Disease prevention

Promoting healthy living and disease prevention requires not only national and regional programmes to increase awareness and education, but also one-to-one discussions to address individual needs, concerns and barriers.

There are many barriers to achieving effective prevention of disease. These range from educational and behavioural factors to cultural and economic considerations. For example:

- Ignorance of risk. This may be lack of knowledge of what constitutes high-risk behaviour; however, perhaps more often the individual chooses to ignore preventative advice (for example, in smoking, unhealthy eating or abuse of drugs).
- Lack of choice (for example, where there is shortage of water, dirty water is chosen rather than no water).
- Cultural pressures. These may encourage high-risk behaviours, especially in young people.

Types of prevention

Primary and secondary prevention

Prevention may be classified as primary or secondary.

Primary prevention

This is aimed at healthy individuals, to prevent disease from occurring. Examples include:

- Vaccinations.

- Adopting a healthy lifestyle - for example:

    - Diet.
    - Weight.
    - Exercise.
    - Avoidance of smoking.
    - Avoidance of excess alcohol.
    - Practising safe sex.
    - Avoidance of drug abuse.

Secondary prevention
This is aimed at patients with an existing pathology, to reduce the risk of recurrence or progression - for example:

- Aspirin in arterial disease.
- Beta-blockers and angiotensin-converting enzyme (ACE) inhibitors after myocardial infarction.
- Smoking cessation in chronic obstructive pulmonary disease (COPD) and established arterial disease.

Primary or secondary prevention
Many interventions may be either primary or secondary, depending upon the circumstances - for example:

- Smoking cessation in coronary heart disease and COPD.
- Statins may be used in both primary and secondary prevention.

Levels of prevention

Prevention is also classified according to the level at which action is taken. Thus, it can be at the national, local or personal level.

National level

At this level, interventions include legislation such as:

- Compulsory seatbelts or motorcycle crash helmets.
- Appropriate taxation. This can reduce alcohol-related harm and can work in other areas as well.[1]
- In other countries it may involve the eradication of mosquitoes or the provision of clean drinking water and sewage disposal. Dental disease can potentially be tackled through fluoridation of the water but this can be controversial.

Local level

- The provision of cycle paths and sports centres facilitates exercise; healthy eating in school canteens and places of work.
- At work, health and safety is overseen by the Health and Safety Executive. They are a helpful organisation who prefer to facilitate. However, where regulations are breached they have powers to act as well.

Personal level

- Individuals make personal decisions about lifestyle.
- Individuals consulting with health professionals may be advised about diseases, treatments and personal management of preventative health measures.

Wherever possible, doctors as individuals and as a profession should encourage national government, local government or other organisations in measures to prevent disease and to promote health. However, the majority of interventions by most health professionals will be at the personal level with the individual patient.

Public health doctors work more often at other levels with opportunities to advise and influence local and national government. On a personal level, doctors are well placed to set an example by following a healthy lifestyle. There is evidence that shows that patients of healthy doctors are more likely to undergo preventative measures and have better outcomes.[2]

The challenges of prevention

The scope for the prevention of diseases is enormous. There will be scope for prevention of all types and at all levels. Many people in the developed world are dying from diseases of 'excess' - for example, those related to smoking and obesity.

Political challenges

A great deal of health promotion is necessary at a national level. National campaigns are essential to tackle many causes of ill health such as obesity, smoking, and many infectious diseases (eg, sexually transmitted infections). For example:

- AIDS has caused devastation throughout much of sub-Saharan Africa and other parts of the world.
- Smoking-related diseases are increasing in developing countries where tobacco companies have been promoting sales.
- Widespread disease and death still occur in many countries which don't have a clean and plentiful water supply.
- Wars and armed conflict have hindered or destroyed the development of basic infrastructure in many parts of the world.

It is therefore evident that measures at government level are essential and any absence or failure of government action can have devastating effects.

Specific challenges

Many of these are clinical or individual challenges. Almost every PatientPlus clinical article on disease has a concluding paragraph about prevention of that disease. This may include the barriers to prevention. Articles of particular note include:

- Accidents and their Prevention.
- Antenatal Care.
- Gunshot Injuries.
- Prevention of Falls in the Elderly.
- Stroke Prevention.

- Health Inequalities and Social Deprivation.
- Acquired Immune Deficiency Syndrome (AIDS).
- Obesity in Adults.
- Physical Training.
- Sexually Transmitted Infections (STIs).

There are articles on:

- Prevention of Cardiovascular Disease.
- Prevention of Type 2 Diabetes.
- Prevention of Venous Thromboembolism.
- Smoking Cessation.
- UK Immunisation Schedule.
- Hepatitis B Vaccine and Prevention.

Screening for disease

The UK has a number of screening programmes in place for adults and children. See the separate Screening Programmes in the UK article.

There are a number of criteria that must be fulfilled for a screening procedure to be viable. These were outlined by Wilson in 1966:[3]

- The disease must be sufficiently common within the group to be screened that a reasonable number of cases can be expected to be detected.
- There is benefit in early detection. This may mean offering treatment at a more favourable stage or taking action to prevent or ameliorate the disease.
- The screening procedure must be cheap, easy and acceptable. The last is a problem with regard to faecal occult blood for colorectal cancer or prostatic biopsy for prostate cancer. It is also a problem for cervical cytology amongst some ethnic groups.

- The screening test is not usually the 'gold standard' for diagnosis and so there must be an acceptably small number of false positive results. Low specificity will overload the system with further investigation and lead to unnecessary anxiety.
- There must be a very low level of false negatives. Low sensitivity with too many false reassurances will bring the test into disrepute.

The problem with sensitivity and specificity is that there may be some overlap between normal and abnormal results. It is important that everyone should realise that a screening test is not infallible and that false positives and also some false negatives will occur. The overall assessment of a screening test, particularly one where some false positives may be generated, needs to take into account the potential harm of further investigations in those who will turn out to have no disease.

Current UK screening programmes include cervical cancer and breast cancer, but testing for many other cancers - eg, prostate cancer - remain controversial and so are not included in the National Screening Programmes.

Prostate cancer

A Cochrane review concluded that screening for prostate cancer did not significantly decrease prostate cancer-specific mortality or overall mortality. Harms associated with prostate specific antigen (PSA) screening and subsequent diagnostic evaluations were frequent, and moderate in severity. Overdiagnosis and overtreatment were common and associated with treatment-related harms. Any reduction in prostate cancer-specific mortality may take up to 10 years to accrue, and therefore, men who have a life expectancy of less than 10 to 15 years should be informed that screening for prostate cancer is unlikely to be beneficial. Estimation of PSA is insufficiently discriminative, whilst transrectal ultrasound may have difficulties with uptake.[4]

Cervical cancer

The cervical screening programme is associated with improved rates of cure of cervical cancer.[5] See the separate Cervical Screening (Cervical Smear Test) article.

Breast cancer

The breast cancer screening programme in the UK was initiated in 1998 following the Forrest Report. See the separate Breast Cancer Screening with Mammography article. Although mammography is an accepted screening programme for women, there are false positives and some women will be treated unnecessarily and endure unnecessary psychological distress, including anxiety.[6]

Therefore national screening programmes need to be reinforced with good education about the benefits and risks.

Integrating prevention in the consultation

There is now, politically and professionally, an expectation of a preventative component to every general practice consultation.

Financial incentives have been used to influence behaviour and are now used routinely under the existing GP contract, which makes provision for regular review of targets and incentives.

This still poses a challenge when consultation time is limited and patients come with their own aims and expectations.

Targets for prevention

Some primary prevention is relevant to all of us. For example, advice on diet and exercise may be applicable to everyone. However, most measures need to be targeted so that they can be cost-effective and clinically appropriate. Giving statins to everybody over 21 years of age might eventually prevent death from strokes and coronary heart disease but it would be prohibitively expensive and the adverse events may well exceed the benefits.

Giving statins to those with established coronary heart disease is cost-effective and now standard practice. Anticoagulation of patients with atrial fibrillation is very effective but the evidence suggests that large numbers of people who would benefit still do not receive anticoagulation and the uptake is poor in the elderly.[7]

Uncovering the target group

Registration

An up-to-date practice database is an essential tool for primary and secondary prevention. Even the simplest of lists will have the patient's age and sex but most databases are more advanced and will allow searching by disease so that at-risk patients may be identified.

Opportunistic screening

This is widely used to identify at-risk patients and promote prevention. It can be useful in reaching patients who do not take advantage of screening initiatives or perhaps would not otherwise be included in the at-risk group.

Barriers to prevention

Taxation and cost issues

Raising the taxation on tobacco and alcohol does reduce consumption.[1] [8] Only a minority of drinkers are 'problem drinkers' but there is a spectrum of drinking habits. As total alcohol consumption rises or falls, the number of people in the 'problem drinker' category rises or falls too. However, raising taxation on tobacco and alcohol by a large amount may have a number of perceived consequences that act as barriers:

- Consumption may fall so much that total revenue from that source falls. This can be politically challenging with industry concerned about economic damage.
- It may be very unpopular with the electorate and in a democracy politicians have to be constantly aware of the effects of their actions in terms of votes won or lost.
- Unintended health consequences may arise from the use of tobacco and alcohol from illicit and unregulated sources.
- Most interventions have costs and do not have the advantages of revenue generation associated with, for example, taxation on tobacco. This includes screening programmes or advertising campaigns.
- Screening programmes also generate further costs associated with the investigation of the false positives.
- Immunisation programmes cost money to set up, administer and change.

Demographic issues

A major economic problem facing all developed nations is the rising cost of healthcare associated with the change in demographics of the population. A growing elderly population puts more strain on health and social services. A significant number of people now spend a quarter of their lives as pensioners retired from working life.

Other political barriers

The Black Report was a careful study of health inequalities with a long list of recommendations.[9] See the separate Health Inequalities and Social Deprivation articles.[10]

Some measures generate interest from pressure groups who seek to protect personal freedoms. Politicians are keen to protect their popularity when faced with the prospect of an election. In addition, the lobbying power of certain industries, such as food manufacturers and the alcohol industry, is considerable and may affect the measures politicians put in place.

Politicians were wary about the feasibility and acceptability of restricting smoking in public places. Experience in a number of countries had shown it to be surprisingly effective and acceptable. Even smokers accept that they do need pressure to make them quit, and non-smokers enjoy a smoke-free environment in public spaces.

Financial and political pressures may also impair health promotion at local government level. Employers might also see promotion of healthy eating and safety at work as unaffordable. Some industries even have a financial interest in indirectly promoting unhealthy living.

Personal barriers

Cost and quality

Many people feel that expense is an impediment to a healthy lifestyle. Food labelled as 'organic' may be substantially more expensive and benefits are often dubious. Processed food may be easier and cheaper to access for people who lack the education and skills to cook from scratch.

Information

Deciding what is healthy and what is unhealthy food can be challenging. Processed food may contain a great deal of added salt, sugar and fat. Contents (fat, unsaturated fat, salt, sugar and other ingredients) are often on the package but not easily legible or understandable. Salt may be given as grams of salt, grams of sodium or milliequivalents. Fat content may be per package, per 100 grams or per serving. Food labelling in the UK is moving towards a consistent approach but it remains voluntary with many manufacturers not participating.

Exercise

There may be many barriers to people taking regular exercise. This can be complex but again cost need not be a barrier. It is possible to choose recreations and pastimes that are both healthy and cheap. Building exercise into daily routines can help - for example, cycling to work. This is cheaper than taking the car and could be considered a healthy option. However, there are problems:

- Work must be a reasonable cycling distance away.
- The car must not be required at work.
- There should be facilities to shower and change.
- Adverse weather conditions.

Social, educational and cultural barriers

There are many examples of how these factors can present a barrier to the promotion of health. Social and cultural factors which discourage healthy lifestyles are evident in the media and in advertising. These both reflect and shape attitudes and fashions connected with unhealthy habits and behaviour - for example:

- The tobacco industry and tobacco advertising tried hard, both to discredit the research that exposed its dangers and to present its product as desirable. Hollywood continued to portray smoking as cool and sophisticated. Often younger people do not consider health warnings as relevant to them, whereas the images and positive attributes of smokers portrayed in advertising and films can be alluring.

- Peer pressure can encourage young people to experiment with drugs and to drive dangerously. Alcohol consumption amongst the young is a major concern with a rise in binge drinking in recent years - see the separate Effects of Alcohol Abuse article.
- Misinformation, ignorance and lack of education can all lead people to miss out on healthy choices or to adopt an unhealthy lifestyle. For many years the media undermined the measles, mumps and rubella (MMR) vaccine by referring to it as 'the controversial MMR vaccine' and by implying that significant scientific uncertainty persisted.

Administrative barriers

Badly run prevention programmes are often responsible for lack of effectiveness. Inadequate lists, unachievable targets and lack of follow-up for non-responders are typical problems. The greatest barrier to effective prevention is lack of effectiveness in modifying the risk factors in patients identified as at-risk.

Role of prevention in primary care

Prevention is better than cure. However, the management of change is a complex and difficult issue, not least transformation of lifestyles.

In recent decades general practice has, through several mechanisms, embraced prevention, to help produce a National Health Service, rather than just a National Sickness Service. Doctors, educators and politicians have a duty to ensure that the facts are delivered in a form that can be understood by all. What is rather more contentious is the degree to which prevention should be enforced. People should be allowed to have personal freedom and make informed judgements about how they live their lives.

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