was negligent. There is, however, an irreducible number of false negative results in any screening programme; the reasons for this are complex.[2 3] In cervical screening it is accepted that the proportion of false negative screening tests should be 5% or less. Negligent false negatives on one hand and an irreducible minimum of screening errors on the other are difficult to reconcile.

Are screening programmes doing all they can to ensure that false negative cancers are occurring at the minimum possible rate? The NHS breast screening policy is to have a single reading of mammograms and single view mammography after the first screen, but the evidence is that the best practice is two view mammography at every screen and double reading, with arbitration for discordant opinions. This results in considerably more small breast cancers being detected, with no increase in false positive results.[8] Therefore, current NHS breast screening practice may be failing to achieve the irreducible minimum of false negative screens. The breast screening and cervical screening programmes are subject to rigorous quality assurance and quality control, involving external peer review of both the processes and outcomes, to ensure that the standards of care for each woman and the population are acceptable.

So what more can be done? People invited for cancer screening must be told about the risks, benefits, and limitations in a way that instils realistic expectations and ensures fully informed consent in those who participate. The quality assurance systems applied to screening programmes must be rigorous and involve individual peer review to ensure that performance is maintained above the prescribed minimum standards. The corollary of this is that screening must be given enough resources to ensure that standards can be achieved and false negative cases are indeed kept to the irreducible minimum. The legal system must take account of the difference between population screening and diagnoses in individuals based on symptoms and deal with alleged negligence in the context of population screening. Expert panels could be set up to offer advice to courts in these instances.

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A national screening policy for sickle cell disease and thalassaemia major for the United Kingdom

Questions are left after two evidence based reports

Sickle cell disease and thalassaemia major are serious health problems for inner city populations in Britain, but services are inconsistent and policy guidance is unclear.[1–4] The NHS Health Technology Assessment Programme commissioned two systematic reviews to identify the objectives of the screening programmes and to determine whether, and in which populations, screening using haematological tests should be either selective or universal. The decision on who to screen in areas where not everyone is tested is based on questions to identify ethnic origin.

The two reports provide similar estimates for the burden of disease. One estimated that each year 28-60 fetuses are conceived and 17 infants are born with thalassaemia and that 133-238 fetuses are conceived and 160 infants are born with sickle cell disease in England.[5] The other report gave estimates for the United Kingdom of 44 and 171 respectively for conceptions.[6]

Both reports show that the population at risk has an uneven geographical distribution. For this reason, selective rather than universal antenatal and neonatal screening is likely to be more appropriate in most areas. Previous guidance suggested that universal screening might be appropriate in areas where the proportion of people from ethnic minorities was greater than 15%. Zeuner et al recommend that decisions about universal or selective screening should consider the proportion of the population which is of African or African-Caribbean origin, as this is the main determinant of the prevalence of sickle cell disease.[6] They also say that a strategy of universal antenatal screening would be more cost effective than selective screening when the prevalence of sickle cell disease in fetuses is above 5-12 per 10 000. This would include 7-15 health authorities on the basis of 1993 boundaries. A strategy of universal screening of neonates would be the more cost effective at a prevalence of sickle cell disease in fetuses of about 7-18 per

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10 000. Davies et al recommend that where there are more than 5 cases of sickle cell disease per 10 000 births or 15 per 1000 cases of sickle cell trait it is cost effective to introduce universal haematological screening of neonates.[5] They also say this screening will be more efficient if it is performed by a few large laboratories. A laboratory service should provide a service for over 25 000 births per year.[7]

But wider issues than those covered by the reports need to be considered. The two reviews considered health authorities as the unit of analysis, but in cities or conurbations it makes sense to consider whole geographical areas. Universal programmes of neonatal screening are based on resident populations, but both selective neonatal and antenatal screening programmes may be based either on hospital catchment or on resident populations. Gaps and overlaps may arise when programmes using different populations coexist.[8]

Selective screening based on ethnic origin may be problematic. Davies et al estimate that a question about ethnic origin as an initial screening test to identify those neonates who need to be screened by the laboratory fails to identify 20% of those at risk.[7] If this leads to a lower sensitivity for detecting cases than with universal laboratory screening there will be inevitable geographical inequity, even though the selective approach may be more cost effective in areas with a low prevalence of sickle cell disease.[6,7]

Several steps must be taken to make progress. Firstly, an explicit national policy is needed to cover both antenatal and neonatal screening for haemoglobinopathies. This should clarify roles and responsibilities at local, regional, and national levels for service development and quality management.[9] Secondly, a programme of research to address the gaps in knowledge highlighted by these reports is needed.

We need to know more about the effectiveness of a question about ethnic origin as a first level screen and how best to link information from antenatal and neonatal programmes. We need to understand how updated projections of the size of ethnic populations should change the conclusions of the reviews from the Health Technology Assessment Programme. Thirdly, we need a practical implementation plan. Adequate services for treatment need to be in place when screening programmes are established, otherwise the programme may be seen as trying to reduce the size of the affected population to lessen the demand for treatment.[9] Finally, for uptake to be optimal the populations most at risk must understand the risks and benefits of screening.

National programmes of public education are essential, as is the education of primary care practitioners. These steps need resources, and this remains an outstanding barrier to the effective implementation of any national screening programme for major haemoglobinopathies even though universal neonatal screening for the United Kingdom would probably cost less than £10m ($6m). The public health importance of the issue is now unquestioned.

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Reperfusion in acute myocardial infarction

Ensuring early reperfusion, by whatever means, is the best strategy for now

Acute myocardial infarction is usually caused by occlusive coronary thrombosis initiated by rupture of an atheromatous plaque. The subendocardium infarcts early after coronary occlusion, but outward extension to affect the full thickness of the ventricular wall may take several hours. Restoration of normal coronary flow, before the transmural spread of infarction is complete, is now seen as the primary goal of hospital treatment because it allows reperfusion of the threatened myocardium with reduction of eventual infarct size.

The best established method of restoring coronary flow is treatment with thrombolytic agents, but angioplasty, with or without the insertion of a stent, is fast gaining exponents. Thrombolytic therapy is the best tested and most widely used means of achieving this goal and among eligible patients produces coronary recanalisation in about 60-80% of cases,[1,2] depending on the agent used. Beneficial effects on survival have been confirmed in several studies.[3,4]

Nevertheless, thrombolytic therapy has important limitations because normal coronary flow is achieved

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