lacking is coordination at a national level, and a mechanism for implementing central initiatives in individual academic centres. These require national coordination with government involvement, argues Catto (p 633).[7]

The main imperative to get academic medicine right comes from patients. Clive Wilkinson, speaking on their behalf at the October meeting, demanded to know why the public should support investment in medical research. "You have to show the public that the system their taxes are funding is working to deliver better quality health care and better qualified staff. Health funding is under pressure, and some people are going to have to give things up in order that we can deliver on NHS commitments. The public understands that research is essential; but it needs to be on their terms—not on the basis of what is comfortable to academics."

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Evidence based screening for Down's syndrome

We should be prepared to re-examine entrenched practices

An important lesson in all medicine, but particularly illustrated in screening programmes, is the continued need to review and audit. Serum screening for Down's syndrome, introduced by many health authorities in the past decade,[1-3] is a good example. The original demonstration projects compared the detection rate when Down's syndrome was identified after serum screening with earlier data derived from screening targeted towards pregnancies in older women.[2] Howe et al from Southampton now challenge some of the assumptions (see p 606).[4] They found that the Down's syndrome detection rate in one Southampton maternity hospital averaged 68% (and at least 41% in the pregnancies of women aged less than 35), *without* using serum screening. The higher detection rate without serum studies undermines the cost benefit arguments for such screening and raises questions about what to do next.

One reason for this higher than expected detection rate is a change in the age distribution of pregnant women. In the Southampton study 10% of pregnancies occurred in mothers older than 35, compared with 6% a decade ago.[1] Because of this, the proportion of conceptions with Down's syndrome would increase, as would the detection rate. There has also been an increase in the proportion of fetuses with Down's syndrome, or other trisomies, detected using ultrasound markers of chromosome anomaly.[4-7] In our Nottingham genetic service ultrasound abnormalities are increasingly the trigger for placental biopsy or other intervention.

So, how do we go forward? Should health authorities cease serum screening in favour of more targeted ultrasound facilities? Should serum screening be restricted more, perhaps to pregnancies in women under a certain age? A sensitive question would be whether couples whose screening for chromosome anomalies at the local antenatal clinic was provided by the NHS based on the most relevant evidence should be able to purchase additional testing. Though I would not favour such an option, there does need to be a greater involvement in decision making by pregnant women and their partners.[8] Let us begin by ensuring that women whose tests (by whatever technique) are "screen negative" are not left with the impression that there is no risk at all. Conversely, those who are screen positive must know that their risk is increased, based on a threshold, but the baby is still likely to be normal.

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To the couple who plan, or have embarked on, a much wanted pregnancy the things that matter are any initial risks, the ambience of the antenatal clinic, the availability of the information needed to decide on any tests, and, if uncertainties crop up, an easily accessible account of the options available as well as the gestational age at which a clear diagnosis can be established. The couple's decisions must be informed. In this context it was alarming that nine years ago 12% of antenatal records for pregnancies where the subsequent diagnosis was Down's syndrome did not document whether counselling had been given about risks, prenatal tests, or the available options.[9]

Couples whose pregnancy is shown by screening to be at greater risk, and the few in whom serious fetal abnormalities are confirmed, must be given the information in an appropriate setting and in such a way that they can make the decision that is best for their family. Doctors often allow insufficient time to tackle the sensitive disclosure of possible or confirmed bad news. Since this is partly a training issue, we have developed seminars for senior medical students in Nottingham on breaking bad news (Raeburn JA, Walker D, Raeburn AR, unpublished), but information already exists which every obstetrician, fetomaternal medicine expert, and geneticist should study.[10] In general clinicians are not good at providing patients with opportunities to take informed decisions, especially when the concepts or procedures are complex.[11]

Those planning a pregnancy and the professionals who help them all need to ensure that relevant risks are addressed using evidence based methods. A forthcoming report of the National Screening Committee will make recommendations about screening in pregnancy for conditions such as Down's syndrome. Also, several comparative studies of serum screening and nuchal thickening as discriminators for pregnancies at higher risk will shortly report their results, as well as studies on

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serum markers such as PAPP-A,[12] which are valid earlier in pregnancy.

In the meantime Howe et al say that serum screening for an increased risk of Down's syndrome is so firmly established "that it is unlikely that it will ever be tested properly." Initially I found myself agreeing that a randomised controlled trial was unlikely. Yet what a bad precedent against evidence based medicine that sets. If relevant, change is essential, backed by evidence. The changing nature of the population who want screening and the relentless development of new approaches make audit—if not trials—vital. If adjacent health districts decide on different policies this provides opportunities for continuing comparative audit, involving clinicians, managers, and scientists who passionately believe in their own system.

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Radiation doses in computed tomography

The increasing doses of radiation need to be controlled

Computed tomography has made dramatic advances, both in its breadth of application and in its technological improvements. The advances are such that it is possible with the spiral technique to carry out an entire examination of the chest within a single breathhold as against a few minutes in earlier systems. Yet these advances have brought with them the potential for greatly increased doses of radiation to the patient.

Until a few years ago computed tomography constituted about 2-3% of all radiological examinations but contributed about 20-30% of the total radiation load from medical use of ionising radiation.[1 2] A recent report from the Royal College of Radiologists in the United Kingdom states, "CT now probably contributes almost half of the collective dose from all *x* ray examinations."[3] Although magnetic resonance imaging was expected to reduce the frequency of computed tomography, this has not happened. Indeed, the use of computed tomography has grown. It is now often used as an adjunct to radiotherapy or chemotherapy; interventional procedures use computed tomography for fluoroscopy and angiography; computed tomography equipment is available in operating theatres and postoperative areas; and the technique is increasingly used in children. All these contribute to an increased use of computed tomography and of high doses of radiation to patients. Europeans have long been concerned about these high doses—the recent European Union Euratom directive categorises computed tomography and interventional radiology as procedures that expose patients to high doses of radiation—but other parts of the world also need to take the risks seriously.

Typical computed tomography of the chest gives a radiation dose equivalent to 400 chest radiographs (chest tomography ≈8 mSv; chest radiography = 0.02 mSv).[3] Computed tomography of the thoracic spine, mediastinum, abdomen, liver, pancreas, kidney, lumbar spine, and pelvis is associated with effective doses of >5 mSv (equivalent to over 250 chest radiographs) and in some cases as high as 30 mSv (equivalent to 1500 chest radiographs). Furthermore, the dose to the breast in many thoracic examinations ranges from 18 to 33 mSv,[4] while the dose to the lens of the eye is around 30 mSv in computed tomography of the head, about 70 mSv in scanning of sinuses, and about 10-130 mSv in scanning for orbital trauma.

Wall and Hart reported a 30% reduction in doses of radiation from common radiological procedures compared with 10 years ago but an increase in radiation doses of about 35% for computed tomography of the abdomen and pelvis.[5] This may be based on the collective dose, which depends on the frequency of examination, but individual doses are not reducing, because larger areas are being included in each examination. There is a common belief that the shorter the examination the lower the dose, but that is not so.

What can be done to reduce these high doses? There may be alternative examinations. For example, Dixon has suggested that the role of computed tomography in following up of testicular cancer should be reconsidered.[6] The abdomen could be examined with ultrasound and magnetic resonance imaging and the chest with low dose computed tomography, though it may seem more attractive in terms of speed and cost to perform the whole study involving chest and abdomen with computed tomography. Furthermore, many UK departments have already reduced to a minimum the number of computed tomography examinations for intra-abdominal disease alone.[6] In recent years

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