that the use of mobile phones while driving translates into a substantially increased risk of an accidental collision.

Policy considerations

For the majority of tumours studied so far, a long latency period might exist, and the finding of any link to the use of mobile phones is complex. Consequently, most of the published research cannot elucidate the risk of long-term effects. If there is a risk, the current evidence suggests it is small.

Since there are still gaps in knowledge, continued research and better health risk analyses are needed. Moreover, without scientifically recognized adverse effects on health, it is not possible to produce evidence-based recommendations.

Therefore, a precautionary approach to the use of this communication technology should be adopted until more scientific evidence on its effects on health becomes available. Such an approach includes restricting exposure (according to existing guidelines and the European Union (EU) Directive) and providing the public with information and options.

The full report including sources of information and methodologies, is available at:
<http://www.euro.who.int/Document/E89486.pdf>

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