

# Screening

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In this issue we look at a recent trial of school dental screening in the UK. This has been a feature of UK children's dental services for over 100 years. Recently it has been endorsed by the World Health Organization, which stated that, "Screening of teeth and mouth enables early detection and timely interventions towards oral diseases and conditions, leading to substantial cost savings. It plays an important role in the planning and provision of school oral health services as well as health services". The trial discussed in this issue found that school dental screening delivered according to three different models was not effective at reducing levels of active caries and increasing attendance at dental practices in the population under study. It was a large,

well-designed study: should we therefore, on the basis of this evidence, stop the programme? I would suggest that, at the present time, the answer to this is no.

Screening is defined by the UK National Screening Committee (NSC) as, "a public health service in which members of a defined population, who do not necessarily perceive they are at risk of, or are already affected by a disease or its complications, are asked a question or offered a test, to identify those individuals who are more likely to be helped than harmed by further tests or treatment to reduce the risk of a disease or its complications" (see [www.nsc.nhs.uk/whatscreening/whatscreen\\_ind.htm](http://www.nsc.nhs.uk/whatscreening/whatscreen_ind.htm)). Screening is often seen as a single test and for many years the criteria for appraising screening were based on the Wilson and Jungner criteria<sup>1</sup> (Figure 1, below left).

There is constant pressure to introduce screening tests for a wide range of conditions. In order to cope with this the UK National Health Service was instructed not to introduce any new screening programmes until the NSC had reviewed their effectiveness. With the establishment of the NSC there was a change in focus from specific screening tests to the development of effective screening programmes because, for screening to be effective, all the steps from identification of the population at risk, to diagnosis of the disease or precursor, to treatment of the individual, must be effective. To achieve this, the NSC assesses proposed new screening programmes against a set of internationally recognised criteria<sup>2</sup> covering the condition, the test, the treatment options and effectiveness and acceptability of the screening programme (Figure 2, next page).

Assessing programmes in this way is intended to ensure that they do more good

than harm at a reasonable cost. Currently the NSC is reviewing screening of dental disease, as noted by our commentator on page 5. Their interim report highlights three areas that need to be addressed:

- Could attendance resulting from screening be improved?
- Could treatment rates following referral be improved?
- What means might be used to maintain surveillance of dental health of children if the programme were to be abandoned?

I believe that we need greater clarity on these issues before we abandon school dental screening here in the UK.

1. Wilson JMG, Jungner G. Principles and practice of screening for disease. Public Health Paper No. 34. Geneva: World Health Organization; 1968.
2. World Health Organization. Oral health promotion: an essential element of a health-promoting school. WHO Information Series on School Health. Document 11. Geneva: World Health Organization; 2003.

**Figure 1. The Wilson-Jungner<sup>1</sup> criteria for appraising the validity of a screening programme**

- The condition being screened for should be an important health problem
- The natural history of the condition should be well-understood
- There should be a detectable early stage
- Treatment at an early stage should be of more benefit than at a later stage
- A suitable test should be devised for the early stage
- The test should be acceptable
- Intervals for repeating the test should be determined
- Adequate health service provision should be made for the extra clinical workload resulting from screening
- The risks, both physical and psychological, should be fewer than the benefits
- The costs should be balanced against the benefits

**Figure 2. UK National Screening Committee. Criteria for appraising the viability, effectiveness and appropriateness of a screening programme (see [www.library.nhs.uk/screening](http://www.library.nhs.uk/screening))**

Ideally all the following criteria should be met before screening for a condition is initiated:

**The condition**

1. The condition should be an important health problem
2. The epidemiology and natural history of the condition, including development from latent to declared disease, should be adequately understood and there should be a detectable risk factor, disease marker, latent period or early symptomatic stage
3. All the cost-effective primary prevention interventions should have been implemented as far as practicable
4. If the carriers of a mutation are identified as a result of screening, the natural history of people with this status should be understood, including the psychological implications

**The test**

5. There should be a simple, safe, precise and validated screening test
6. The distribution of test values in the target population should be known and a suitable cut-off level defined and agreed
7. The test should be acceptable to the population
8. There should be an agreed policy on the further diagnostic investigation of individuals with a positive test result and on the choices available to those individuals.
9. If the test is for mutations, the criteria used to select the subset of mutations to be covered by screening, if all possible mutations are not being tested, should be clearly set out

**The treatment**

10. There should be an effective treatment or intervention for patients identified through early detection, with evidence of early treatment leading to better outcomes than late treatment
11. There should be agreed evidence-based policies covering which individuals should be offered treatment and the appropriate treatment to be offered
12. Clinical management of the condition and patient outcomes should be optimised in all healthcare providers prior to participation in a screening programme

**The screening programme**

13. There should be evidence from high-quality randomised controlled trials that the screening programme is effective in reducing mortality or morbidity. Where screening is aimed solely at providing information to allow the person being screened to make an informed choice (eg, Down's syndrome, cystic fibrosis carrier screening), there must be evidence from high-quality trials that the test accurately measures risk. The information that is provided about the test and its outcome must be of value and readily understood by the individual being screened
14. There should be evidence that the complete screening programme (test, diagnostic procedures, treatment/ intervention) is clinically, socially and ethically acceptable to health professionals and the public
15. The benefit from the screening programme should outweigh the physical and psychological harm (caused by the test, diagnostic procedures and treatment)
16. The opportunity cost of the screening programme (including testing, diagnosis and treatment, administration, training and quality assurance) should be economically balanced in relation to expenditure on medical care as a whole (ie, value for money)
17. There should be a plan for managing and monitoring the screening programme and an agreed set of quality assurance standards
18. Adequate staffing and facilities for testing, diagnosis, treatment and programme management should be available prior to the commencement of the screening programme
19. All other options for managing the condition should have been considered (eg, improving treatment, providing other services), to ensure that no more cost-effective intervention could be introduced or current interventions increased within the resources available
20. Evidence-based information, explaining the consequences of testing, investigation and treatment, should be made available to potential participants to assist them in making an informed choice
21. Public pressure for widening the eligibility criteria for reducing the screening interval, and for increasing the sensitivity of the testing process, should be anticipated. Decisions about these parameters should be scientifically justifiable to the public
22. If screening is for a mutation, the programme should be acceptable to people identified as carriers and to other family members

**References**

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6. Holland WW, Stewart S. Screening in Healthcare. London Nuffield Provincial Hospitals Trust; 1990.
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