

# Retrospective audit of different antenatal screening policies for Down's syndrome in eight district general hospitals in one health region

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## Abstract

**Objective** To compare the effectiveness of different screening policies for the antenatal detection of Down's syndrome.

**Design** Retrospective six year survey.

**Setting** Maternity units of eight districts.

**Participants** Women who completed their pregnancies between 1 January 1994 and 31 December 1999 (155 501 deliveries).

**Main outcome measures** Cases of Down's syndrome identified before 24 weeks' gestation.

**Results** 335 cases of Down's syndrome were identified, 323 in continuing pregnancies or liveborn children. Of these, 171 were identified antenatally. Seven different screening policies were used, in three principal groups: serum screening offered to all mothers, maternal age with serum screening or nuchal translucency available to limited groups, and maternal age combined with anomaly scans. The districts that used serum screening detected 57%, those using maternal age plus serum or nuchal translucency screening 52%, and those using a maternal age of  $\geq 35$  and anomaly scans detected 54%. The least successful district, which offered amniocentesis only to women aged over 37 years, detected only 31%. If amniocentesis had been offered from 35 years, as in all other districts, the detection rate would have risen to 54%. Across the region 15% (range 12-20%) of pregnant women were 35 years or more at delivery, and 58% (33-69%) of infants with Down's syndrome were born to women in this age range.

**Conclusions** Current additional serum or nuchal translucency screening techniques for antenatal detection of Down's syndrome are less advantageous than previously supposed. More pregnant women were aged over 35 than has been presumed in statistical models used in demonstration projects of serum screening and, as a result, the proportion of affected fetuses in this age group is much greater than predicted.

## Introduction

Screening for Down's syndrome has become an accepted part of routine antenatal care, but there is wide variation between districts in the policy used. On the advice of the antenatal subgroup of the National Screening Committee in April 2001 the UK government announced that by 2004 all pregnant women should be offered serum screening in the second trimester to increase the antenatal detection of Down's syndrome and to reduce the amniocentesis rate.

There have been no controlled trials showing the effectiveness of this system compared with screening by maternal age in units that offer routine anomaly scanning. We carried out a comparative audit of antenatal screening in adjacent health districts to

determine whether serum screening is justified by an increase in the detection rate of Down's syndrome or by a reduction in the rate of invasive procedures.

## Methods

We used the Wessex antenatally detected anomalies register to ascertain all cases of Down's syndrome detected in pregnancy (including deliveries, miscarriages, or terminations) or postnatally in the region in the six years from 1 January 1994 to 31 December 1999. We considered cases to have been successfully diagnosed antenatally if they were detected before 24 weeks' gestation, a stage in pregnancy when termination can still be offered.

## Results

In the six years studied, 155 501 babies were delivered in the region in the eight district hospitals, their associated community hospitals, or at home. In total 335 cases of Down's syndrome were detected during pregnancy or in newborn babies, giving an overall incidence of 2.1 per 1000 deliveries (95% confidence interval 1.9 to 2.3). In 1989 the national incidence was 1.4 per 1000 live births.<sup>1</sup> In 12 cases the pregnancies had already failed as a result of missed abortions or miscarriage and so would not have led to a live child. We confined the analysis to the 323 continuing pregnancies.

Across the region 15% of pregnant women were aged 35 or more. Overall, 186 (58%, 53% to 63%) affected pregnancies were in women aged 35 years and over, suggesting that if maternal age was the only indication for offering invasive testing a high proportion of cases would be detected. Among the eight districts, there were seven different screening policies for Down's syndrome (table 1).

### Detection rates of Down's syndrome—all ages

The overall antenatal detection rate was 171/323 (53%, 48% to 58%). Table 2 shows the proportion detected antenatally in each district and the screening methods that prompted an offer of an invasive procedure. There was no significant advantage to any screening policy, and the addition of more screening tests did not produce an additive effect.

In 1993, when serum screening was introduced to districts A and B, the uptake was about 85%, but by 1999 this had dropped to 55% in district A and 65% in district B. As a result, only 24% of affected fetuses were detected after serum screen results that indicated a high risk (table 2). The remainder were detected as a result of other indications for invasive testing. Some women aged over 35 years opted directly for amniocentesis, and in others an abnormal scan result led to the diagnosis of Down's syndrome. In these dis-

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**Table 1** Screening methods for Down's syndrome and local scanning policies

District	Serum screening	Nuchal thickening	Dating scan	Anomaly scan	Maternal age*
A	Yes	No	16 wks	No	No
B	Yes	No	12 wks	Yes	No
C	No	Yes (for $\geq 34$ years)	No	Yes	Yes
D	No	Yes	No	Yes	Yes
E	Offered privately	Offered privately	No	Yes	Yes
F	No	No	No	Yes	Yes
G	No	No	No	Yes	Yes
H	No	No	No	Yes	Yes (for $\geq 37$ years)

\*Offered at 35 years unless specified.

districts, among women who accepted serum screening its sensitivity was 43% in women aged under 35 years and 80% in women over 35 years.

#### Detection rates in women aged under 35 years

One of the arguments advanced for methods such as nuchal translucency and serum screening is that they would increase the detection rate of Down's syndrome in young women. The overall detection rate in women aged under 35 was 47/137 (34%, 26% to 42%). There were differences between the districts but these were not significant (see the full version of this paper on [bmj.com](http://bmj.com)).

There were 90 cases that were not diagnosed before 24 weeks' gestation in women under 35 years. In 57 there was no indication for invasive testing under the local policy, though nine fetuses had unrecognised heart abnormalities that were detected postnatally. In the 33 other cases, seven women had refused serum screening, 15 women had false negative results on serum screening and six had false negative results on nuchal scanning, three women declined invasive testing after nuchal or serum screens that indicated high risk, and two cases were in twin pregnancies with one affected fetus.

#### Detection rates in women aged 35 years and over

Districts that screened by maternal age might be expected to detect all cases in women aged  $\geq 35$  years, whereas other screening methods would miss some of these cases. Across all districts, 186 cases of Down's syndrome occurred in older women and 124 (67%, 60% to 74%) were detected antenatally. Of the 62 missed antenatally, in 10 (16%) test results were falsely

### What is already known on this topic

Serum screening for Down's syndrome has been presumed to be more effective than screening by maternal age

There have been no controlled studies comparing serum screening with screening by maternal age, and its greater efficacy has been presumed from mathematical modelling, which assumed that only 5% of pregnant women were aged over 35 years

The modelling predicted that only 20-30% of cases of Down's syndrome would arise in women aged over 35 and made no allowance for the effects of routine anomaly scanning

### What this study adds

15% of pregnant women were aged over 35 years, more than double the 5-7% presumed in statistical models of screening

58% of babies with Down's syndrome were born to women aged 35 years or more

Serum screening and nuchal scanning did not achieve significantly higher antenatal detection rates of Down's syndrome than the use of maternal age and routine anomaly scanning

negative (three serum screen, seven nuchal scans), in 43 (69%) women declined antenatal diagnosis, and in five (8%) invasive testing was declined as the pregnancy was twin. Finally, four (7%) in women aged  $\geq 35$  were undetected in district H, where the policy was to offer invasive testing only to women over 37 years. Among all women  $\geq 35$  years and over who had affected fetuses, 23% (43/186) refused a diagnostic test.

#### Invasive procedure rates

The rates of amniocentesis and chorionic villus sampling varied from 2.8% in the district with the youngest maternal population (D) and 4.2% in district H, where amniocentesis is offered to women aged 37 years and over, to 7.7% in district E, which had the old-

**Table 2** Indication for invasive test that resulted in antenatal diagnosis of Down's syndrome before 24 weeks' gestation by district for 1994-9

District	Detected antenatally				Total	Detected at/after birth	Proportion detected antenatally % (95% CI)	Total cases
	Serum screen	Nuchal thickening	Anomaly Scan	Maternal age/previous affected pregnancy				
A	16	0	11	6	33	25	57 (44 to 70)	58
B	6	5	4	4	19	14	58 (41 to 75)	33
A&B serum screen combined	22	5	15	10	52	39	57 (47 to 67)	91
C	1	20	8	8	37	33	53 (41 to 65)	70
D*	0	2	1	2	5	7	42 (14 to 70)	12
E	6	1	6	6	19	16	54 (38 to 71)	35
C,D,&E $\geq 35$ years, nuchal thickening, serum screen	7	23	15	16	61	56	52 (42 to 62)	117
F	1	7	10	20	38	23	62 (50 to 74)	61
G	2	1	2	10	15	23	40 (24 to 56)	38
F&G $\geq 35$ years scan	3	8	12	30	53	46	54 (44 to 64)	99
H	0	0	0	5	5	11	31 (8 to 54)	16
Total	32 (10%)	36 (11%)	42 (13%)	61 (19%)	171 (53%)	152 (47%)	53 (48 to 58)	323

\*Data for 1997-9.

est maternal population. District F is a referral centre and its rate is raised by having cases referred from other districts. The invasive procedure rate for local women in district F averaged 5.4%. Thus about 1.4% of invasive procedures were performed on women referred from elsewhere.

## Discussion

We found no evidence that serum and nuchal translucency screening improves antenatal detection rates or reduces rates of invasive procedure. Our findings suggest that the recently announced government initiative to introduce universal serum screening from 2004 will not achieve its stated objectives. The current maternal age distribution observed in our study is different to that used in the demonstration projects; 15% of women who were pregnant during the study period were aged 35 years and over. As a consequence 58% of babies with Down's syndrome were born to women in this age group. This shows a return to levels seen in the 1950s and 1960s, when over 13% of childbearing women were aged 35 and over and more than half of

the children with Down's syndrome were born to women in this age group.<sup>2</sup> In districts with a higher proportion of older women the use of maternal age detects a high proportion of affected fetuses. The addition of routine anomaly scans, which are already offered in most UK health districts, also allows a large proportion of affected fetuses to be detected in younger women.

To avoid continuing the confusion that Down's screening currently causes in pregnant women, we believe that new screening methods should be offered only as part of a controlled study until their benefit is proved.

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# A multicentre observational study of presentation and early assessment of acute stroke

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## Abstract

**Objective** To investigate delays in the presentation to hospital and evaluation of patients with suspected stroke.

**Design** Multicentre prospective observational study.

**Setting** 22 hospitals in the United Kingdom and Dublin.

**Participants** 739 patients with suspected stroke presenting to hospital.

**Main outcome measures** Time from onset of stroke symptoms to arrival at hospital, and time from arrival to evaluation by a senior doctor.

**Results** The median age of patients was 75 years, and 400 were women. The median delay between onset of symptoms and arrival at hospital was 6 hours (interquartile range 1 hour 48 minutes to 19 hours 12 minutes). 37% of patients arrived within 3 hours, 50% within 6 hours. The median delay for patients using the emergency service was 2 hours 3 minutes (47 minutes to 7 hours 12 minutes) compared with 7 hours 12 minutes (2 hours 5 minutes to 20 hours 37 minutes) for referrals from general practitioners ( $P < 0.0001$ ). Use of emergency services reduced delays to hospital (odds ratio 0.45, 95% confidence interval 0.23 to 0.61). The median time to evaluation by a senior doctor was 1 hour 9 minutes (interquartile range 33 minutes to 1 hour 50 minutes) but was undertaken in only 477 (65%) patients within 3 hours of arrival. This was not influenced by age, sex, time of

presentation, mode of referral, hospital type, or the presence of a stroke unit. Computed tomography was requested within 3 hours of arrival in 166 (22%) patients but undertaken in only 60 (8%).

**Conclusion** Delays in patients arriving at hospital with suspected stroke can be reduced by the increased use of emergency services. Over a third of patients arrive at hospital within three hours of stroke; their management can be improved by expediting medical evaluation and performing computed tomography early.

## Introduction

Stroke is a leading cause of death and long term disability and is associated with high costs.<sup>1 2</sup> Recent studies show that thrombolysis is an effective treatment in selected patients but needs to be undertaken within three hours and no later than six hours from the onset of symptoms.<sup>3-6</sup> Most guidelines emphasise the rapid assessment of patients with suspected stroke,<sup>7</sup> but this is not the case for most patients.<sup>8-10</sup> Studies in the United States have shown that underutilisation of emergency medical services and delays in hospital assessment are important impediments to thrombolysis,<sup>11-19</sup> which can be modified readily to improve the care of stroke.<sup>11-13</sup>

The uptake of thrombolysis has been more cautious in the United Kingdom than it has in North America and western Europe for two reasons.<sup>20 21</sup>

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