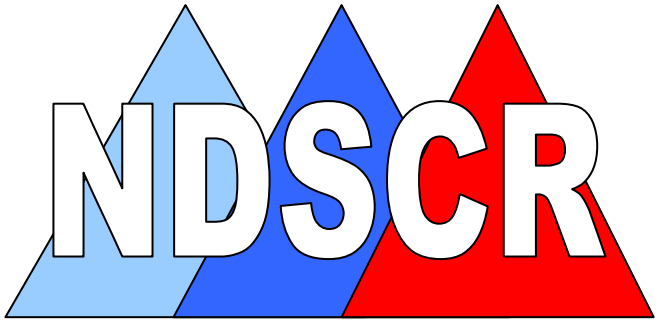
The National Down Syndrome Cytogenetic Register

2006 Annual Report

(data collection funded by the National Screening Committee)



Web site: www.wolfson.qmul.ac.uk/ndscr
Phone: +44 (0) 20 7882 6274 / 6220
Fax: +44 (0) 20 7882 6221
Email: ndscr@qmul.ac.uk

Foreword

This 2006 annual report contains information about the NDSCR – who we are and what we do as well as detailed data on all reported cases of Down syndrome diagnosed cytogenetically from 1989 to 2006 and cases of Edwards syndrome (trisomy 18) and Patau syndrome (trisomy 13) diagnosed from 2004 to 2006.

We would like to thank all the individuals who contribute to the NDSCR to make it such a valuable resource. We hope that we can continue to count on their collaboration.

Joan Morris – Director NDSCR
Eva Alberman
David Mutton
Haiyan Wu
Annabelle Stapleton
Beth de Souza
Khadeeja Wahid

Executive Summary

- The NDSCR is approved to gain support under Section 60 of the Health and Social Care Act 2001 and has ethical approval from Trent MREC.
- The NDSCR has continued to maintain a near complete record of all Down syndrome diagnoses in England and Wales in 2006.
- In 2006 there were 1,877 diagnoses of Down syndrome, of which 60% were prenatally diagnosed.
- In 2006 there were 741 Down syndrome live births, a live birth rate of 1.2 per 1000 (these figures are provisional as there are a large number of missing outcomes).
- In 2006 there were 204 diagnoses of Patau and 461 diagnoses of Edwards syndrome of which 22 and 60 respectively were live births.
- At present the large number of missing outcomes is unacceptable (16%). This is lower than the 20% in last years annual report, but we hope that by working with the local screening co-ordinators we will be able to reduce this further.
- Data collection by the NDSCR is funded by the National Screening Committee. The NDSCR is working with the regional and local screening co-ordinators to help them fulfil their audit function.

April 2008

Contents

Other Websites

DS Medical Interest Group
www.dsmig.org.uk

Down syndrome Association, UK
www.dsa-uk.com

Down Syndrome Health Issues
www.ds-health.com

Association of Clinical Cytogeneticists
www.cytogenetics.org.uk

Introduction

The NDSCR is based at the Centre for Environmental and Preventive Medicine, Wolfson Institute of Preventive Medicine, Queen Mary's in London. The register is funded by the National Screening Committee.

Aims of the NDSCR

The NDSCR was started in 1989 and we aim to collect all cytogenetic or DNA reports of trisomies 21, 18 and 13 and their cytogenetic variants occurring in England and Wales. These data can then be used to help:

- monitor the Down syndrome antenatal screening and diagnostic services and the impact they have on the diagnoses of trisomies 18 (Edwards syndrome) and 13 (Patau syndrome);
- provide data on annual numbers of affected births to help those planning for their health, educational and social care;
- provide information for research into the epidemiology of Down, Edwards and Patau syndromes.

How the NDSCR works

All cytogenetic laboratories in England and Wales collaborate with the NDSCR and provide, on standard forms, a notification of all prenatal and postnatal diagnoses of Down, Edwards and Patau syndromes. (Appendix A gives a list of all 19 laboratories and a copy of the form used in 2006 is shown in Appendix B). The form is self-copying and has 4 pages. The top copy is sent to the NDSCR by the laboratory, the 2nd (blue) and 3rd (green) are sent to the referring clinician and the 4th (pink) sheet is retained by the laboratory. The clinicians are asked to forward the 3rd (green) copy to the local screening co-ordinator, who is usually based within the Antenatal Unit at referring hospital. **No direct contact is ever made with the mothers by the NDSCR.**

What data are collected

The notification form contains details of the chromosome analysis and some information on the mother and child, including postcode of residence, mother's age, length of pregnancy, the reason for referral for diagnosis and antenatal screening information. To preserve anonymity, the data do not include full names or addresses, but include enough information to enable us to identify duplicate registrations.

Data completion and processing

Postnatal diagnoses

Postnatal diagnoses include all diagnoses made after the birth of the child (both live and still) or miscarriage if it occurs after 20 weeks or more gestation. We do not include cases that have been diagnosed after a miscarriage before 20 weeks, as not all such early miscarriages are karyotyped. Inclusion of later miscarriages is a change of policy this year which we have applied it to all earlier years data, because we believe this is likely to be a complete sample and it is consistent with the practice of other congenital anomaly registers.

Follow-up of prenatal diagnoses

For all prenatal diagnoses we request the referring physicians to inform us of the date and gestational age at the outcome of the pregnancy (birth, termination or miscarriage). The data we have on outcome show that after the prenatal diagnosis of Down syndrome 94% of affected pregnancies are legally terminated and 6% are continued, some miscarrying naturally and some ending as stillbirths. There is often a time lapse before we are informed of these outcomes (see below).

How the data are stored

The data are entered onto password-protected computers kept in locked offices. The full data are accessible only to the research team.

Validation of data

In order to ensure high levels of ascertainment, the data are matched with those held by the National Statistics Congenital Anomaly System and some of the Regional Congenital Anomaly Registers. In previous years this has shown the NDSCR data on births to be over 94% complete. Annual lists are sent to the laboratories for them to check that all cases have been registered.

Data quality

The Table in Appendix C gives the proportion of missing data on forms for the years 1989 to 2003 combined; and separately for 2004, 2005 and 2006. This is always highest in the most recent data where the clinicians have not yet been contacted. Requests for missing data are sent out regularly. The major problem is to ascertain the outcome of prenatally diagnosed pregnancies, particularly where the referral has been from a centre other than that where the mother was booked. This occurs for private referrals which have risen sharply over the years. Missing data for variables other than outcome are rare, with the exception of the numbers of previous pregnancies, a question that may not be seen as relevant by the clinicians, although it is important in terms of risk of recurrence. There have been many changes in postcodes since the start of the register and the same is true for health authority definitions. Regular recoding is carried out to keep these up-to-date.

Speed of reporting

Although most laboratories provide data within six months of the diagnoses we are hopeful that the involvement of the National Screening Committee and local screening co-ordinators will speed up the provision of outcome data, and provide more complete information on pregnancy history. We are also developing a web site to enable the laboratories to complete the forms online in the future if they wish.

Data confidentiality and informed consent
Personal information held on a computer system is safeguarded by the Data Protection Act 1998 and the NDSCR is registered under this Act.

The Government has made it clear that informed consent is a fundamental principle governing the use of patient identifiable information. However it also recognises that situations arise where informed consent cannot practicably be obtained. Section 60 of the Health and Social Care Act 2001 provides a power to ensure that patient identifiable information needed to support essential NHS activity can be used without the consent of patients. The Act requires that the National Patient Information Advisory Group (PIAG) consider applications to use patient identifiable information without full informed consent. Since 2003, the NDSCR as a part of the British Isles Network of Congenital Anomaly Registers (BINOCAR) has been given permission to operate without informed consent. In 2006 the application of the NDSCR for ethics approval from the Trent multi-centre research ethics committee (MREC), as part of BINOCAR, was also approved.

How the data are used

Audit of Down Syndrome Screening

- All local screening co-ordinators should receive the green copy of the NDSCR form to assist them in their audit requirements.

- Annual reports are produced describing numbers of prenatal and postnatal diagnoses, and the methods of prenatal screening which led to prenatal diagnoses.

- More detailed information is regularly published in medical journals.

Feedback

- NDSCR leaflets giving information on the trends in Down syndrome diagnosis are produced annually and distributed to cytogenetic laboratories, local screening co-ordinators and clinicians.

- The NDSCR web site is regularly updated.

- Information is provided on request to journalists, charities and other interested parties.

Recent special studies

In-house studies

1) By combining data from the NDSCR and data from registries who are members of EUROCAT (European Concerted Action on Congenital Anomalies and Twins) we are investigating the risk of a woman having a Down syndrome pregnancy given that she has already had a pregnancy affected with trisomy 13 or 18.

2) We have demonstrated that the risk of natural fetal loss in Down syndrome pregnancies increases with the age of the mother more steeply than this risk in chromosomally normal pregnancies.

3) By combining data from the NDSCR and data from registries who are members of BINOCAR we are estimating the prevalence of trisomies 13 and 18 according to maternal age and gestational age.

Collaborative studies

1) We are continuing our collaboration with the National Childhood Cancer Register, to estimate the age-specific risk of leukaemia in children with Down syndrome, where we are able to provide denominator data for children on their register.

2) We are collaborating with the Children with Down's Syndrome Study (St James' University Hospital in Leeds and the Epidemiology & Genetics Unit at the University of York) to ensure they have identified all the children.

Future studies

1) In 2006 we started collecting data on whether women had been offered screening and had accepted or rejected the offer. Once more data is available we will be reporting on the completeness and efficacy of screening for Down syndrome in England and Wales.

Publications
A list of publications based on, or using NDSCR data, are given in Appendix D.

The NDSCR Steering Committee

A steering committee was established in 2004 to be an independent source for :

a) Monitoring the progress of the register towards its overall objectives;
b) Advising on the strategies for the use and development of the register;
c) Advising on the undertaking and conduct of new research projects;
d) Providing technical advice.

The membership is :

Dr Joan Morris (chair)	NDSCR
Dr Jenny Kurinczuk	National Perinatal Epidemiology Unit.
Dr Karl Murphy	Imperial College
Ms Susannah Seyman	The Down's Syndrome Association
Dr Jonathan Waters	NE London Regional Cytogenetics Laboratory

The Data in the NDSCR

Down syndrome cases diagnosed in 2006

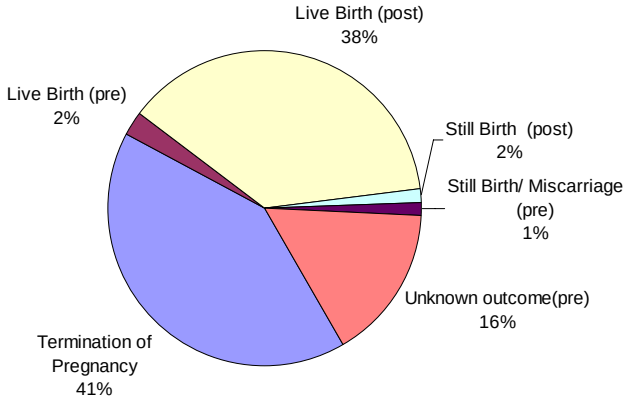
1877 Down syndrome diagnoses were made in 2006, 1132 (60%) prenatally and 745 (40%) postnatally (Table 1, Figure 1). The outcome of 293 of the prenatal diagnoses is as unknown. Assuming that their proportion terminated remains as before 2006, the likely number of Down syndrome live births in England and Wales in 2006 would have been 767 (46+ 703 + 6% of 293), a prevalence of 1.2 per 1000 livebirths occurring in England and Wales in 2006.

Table 1: Down syndrome cases diagnosed in 2006* by time of diagnosis and outcome.

		No.	%
Prenatal	Termination of pregnancy	767	41
	Live Birth	46	2
	Still Birth / Miscarriage	26	1
	Unknown outcome†	293	16
		1132	60
Postnatal	Live Birth	703	38
	Still Birth / Fetal death	42	2
		745	40
Total		1877	100

* 2006 data are provisional.
† About 6% of those with unknown outcomes are likely to result in a live birth.

Figure 1: Down syndrome diagnoses in 2006*
(pre= prenatal diagnosis, post = postnatal diagnosis)



* 2006 data are provisional.

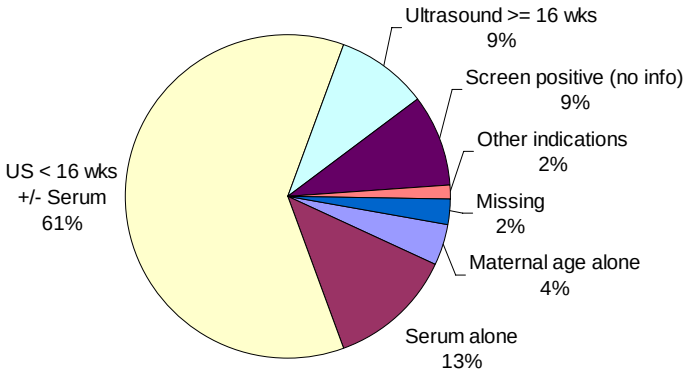
Indication for prenatal karyotyping

Figure 2 shows that in 60% of all prenatally diagnosed cases the indication mentioned was an early ultrasound (likely to have been a nuchal translucency (NT) measurement) with or without serum screening, in 13% it was a serum screening test result and in 9% it was an ultrasound at 15 weeks or later. For 9% of cases there was an indication of a positive screening test result, but the precise screening test was not specified.

Gestational age at prenatal diagnoses

Of the 1129 prenatally diagnosed cases with gestational age, 27% were diagnosed before 13 weeks, 67% before 17 weeks and only 10% over 21 weeks gestation (Table 2). This pattern reflects the type of screening that had led to the prenatal diagnosis.

Figure 2: Indication for prenatal karyotyping in 2006*



*2006 data are provisional.

Table 2: Down syndrome cases diagnosed prenatally according to gestational age at diagnoses in 2006*

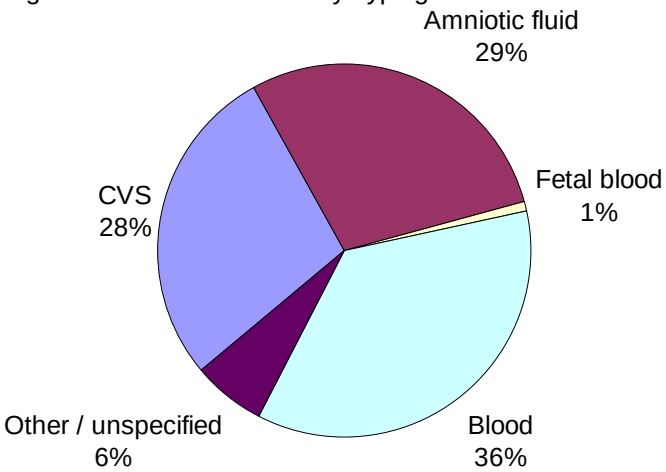
Gestational age (wks)	No.	%
<13	308	27
13-	232	20
15-	222	20
17-	190	17
19-	69	6
21+	108	10
Total	1129	100

* 2006 data are provisional ; 3 diagnoses have missing gestational ages.

Tissue used for karyotyping

In 2006 similar proportions of women had amniocentesis compared with chorionic villus sampling (29% and 28% respectively) (Figure 3). The median time from CVS sampling to termination of pregnancy was 7 days compared with 8 days for amniocentesis. 91% of all terminations following CVS were within 14 days of the procedure compared with 87% for amniocentesis.

Figure 3: Tissue used for karyotyping in 2006*



*2006 data are provisional.

Maternal age at diagnosis

The mean age of the mother at the time of diagnosis of fetal Down syndrome was 37, and 62% (1044/1690) of the mothers of known age were between 35 and 44 years (Table 3).

Table 3: Down syndrome cases diagnosed in 2006* according to maternal age at diagnosis

Maternal age (years)	No.	%
<20	18	1
20-	92	5
25-	156	8
30-	339	18
35-	587	31
40-	457	24
45+	41	2
missing	187	10
Total	1877	100

* 2006 data are provisional.

Patau and Edwards syndrome cases diagnosed in 2006

Around 86% of Patau and Edwards syndrome diagnoses were made prenatally (Table 4), with only a small proportion of all diagnoses being live births.

Table 4: Patau and Edwards syndrome cases diagnosed in 2006* by time of diagnosis and outcome.

		No.	%
Patau syndrome			
Prenatal	Termination of pregnancy	131	64
	Live Birth	6	3
	Still Birth / Miscarriage	1	1
	Unknown outcome†	38	18
Postnatal	Live Birth	16	8
	Still Birth / Fetal death	12	6
	Total	204	100
Edwards syndrome			
Prenatal	Termination of pregnancy	266	58
	Live Birth	8	2
	Still Birth / Miscarriage	15	3
	Unknown outcome†	105	23
Postnatal	Live Birth	52	11
	Still Birth / Fetal death	15	3
	Total	461	100

* 2006 data are provisional; † NK: unknown

The main indication for karyotyping was an early ultrasound (likely to have been an NT measurement) with or without serum screening, with around one third due to an ultrasound scan after 15 weeks (Table 5).

Regional differences in cases diagnosed in 2006

Table 6 shows the patterns of diagnoses of Down syndrome across England and Wales, according to the mothers region of residence. The proportion of cases diagnosed prenatally varies from 48% in North East GRO to 73% in East of England GRO. Women in the regions with a higher proportion of referrals due to an ultrasound scan before 16 weeks (probably nuchal translucency measures in the first trimester) were more likely to have had a CVS than an amniocentesis.

Table 5: Prenatally diagnosed Patau and Edwards syndrome cases in 2006*: Indications for karyotyping

Indication for Karyotyping	Syndrome Patau (%)	Edwards(%)
Serum screening alone	2	2
Ultrasound < 16 weeks +/- serum	59	74
Ultrasound 16+ weeks	33	21
Maternal age alone	2	2
Other	4	1
Total	100	100

* 2006 data are provisional.

Trends over time in Down syndrome Diagnoses

Since the register started collecting data on 1st January 1989 the annual number of Down syndrome diagnoses has increased steadily partly due to increasing maternal age and partly because of the increase in prenatal diagnosis. The proportion diagnosed prenatally has risen from 31% in 1989 to 60% in 2006, and the numbers from 318 to 1132 in 2006. (Table 7 and Figure 4) Since the rate of natural fetal loss in Down syndrome is high, the potential losses in those diagnosed and subsequently terminated early must be adjusted for before looking at the maternal age-related risk of having a Down syndrome birth. When this is done it is evident that although the numbers of Down syndrome diagnoses are rising annually, the maternal age-related risk of having a Down syndrome birth has remained constant since 1989.

There was an increase in the proportion of records mentioning a serum test only as an indication for karyotyping from 5% in 1989 to just under 40% from 1993 to 1996 (Table 8 and Figure 5). This proportion then decreased with the introduction of nuchal translucency measurements as a screening test. In 2006 a serum test only was mentioned as an indication for prenatal diagnosis in 13%, with 61% mentioning an ultrasound before 16 weeks (with or without serum screening). The use of maternal age alone as an indication for karyotyping is decreasing steadily, and in 2006 it was given as an indication in only 4% of prenatal diagnoses.

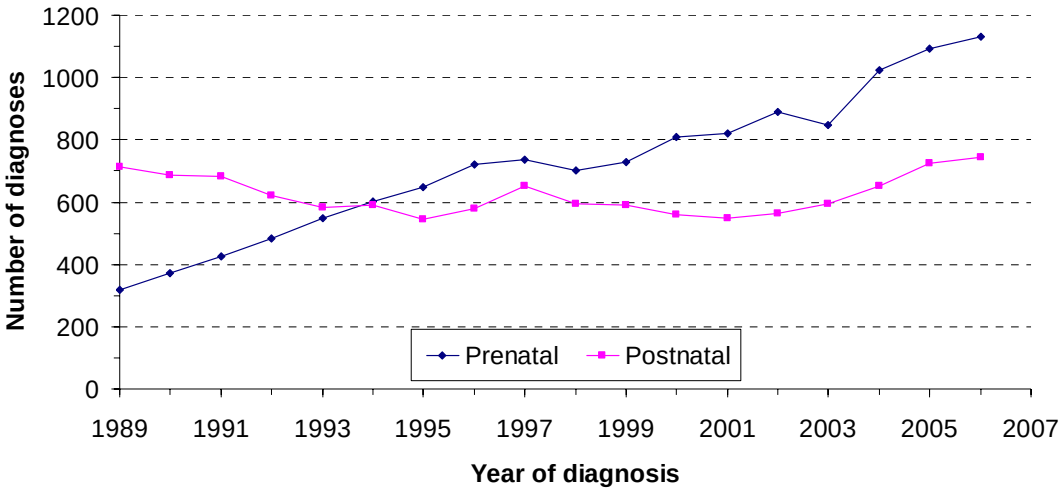
As the screening tests are being done at earlier gestations, an increasing number of women are having chorionic villus sampling (CVS) instead of amniocentesis, the ratios being 18% CVS to 77% amniocentesis in 1989, and 47% to 49% respectively in 2006. (Table 8)

Table 6: Down syndrome diagnoses in 2006 according to Government Regional Office (GRO)*

Government Regional Office	No. of diagnoses	Prenatal diagnoses as % of all diagnoses	Indication for Karyotyping of prenatal diagnoses (%)				Tissue sampled (%)	
			Serum	Ultrasound <16 weeks +/- serum	Ultrasound 16+ weeks	Maternal age alone	CVS	Amnio
North East	87	48	19	62	5	2	17	25
North West	221	52	8	53	12	10	11	36
Yorkshire and the Humber	172	59	18	51	16	4	22	33
East Midlands	126	62	27	44	0	8	27	33
West Midlands	184	51	22	54	10	2	21	27
East of England	203	73	19	59	6	2	33	35
London	381	63	7	70	9	2	38	22
South East	256	66	4	74	8	5	38	25
South West	167	59	8	70	11	5	33	23
Wales	80	58	17	35	20	7	13	40
Total	1877	60	13	61	9	4	28	29

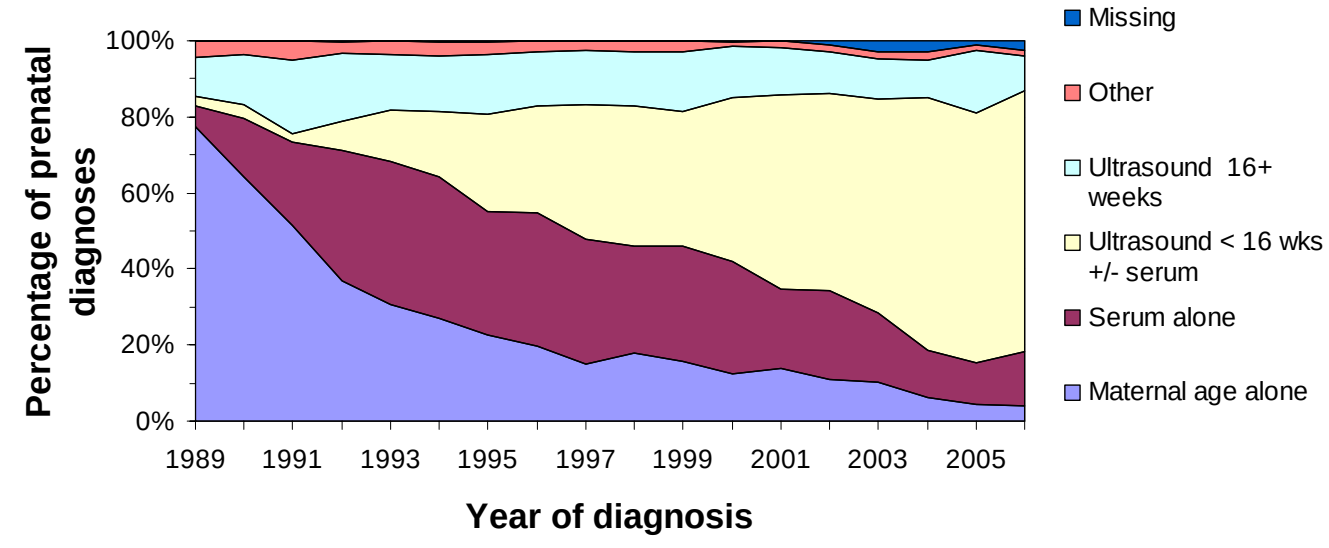
* 2006 data are provisional.

Figure 4: The number of prenatal and postnatal diagnoses according to year of diagnosis



2006 data are provisional.

Figure 5: Indication for karyotyping according to year of diagnosis



2006 data are provisional.

Table 7: Down syndrome diagnoses and outcomes in England and Wales from 1989 to 2006*

Year	No. diagnoses	% prenatal	No. liveborn	No. TOP	No. Misc[+]/ Still	No. Unknown outcome
1989	1,033	31	717	290	18	8
1990	1,055	35	702	324	17	12
1991	1,108	38	704	364	31	9
1992	1,103	44	633	427	25	18
1993	1,130	48	604	498	20	8
1994	1,194	51	608	533	28	25
1995	1,193	54	563	567	38	25
1996	1,302	55	601	654	34	13
1997	1,390	53	665	660	42	23
1998	1,298	54	632	610	22	34
1999	1,321	55	605	644	38	34
2000	1,369	59	594	679	25	71
2001	1,369	60	572	655	33	109
2002	1,451	61	590	686	41	134
2003	1,445	59	625	656	37	127
2004	1,675	61	662	696	66	251
2005	1,815	60	733	737	53	292
2006*	1,877	60	749	767	68	293
Total	24,128	53	11,559	10,447	636	1,486

[+] Miscarriages before 20 weeks gestation that have not been diagnosed prenatally are excluded.
* 2006 data are provisional.

Table 8: Down syndrome prenatal diagnoses 1989 to 2006*

Year	No. of prenatal diagnoses	% of Indication for Karyotyping				% of tissue sampled	
		Serum	Ultrasound <16 weeks +/- serum	Ultrasound 16+ weeks	Age only reason	CVS	Amnio
1989	318	5	3	10	77	18	77
1990	370	16	4	13	64	16	76
1991	424	22	2	19	51	15	73
1992	483	34	8	18	37	10	79
1993	548	38	13	15	31	16	77
1994	603	37	17	15	27	22	69
1995	648	32	26	16	23	25	69
1996	722	35	28	15	20	30	65
1997	738	33	36	14	15	35	61
1998	703	28	37	14	18	36	61
1999	729	30	35	16	16	33	61
2000	808	30	43	13	13	38	60
2001	819	21	51	13	14	45	52
2002	889	23	52	11	11	43	54
2003	849	18	55	11	10	47	52
2004	1,025	12	63	10	6	47	51
2005	1,091	11	64	16	4	46	50
2006*	1,132	13	61	9	4	47	49

* 2006 data are provisional.

Appendix A

List of Cytogenetic Laboratories in England and Wales

1. Northern Genetics Service
2. Central Manchester and Manchester Children's Hospital
3. Cheshire and Merseyside Genetics Service
4. Yorkshire Regional Genetics Service
5. North Trent Genetics Service
6. Nottingham Genetics Service
7. Leicestershire Genetics Centre
8. West Midlands Regional Genetics Service
9. Oxford Regional Genetics Service
10. East Anglia Regional Genetics Service
11. Norwich Molecular and Cytogenetics Service
12. South Western Regional Genetics Service
13. NW Thames Regional Genetics Service
14. NE Thames Regional Genetics Service
15. SW Thames Regional Genetics Centre
16. Guy's and St Thomas' Hospital NHS Trust
17. Wessex Clinical Genetics and Laboratory Service
18. Cardiff, Wales
19. TDL Genetics (Cytogenetics Services up until 20/02/04)

Appendix B

Data Completeness

The following table shows the completeness of the different data items for the years 1989 to 2003, 2004, 2005 and 2006. We are still following up the missing data for 2004 and 2005. The data from 1989 to 2003 are included for comparison purposes to demonstrate the levels we are aiming to achieve for the 2004, 2005 and 2006 data.

Table B1: Completeness of data from 1989 to 2006*

	Percentage complete			
Data Item	1989-2003	2004	2005	2006*
Reason for referral for karyotyping	100	98	97	89
Type of tissue karyotyped	100	99	95	96
Sex of fetus (some DNA based diagnoses such as FISH and q-PCR do not include sex chromosome analysis)	100	97	97	97
Maternal age	96	91	90	90
Gestational age at sample for prenatal diagnosis	100	100	100	100
Outcome of pregnancy†	96	85	85	84
Gestational age at outcome for prenatal diagnosis	90	80	79	80
Number of previous pregnancies	66	64	64	64
Post Codes (some information)	93	92	92	91
(complete postcodes)	83	87	87	89
Maternal NHS number (requested from 2005)	NA	NA	51	54

* 2006 data are provisional.
† A large proportion of the missing outcomes are from one single large private cytogenetic laboratory in London, which analyses samples from women throughout the South East of England. Excluding this lab this percentage complete would be 98%, 93%, 94% and 93% respectively.

Appendix C

Form in 2006

Reference No. 7234 NDSCR |___|___|___|___|___|

NATIONAL DOWN SYNDROME CYTOGENETIC REGISTER

NOW INCLUDING TRISOMIES 13 AND 18 *(In collaboration with the National Screening Committee)*

LABORATORY: PLEASE RETURN THIS FORM TO: **(Please send blue and green copies to the referring clinician)**

Joan Morris, Wolfson Institute of Preventive Medicine, Barts and the London, Charterhouse Square, London, EC1M 6BQ
Telephone: 0207 882 6220 Fax: 0207 882 6221 Website: http://www.wolfson.qmul.ac.uk/ndscr/

PLEASE ENTER CASE DETAILS AND TICK APPROPRIATE BOXES

Laboratory ID |___|___| PLEASE INCLUDE TRISOMIES 13 & 18

Specimen ID |___|___|___|___|___|___|___|___|___|___|

Karyotype .....

STAGE AT DIAGNOSIS

Prenatal |___| Postnatal |___| After miscarriage |___|

INDICATION FOR KARYOTYPE

Screen +ve |___| Mat age alone |___| Postnatal signs |___|

Other referral reasons: .....

(e.g. anxiety, history, ...

ultrasound markers, etc.) .....

Confirmation of previous diagnosis |___|

ID |___|___|___|___|___|___|___|___|

SCREENING TEST (both positive and negative results)

Offered |__| Not offered |__|

Accepted |__| Declined |__| >20 weeks |__| other |__|

Risk 1 in ..... Test result: +ve |__| -ve |__|

Please tick all markers measured

1st trimester		2nd trimester	
NT	|___|	AFP	|___|
Papp-A	|___|	uE3	|___|
Free ß-hCG	|___|	hCG (total or freeß)	|___|
		Inhibin-A	|___|

If other combination, please specify.....

CYTOGENETICS

Tissue		Method of karyotyping	
CVS	|___|	Full	|___|
Amniotic Fluid	|___|	PCR	|___|
Fetal Blood	|___|	FISH	|___|
Postnatal Blood	|___|		
Skin	|___|		
Placenta	|___|		

Other: .....

D D M M Y Y

Date sample taken |___|___|___|___|___|___|

Date of mother's LMP |___|___|___|___|___|___|

Gestation when sample taken |___|___| wks

D D M M Y Y age

Mother's date of birth (age at testing) |___|___|___|___|___|___| |___|___|

Father's date of birth (age at testing) |___|___|___|___|___|___| |___|___|

OUTCOME

Termination |___| Miscarriage |___| Stillborn |___| Liveborn |___|

D D M M Y Y

Date of outcome/ termination/ birth |___|___|___|___|___|___|

Gestation at outcome |___|___| wks

Infant's birth weight |___|___|___|___| gms

Please specify consultant and hospital providing pre/postnatal care

.....

If terminated or delivered elsewhere, please specify hospital:

.....

Number of foetuses / babies in this pregnancy |___|

Sex/ outcome of unaffected twin, triplet, etc.

.....

Number of previous pregnancies: (not including this pregnancy)

Termination |___| Miscarriage |___| Stillborn |___| Liveborn |___|

Previous anomalies (number): Trisomy 21 |___| 18 |___| 13 |___|

Other chrom. anomaly (spec.) .....

If previous anomaly, please specify outcome .....

Mother's usual town of residence:

.....

Postcode |___|___|___|___| |___|___|___| PCT |___|___|___|

Note: (e.g. condition of infant, previous family history, fertility problems, etc.)

.....

.....

.....

(Please continue overleaf)

FOR AUDIT PURPOSES PLEASE COMPLETE

Mother's hospital ID |___|___|___|___|___|___|___|___|___|___|

First 3 letters of mother's surname |___|___|___| Initial |___|

Mother's NHS No. |___|___|___|___|___|___|___|___|___|___|

Infant's hospital ID |___|___|___|___|___|___|___|___|___|___|

Infant's NHS No. |___|___|___|___|___|___|___|___|___|___|

FOR OFFICE USE ONLY

Reference No. 7234 NDSCR |___|___|___|___|___|

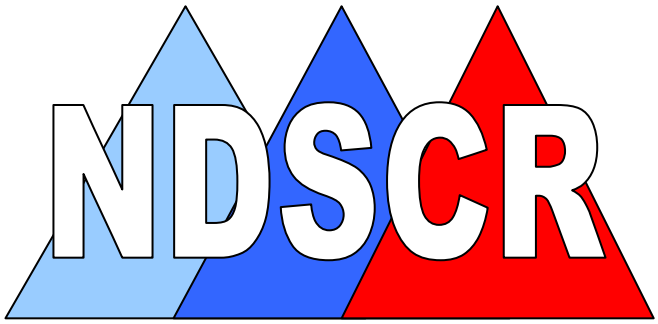
Laboratory |___|___| Trisomy 21 18 13 pren/ postn/ misc

Specimen ID |___|___|___|___|___|___|___|___|

Appendix D

NDSCR Publications

1. Mutton DE, Alberman E, Ide R, Bobrow M. Results of first year (1989) of a national register of Down's syndrome in England and Wales. *BMJ* 1991; **303**:1295-7
2. Mutton DE, Ide R, Alberman E, Bobrow M. Analysis of National Register of Down's syndrome in England and Wales: trends in prenatal diagnosis. *BMJ* 1993; **306**: 431-2.
3. Morris JK, Mutton DE, Ide R, Alberman E, Bobrow M. Monitoring trends in prenatal diagnosis of Down's syndrome in England and Wales, 1989-1992. *J Med Screen* 1994; **1:** 233 - 7.
4. Alberman E, Mutton D, Ide R, Nicholson A, Bobrow M. Down's syndrome births and pregnancy terminations in 1989 to 1993: preliminary findings. *Br J Obstet Gynaecol* 1995; **102**; 445-7.
5. Huang T, Watts HC, Wald NJ, Morris JK, Mutton D, Alberman E. Reliability of statistics on DS notifications. *J Med Screen* 1997; **4**: 94-97. Subsequent letter in same journal.
6. Williamson P, Harris R, Church S, Fiddler M, Rhind J.Prenatal genetic services for Down's syndrome: access and provision. Steering Committee of the National Confidential Enquiry into Counselling for Genetic Disorders. *Br J Obstet Gynaecol* 1996; **103:**676-83.
7. Smith-Bindman R, Waters J, Mutton D, Alberman E. Trends in the effectiveness and efficiency of prenatal Down syndrome (DS) screening in England and Wales, 1989-1999. *J Med Genet* 2001: Supplement 1 SP33.
8. Mutton DE, Alberman ED, Hook EB. (The National Down Syndrome Cytogenetic Register and the Association of Clinical Cytogeneticists) Cytogenetic and epidemiological findings in Down syndrome: 1993. *J Med Genet* 1996; **33**: 387-394.
9. Hook EB, Mutton DE, Ide R, Alberman ED, Bobrow M. The natural history of Down syndrome conceptuses diagnosed prenatally which are not electively terminated. *Am J Hum Genet* 1995; **57**: 875-881
10. Morris JK, Wald NJ, Watt HC. Fetal loss in Down's syndrome pregnancies. *Prenat Diagn* 1999; **19**:142-145
11. Morris JK, Alberman E, Mutton D. Is there evidence of clustering in Down syndrome? *Int J Epidem* 1998; **27**: 495-498.
12. Mutton D, Bunch K, Draper G, Alberman E. Children's cancer and Down syndrome. Abstract in *J Med Genet* 1997; **34**: Supplement 1, S65.
13. Hook EB, Cross PK, Mutton DE. Female predominance (low sex ratio) in 47, +21 mosaics. *Am J Med Genet* 1999; **84**:316-319.
14. Vrijheid M, Dolk H, Armstrong B, Abramsky L, Bianchi F, Fazarinc I, Garne E, Ide R, Nelen V, Robert E, Scott JES, Stone D, Tenconi R. Chromosomal congenital anomalies and residence near hazardous waste landfill sites. *Lancet* 2002; **359**, 320-3.
15. Morris JK, Mutton DE, Alberman E. Revised estimates of the maternal age specific live birth prevalence of Down's syndrome. *J Med Screen* 2002; **9**,2-6
16. Alberman E. The National Down Syndrome Cytogenetic Register (NDSCR) *J Med Screen* 2002; **9**, 97-98 (Editorial)
17. Morris JK, Wald NJ, Mutton DE, Alberman E. Comparison of models of maternal age-specific risk for Down syndrome live births. *Prenat Diagn* 2003,**23**:252-8.
18. Smith-Bindman R, Chu P, Bacchetti P, Waters JJ, Mutton D, Alberman E. Prenatal screening for Down syndrome in England and Wales and population-based birth outcomes. *Am J Obstet Gynecol* 2003; **189(4):** 980-5.
19. Alberman E, Huttly W, Hennessy E, McIntosh A. The use of record linkage for auditing the uptake and outcome of prenatal serum screening and prenatal diagnostic tests for Down syndrome. *Prenat Diagn* 2003 Oct; **23(10):** 801-6.
20. Kovaleva NV, Mutton DE. Epidemiology of double aneuploidies involving chromosome 21 and the sex chromosomes. *Am J Med Genet* 2006; **134A (1):**24-32.
21. Morris JK, de Vigan C, Mutton DE, Alberman E. Risk of a Down syndrome live birth in women of 45 years of age and older. *Prenat Diagn* 2006; **25**:275-8.
22. Morris JK, Mutton DE, Alberman E. Recurrences of free trisomy 21: Analysis of data from the National Down Syndrome Cytogenetic Register. *Prenat Diagn* 2006; **25**:1120-8.
23. Savva GM, Morris JK, Mutton DE, Alberman E. Maternal age-specific fetal loss rates in Down syndrome pregnancies. *Prenat Diagn*. 2006;**26**:499-504.
24. Crane B, Morris JK. Changes in maternal age in England and Wales – Implications for Down syndrome. Down syndrome research and practice 2006;**10**: 41-43.
25. Morris JK, Mutton DE, Alberman E. The proportions of Down's syndrome pregnancies detected prenatally in England and Wales from 1989 to 2004. *J Med Screen* 2006;**13:**163-5.
26. Savva GM, Morris JK. Ascertainment and accuracy of Down syndrome cases reported in congenital anomaly registers in England and Wales. Arch Dis Child Fetal Neonatal Ed (in press)



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Wolfson Institute of Preventive Medicine
Centre for Preventive and Environmental Medicine
Barts and The London
Queen Mary's School of Medicine and Dentistry
Charterhouse Square
London, EC1M 6BQ

Web site: www.wolfson.qmul.ac.uk/ndscr
Phone: +44 (0) 20 7882 6274 / 6220
Fax: +44 (0) 20 7882 6221
Email: ndscr@qmul.ac.uk