Choice of serum markers in antenatal screening for Down's syndrome
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Screening for Down's syndrome using: a) double test (alpha fetoprotein (AFP) and human chorionic gonadotropin (hCG)); b) triple test (AFP, unconjugated oestriol (uE(3)), hCG); c) quadruple test (AFP, uE(3), the freed alpha subunit of hCG, and either total or free beta-hCG).

Type of intervention
Screening

Economic study type
Cost-effectiveness analysis.

Study population
A hypothetical group of pregnant women.

Setting
A hospital outpatient maternity care centre in the United Kingdom.

Dates to which data relate
These are not clearly stated, but reference is made to the period 1989-1991.

Source of effectiveness data
Effectiveness data was derived from a study not yet published at the time of the present publication.

Link between effectiveness and cost data
Not clearly stated.

Study sample
Serum samples from 77 pregnancies with Down's Syndrome and 385 matched controls. White women.

Study design
Prospective study of antenatal serum that was routinely stored.

Analysis of effectiveness
Performance of Down's syndrome screening at 15-22 weeks' gestation, false positive rates and reduction of fetal losses
through amniocentesis for each Down’s syndrome pregnancy diagnosed.

**Effectiveness results**
Given a gestation age is estimated by ultrasound scan (rather than by dates to last menstrual period), the detection rate for a 5% false positive rate was 58% for the double test; 67% for the triple and 72% for the quadruple (using free beta-hCG). At all levels of detection the quadruple test is associated with a lower false positive rate and lower fetal loss rate.

**Clinical conclusions**
The use of total or free beta-hCG had no effect on the performance of the double or triple tests, but did have an effect on the quadruple test.

**Measure of benefits used in the economic analysis**
Cases of Down’s Syndrome diagnosed, false positive rates and reduction of fetal losses through amniocentesis for each Down’s syndrome pregnancy diagnosed.

**Direct costs**
The costs included: serum test (biochemical analysis, interpretation of the tests, provision of information to the patients and counselling women with positive tests) and cost of diagnosis (costs of amniocentesis and karyotyping). Costs data were derived from the literature. Costs and quantities were not reported separately.

**Currency**
UK pounds sterling (£).

**Sensitivity analysis**
Not performed.

**Estimated benefits used in the economic analysis**
At all levels of detection the quadruple test was associated with a lower false positive rate and lower fetal loss rate. If the screening programme was carried out at a 5% false positive rate and the gestational age estimated by scan, the quadruple test would achieve detection rates 5% higher than triple tests and 14% higher than double tests.

**Cost results**
The costs of screening 1000 women are reported to be: 18,000 for the double test, 21,000 for the triple test and 22,000 for the quadruple test.

**Synthesis of costs and benefits**
If the false positive rate were kept constant at 5% and detection rates of the tests were greater than 65%, then, given that the gestational age was estimated by the date of last period and there was a 75% uptake of amniocentesis by screen positive women, the cost per case diagnosed of Down’s syndrome would be: 34,000 for the double test, 36,000 for the triple and 35,000 for the quadruple. If the gestational age was estimated by scan all the tests would cost 32,000 per case diagnosed of Down’s syndrome.

**Authors’ conclusions**
At a detection rate of 65% or above, the quadruple test was financially more cost-effective than the triple test.
The study was under-reported. In particular more information is required on the cost breakdown and how the authors incorporated loss arising from aborted foetuses which were subsequently found not to suffer from Down’s syndrome. Also, there was no consideration given of existing screening protocols, where an age cut-off alone can detect approximately 15% of all Down’s syndrome births. Finally, an incremental analysis would have been useful to reach a comprehensive conclusion.

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