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Selected Birth Defects Data from Population-Based Birth Defects Surveillance Programs in the United States, 2006 to 2010: Featuring Trisomy Conditions

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INTRODUCTION

The annual National Birth Defects Prevention Network (NBDPN) Congenital Malformations Surveillance Report includes state-level data on major birth defects (i.e., conditions present at birth that cause adverse structural changes in one or more parts of the body) and a directory of population-based birth defects surveillance systems in the United States. Beginning in 2012, these annually updated data and directory information are available in an electronic format accompanied by a data brief. This year's report includes data from 41 population-based birth defects surveillance programs and a data brief highlighting the more common trisomy conditions (i.e., disorders characterized by an additional chromosome): trisomy 21 (commonly referred to as Down syndrome), trisomy 18, and trisomy 13.

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Additional Supporting Information may be found in the online version of this article.

State-Specific Data Collection and Presentation for Selected Birth Defects

Data collection—The NBDPN Data Committee, in collaboration with the Centers for Disease Control and Prevention (CDC), invited population-based birth defects surveillance programs in the United States to submit data on major birth defects affecting central nervous, eye, ear, cardiovascular, orofacial, gastrointestinal, genitourinary, and musculoskeletal systems, as well as trisomies, amniotic bands, and fetal alcohol syndrome. Table 1 lists these 47 conditions and their diagnostic codes (International Classification of Diseases, 9th Revision, Clinical Modification [ICD-9-CM]; and Centers for Disease Control and Prevention/British Pediatric Association Classification of Diseases [CDC/BPA]).

Participating state birth defects programs provided counts of all cases of the birth defects listed in Table 1 as well as counts of live births and male live births in their catchment areas for births occurring from January 1, 2006 through December 31, 2010. The cases for all defects were reported by maternal census race/ethnic categories: White non-Hispanic, Black/African-American non-Hispanic, Hispanic, Asian/Pacific Islander non-Hispanic, American Indian/Alaska Native non-Hispanic. Additionally, trisomy cases were provided by six categories of maternal age at delivery: less than 20 years, 20 to 24 years, 25 to 29 years, 30 to 34 years, 35 to 39 years, and 40+ years.

Data presentation—State-specific data from 41 population-based birth defects surveillance programs in the United States are available on-line S1-S121. Similar to the previous NBDPN annual reports, the data for each program are presented by 5 maternal racial/ethnic categories for all reported defects and by 2 maternal age categories (less than 35 years, 35+ years) for Down syndrome, trisomy 18, and trisomy 13. Prevalence for each condition was calculated from the following formula to obtain the prevalence per 10,000 live births: (total birth defect cases for any pregnancy outcome for × years/total live births for × years) * 10,000 (Mason et al., 2005). The total live birth denominator is used for all reported birth defects except for hypospadias, which is calculated using a denominator of total male live births.

This data report attempts to present state surveillance data that was uniformly collected; however, differences in program methodology for case ascertainment can be expected, such as the use of different diagnostic coding systems to classify birth defects and varying administrative data sources. Some of these state-specific methods are included in the footnotes of the accompanying tables, but a more detailed description is provided in the state birth defects surveillance program directory, available on-line S122-S172.

Highlighting Trisomies

This year's data brief focuses on the three most common aneuploidies (Down syndrome, trisomy 18, and trisomy 13). Trisomy occurs when there is an extra chromosome resulting in 47 chromosomes instead of 46. Most cases of trisomy involve an extra chromosome in all cells (full trisomy), but sometimes the extra chromosome is only contained in some cells (mosaic trisomy) or just a part of the extra chromosome is present in the affected cells (partial trisomy) (Sherman et al., 2007).

Down syndrome is the most common of these three aneuploidies, occurring in approximately 1 in 691 live births in the United States (Parker et al., 2010). This is followed by trisomy 18, affecting approximately 1 in 3762 live births and trisomy 13, affecting approximately 1 in 7906 live births (Parker et al., 2010).

Ascertainment of trisomy cases among the population-based birth defects surveillance systems includes a range of prenatal and postnatal data sources. These can include administrative databases, such as hospital discharge data, vital records, and Medicaid databases; in-patient and out-patient medical records; and specialty facilities, such as cytogenetic laboratories and prenatal diagnostic facilities. Approximately one-third of the birth defects programs use trained staff or abstractors who review medical records for case finding (active case-finding) while approximately two-thirds rely on hospital reporting and/or administrative databases (passive case-finding). Some of the programs with passive case-finding methodology engage in follow-up activities to confirm the reported cases. State-specific data sources and methodologies are included in the state birth defects surveillance program directory, available on-line S122-S172.

Trisomy Data Presentation

Table 2 presents the counts and live birth prevalence for Down syndrome by six maternal age categories (Table 2a) and by maternal race/ethnicity (Table 2b). The list of states is grouped by pregnancy outcomes reported: live births only, live births and stillbirths, or all pregnancy outcomes. The same stratifications are presented for trisomy 18 and 13 in Tables 3 and 4, respectively. A graphical presentation of the pooled prevalence of state programs by pregnancy outcomes and maternal age group for the trisomies is presented in Figures 1–3. The states that contributed to the pooled prevalence are listed in Tables 2 to 4.

Table 5 highlights the change in prevalence of Down syndrome, trisomy 18 and trisomy 13 by pregnancy outcome during this data reporting period (2006–2010) compared with an earlier reporting period (2000–2004), as published in the 2007 NBDPN Annual Report (NBDPN, 2007).

DISCUSSION

Data Sources

Variability in the observed prevalence of trisomies across states could be due to true differences; however, other reasons may account for the differences observed, including case ascertainment methodology, ability of a surveillance system to capture all affected cases, and state variations for risk factors such as the distribution of maternal age in these populations. State programs vary in the number and type of data sources used to capture cases. The NBDPN data request stipulated that the birth defect counts provided for the report must be based on multiple data sources (not just vital records); however, the number of additional data sources can differ depending on state legislation, data access, and resources. Cragan and Gilboa (2009) noted that the inclusion of prenatal records from perinatal offices and maternal-fetal medicine departments increased the prevalence of chromosomal abnormalities by over 30%. Similarly, Tao et al. (2013) reported an increase

of nearly 8% of all cases of chromosomal abnormalities for the reporting years 2008– 2010 in the New York surveillance registry by including cytogenetic laboratory reports.

Pregnancy Outcomes

In addition to data sources, another possible variation in the reported prevalence is the inclusion of different pregnancy outcomes in the case definition. Approximately one-third of the birth defects programs ascertain cases among live births only, one-third ascertain cases among live births and still births, and the remaining one-third capture cases for all pregnancy outcomes. Several factors affect a program's decision to identify cases among pregnancy ending in nonlive births, such as program purpose, legal authority, and the availability of data. For example, a program designed to provide follow-up services for affected individuals might only ascertain cases among live births.

However, to understand the full impact of trisomies on the population, it is important to consider all pregnancy outcomes. The pooled prevalence from states with all pregnancy outcomes consistently show a higher prevalence, as presented in Figures 1–3, than the pooled prevalence from states with live births only or states with live births and stillbirths. Crider et al. (2008) reported a prevalence of trisomy 18 among live births only at 1.16 cases per 10,000 live births; among all pregnancy outcomes combined (live births, stillbirths, and elective terminations), the prevalence increased to 4.01 cases per 10,000 live births. Similarly, the prevalence of trisomy 13 changed from 0.63 per 10,000 live births for live births only to 1.57 per 10,000 live births for all pregnancy outcomes combined. Jackson et al. (2013) also reported a shift in the prevalence of Down syndrome from 11.5 per 10,000 live births for cases among live births only to 16.3 per 10,000 live births for cases among all pregnancy outcomes.

Prenatal Testing

Prenatal testing allows for a more accurate ascertainment of cases by surveillance systems, especially if they are diagnosed and captured in medical records. Prenatal diagnostic testing and elective termination have been shown to affect the live birth prevalence of Down syndrome (Mikkelsen, 1992; Cornel et al., 1993; Krivchenia et al., 1993; Bishop et al., 1997; Forrester and Merz, 1999) and of trisomies 18 and 13 (Crider et al., 2008). Noninvasive screening methods such as maternal protein serum assays and ultrasound have become more accurate and are being used with increasing frequency (Baker et al., 2004; Benn et al., 2004; Ekelund et al., 2008; Nakata et al., 2010). Additionally, a recent method of noninvasive prenatal testing that uses cell free fetal DNA collected from maternal blood has recently been used to screen for Down syndrome, trisomy 18, and trisomy 13 (Langlois et al., 2013). This method shows much promise as a screening tool and will likely result in a change in prevalence if early terminations are missed by states that capture all pregnancy outcomes. The data presented in this data report are not affected by cell free fetal DNA analysis because this screening tool was not commonly used/ employed until recently; however, as all noninvasive prenatal screening and testing methods increase in use, the effect on prevalence estimates derived from population-based birth defects surveillance systems will need to be monitored. The frequency with which prenatal detection results in elective pregnancy termination varies among states; opinions about and the use of elective pregnancy

termination have been shown to differ by age, race/ethnicity, religion, socioeconomic status, marital status, and type of health insurance (Harris and Mills, 1985; Jones et al., 2010; Pazol et al., 2011).

Maternal Age

Maternal age is the most consistent risk factor associated with increased prevalence (Hecht and Hook, 1996; Mikkelsen, 1985). As expected, the prevalence consistently increases by maternal age as shown in Figures 1–3. However, surveillance systems that do not collect cases from all pregnancy outcomes are more likely to under-ascertain cases in the older maternal age groups than in the younger groups; this is more pronounced for trisomy 18 and 13 than for Down syndrome. The data suggest that pregnancy loss (e.g., stillbirths, terminations) is more common among advanced maternal age groups. Previous studies have shown an increased risk of stillbirths as well as increased usage of prenatal testing in women 35 years and older (Reddy et al., 2006; Crider et al., 2008; Jackson et al., 2011).

The maternal age distribution in the United States has shifted toward older ages over the past few decades (Martin et al., 2012); however, during the birth period included in this report (2006–2010), this trend has remained relatively stable. Although advanced maternal age is a known risk factor for trisomy, advanced paternal age has not been observed to be an independent risk factor after adjusting for maternal age (Janerich and Bracken, 1986; De Souza and Morris, 2010).

Maternal Race/Ethnicity

There appears to be modest variation in the prevalence of trisomy 13 and 18 by race/ethnicity, but previous reports have not been consistent. Crider et al. (2008) found the highest prevalence for each among non-Hispanic whites, but others found a lower or no difference in prevalence among non-Hispanic whites compared with Hispanics and non-Hispanic blacks (Canfield et al., 2006; Kucik et al., 2012). Variation in prevalence of Down syndrome by race/ethnicity has been more consistently reported. The prevalence among Hispanics is significantly higher than among non-Hispanic whites, particularly among births to mothers 35 years or older (CDC, 1994; Canfield et al., 2006; Agopian et al., 2012; Kucik et al., 2012), while non-Hispanic black women have the lowest observed prevalence. These differences may be related to differential use of prenatal diagnostic services (Kupper-mann et al., 1996, 2006). Jackson et al. (2013) suggest that biological causes, such as maternal age, as well as social factors, such as attitudes regarding elective termination and access to care, might contribute to the race/ethnicity differences observed in the prevalence of Down syndrome.

Trends in Prevalence and Survival

Information on trends in prevalence of trisomy 18 and 13 is sparse (Crider et al., 2008), but the increasing prevalence of Down syndrome has been documented previously (Shin et al., 2009; Cocchi et al., 2010). This report provides evidence that this trend continues for Down syndrome, trisomy 18, and trisomy 13. Compared with birth prevalence estimates reported in the 2007 Annual report of the NBDPN, an increase in the pooled prevalence was noted for all three trisomy groups as reported by state programs that included all pregnancy

outcomes and by those that reported live births and still births (Table 5) (NBDPN, 2007). The pooled prevalence among states that reported only live births increased for Down syndrome and trisomy 18 but declined slightly for trisomy 13. From 1979 to 2003, Shin et al. (2009) reported an increase in the live birth prevalence for Down syndrome from 9.0 to 11.8 per 10,000 live births, so the live birth prevalence in this report supports a continuing increase.

Although trisomy 13 and 18 are nearly always fatal (Rasmussen et al., 2003; Vendola et al., 2010), the improved survival of those born live with Down syndrome has been previously documented (Kucik et al., 2013; Zhu et al., 2013) with the most recent 1-year survival probability (birth period 1997–2003) estimated as high as 94% (Kucik et al., 2013). The greatest survival improvement has been observed among those individuals with Down syndrome born of low birth weight or with a co-occurring congenital heart defect (Kucik et al., 2013; Zhu et al., 2013), which is the leading cause of death among infants and children with Down syndrome (Shin et al. 2007; Zhu et al., 2013).

CONCLUSIONS

This data report provides state-specific birth defects data from 41 population-based birth defects surveillance programs in the United States and continues to be an important data source to understand the impact of these conditions. The focus on trisomy conditions highlights continuing trends and underscores the importance of accounting for differences in ascertainment and reporting practices to fully understand the variation in prevalence by state. With the increasing prevalence of trisomies and improved survival of affected individuals, this report serves as an important notice to clinicians, health officials, and health care planners of the growing public health importance of trisomies; additionally, it suggests the need for more research on the role of prenatal detection in improving postnatal health and health service planning that addresses the lifetime needs of a growing population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Information Network; Washington State Birth Defects Surveillance System; Wisconsin Birth Defects Registry; and West Virginia Congenital Abnormalities Registry, Education and Surveillance System. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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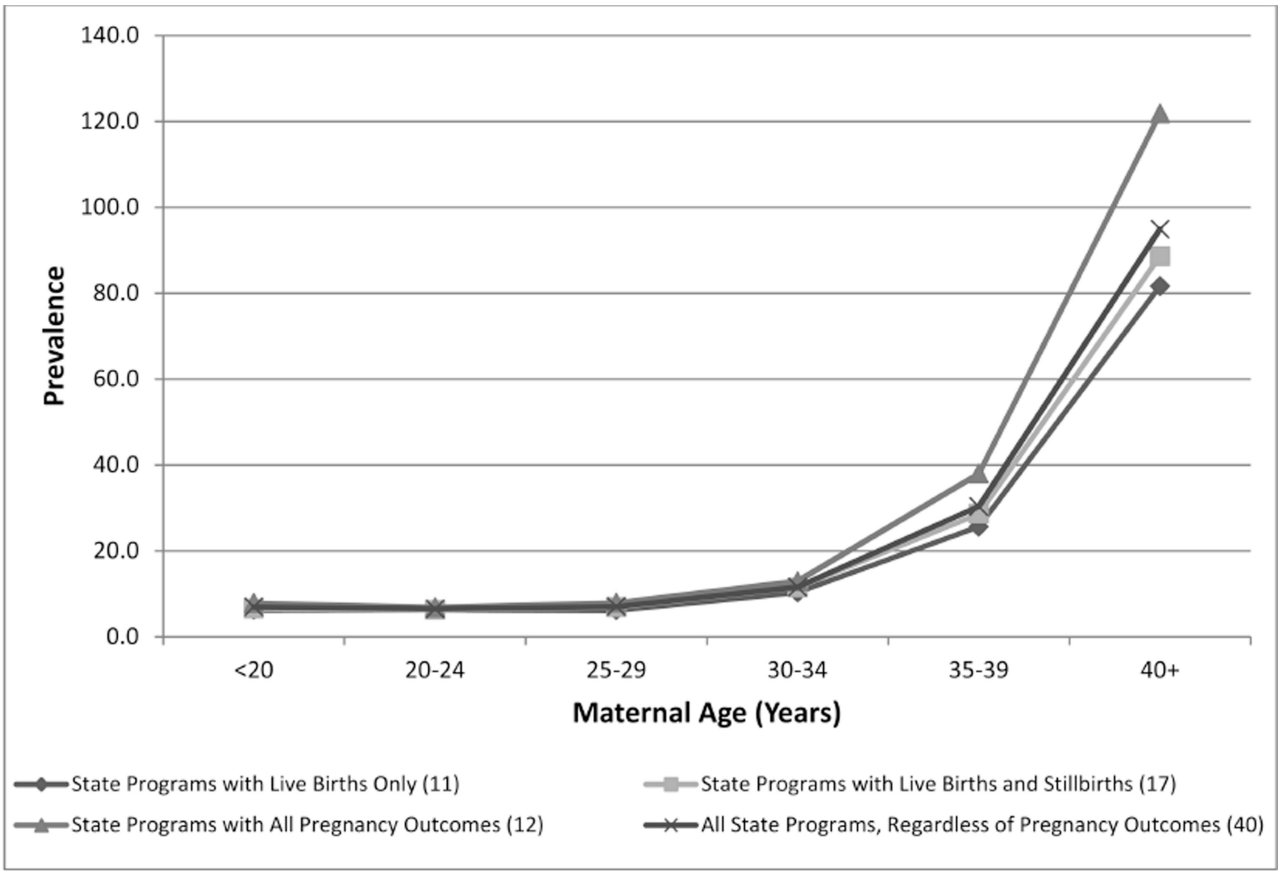
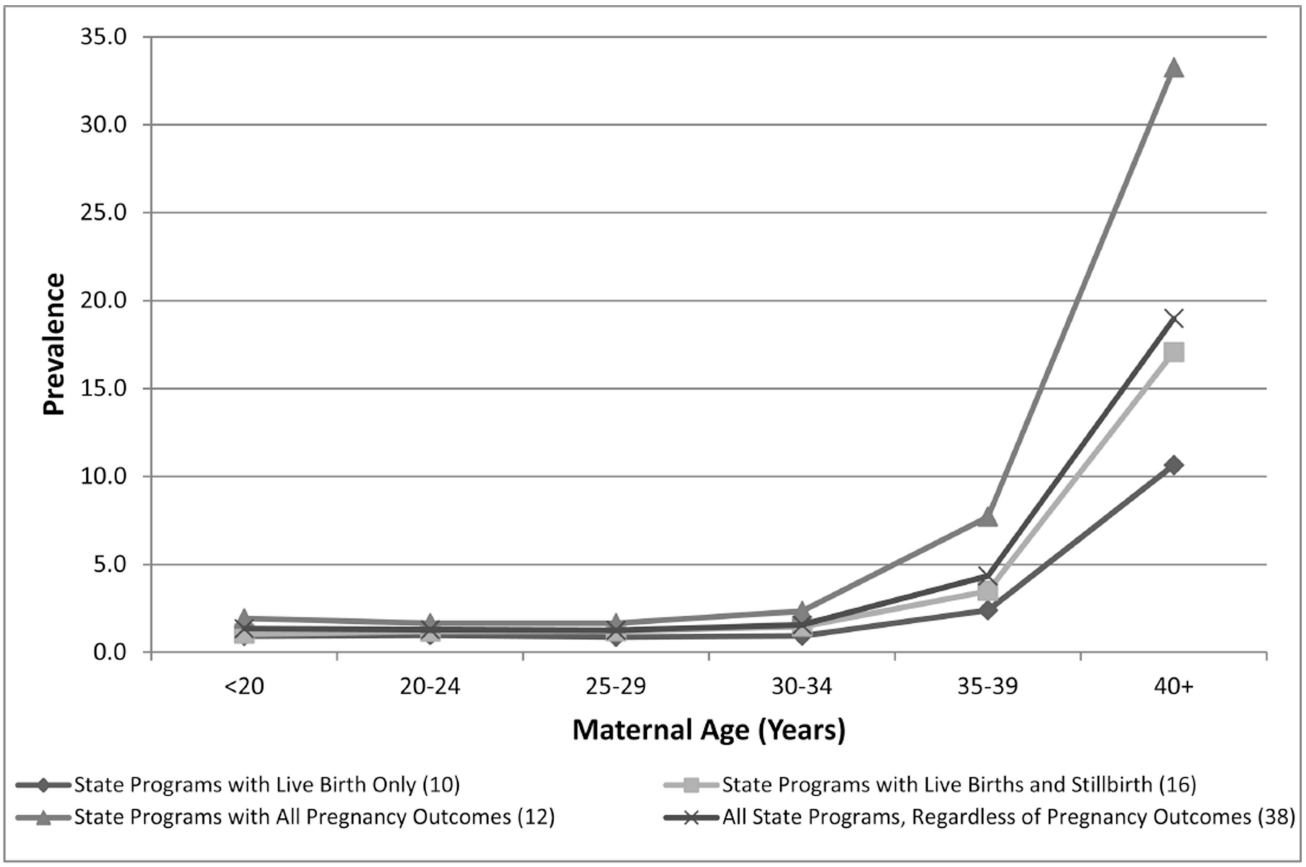


	Maternal Age (Years)						
	<20	**20-24**	**25-29**	**30-34**	**35-39**	**40+**	**Total**
State Programs with Live Births Only (11)	6.2	6.3	6.2	10.3	25.6	81.6	12.5
State Programs with Live Births and Stillbirths (17)	6.5	6.3	6.9	11.5	28.6	88.6	12.6
State Programs with All Pregnancy Outcomes (12)	7.8	6.9	7.9	12.9	38.0	121.8	14.2
All State Programs, Regardless of Pregnancy Outcomes (40)	7.0	6.5	7.0	11.6	30.3	94.9	13.1

All states listed in Table 2 are included in the pooled prevalence by pregnancy outcome except for the Department of Defense.

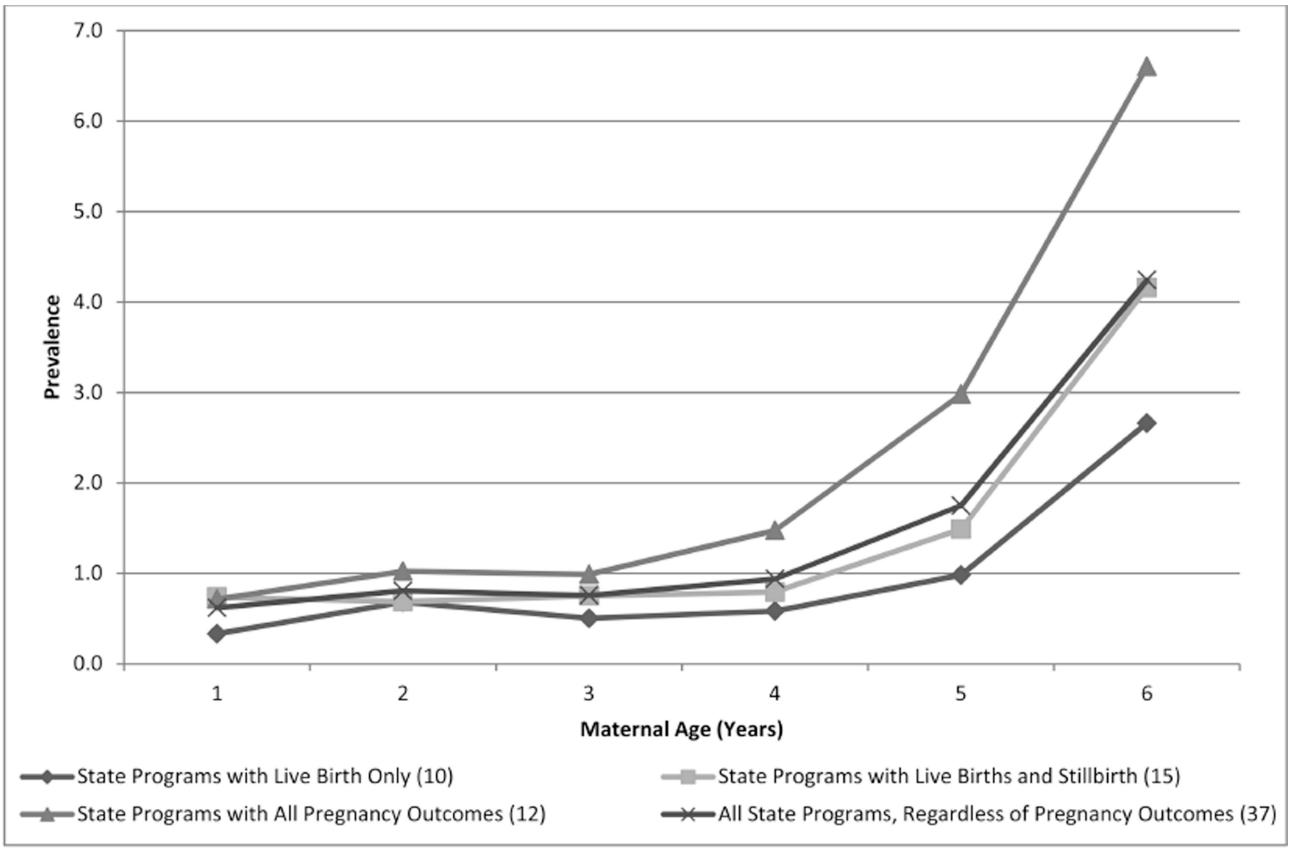
Figure 1.
Pooled prevalence (per 10,000 live births) of Down syndrome by maternal age (years).



	Maternal Age (Years)						
	<20	**20-24**	**25-29**	**30-34**	**35-39**	**40+**	**Total**
State Programs with Live Birth Only (10)	0.9	1.0	0.9	0.9	2.4	10.6	1.5
State Programs with Live Births and Stillbirth (16)	1.0	1.2	1.2	1.5	3.5	17.1	2.0
State Programs with All Pregnancy Outcomes (12)	1.9	1.6	1.6	2.3	7.7	33.3	3.1
All State Programs, Regardless of Pregnancy Outcomes (38)	1.3	1.3	1.2	1.6	4.3	19.0	2.2

All states listed in Table 3 are included in the pooled prevalence by pregnancy outcome except for the Department of Defense.

Figure 2.
Pooled prevalence (per 10,000 live births) of trisomy 18 by maternal age (years).



	Maternal Age (Years)						
	<20	**20-24**	**25-29**	**30-34**	**35-39**	**40+**	**Total**
State Programs with Live Birth Only (10)	0.3	0.7	0.5	0.6	1.0	2.7	0.7
State Programs with Live Births and Stillbirth (15)	0.7	0.7	0.8	0.8	1.5	4.2	0.9
State Programs with All Pregnancy Outcomes (12)	0.7	1.0	1.0	1.5	3.0	6.6	1.4
All State Programs, Regardless of Pregnancy Outcomes (37)	0.6	0.8	0.8	0.9	1.7	4.2	1.0

All states listed in Table 4 are included in the pooled prevalence by pregnancy outcome except for North Dakota and the Department of Defense.

Figure 3.
Pooled prevalence (per 10,000 live births) of trisomy 13 by maternal age (years).

Table 1

ICD-9-CM and CDC/BPA Codes for 47 Birth Defects Reported in the NBDPN Annual Report

Birth defects	ICD-9-CM codes	CDC/BPA codes
Central nervous system		
Anencephalus	740.0 – 740.1	740.00 – 740.10
Spina bifida without anencephalus	741.0 – 741.9	741.00 – 741.99
	w/o 740.0 – 740.10	w/o 740.0 – 740.10
Hydrocephalus without spina bifida	742.3 w/o 741.0, 741.9	742.30 – 742.39
		w/o 741.00 – 741.99
Encephalocele	742.0	742.00 – 742.09
Microcephalus	742.1	742.10
Eye		
Anophthalmia/microphthalmia	743.0, 743.1	743.00 – 743.10
Congenital cataract	743.30 – 743.34	743.32
Aniridia	743.45	743.42
Ear		
Anotia/microtia	744.01, 744.23	744.01, 744.21
Cardiovascular		
Common truncus	745.0	745.00
Transposition of great arteries	745.10, .11, .12, .19 (For CCHD screening*, 745.10 only)	745.10–745.19 (exclude 745.13, 745.15, 745.18) (For CCHD screening*, only 745.10, 745.11, 745.14, 745.19)
Tetralogy of Fallot	745.2	745.20 – 745.21, 747.31
Ventricular septal defect	745.4	745.40 – 745.49 (exclude 745.487, 745.498)
Atrial septal defect	745.5	745.51 – 745.59
Atrioventricular septal defect (endocardial cushion defect)	745.60, .61, .69	745.60 – 745.69, 745.487
Pulmonary valve atresia and stenosis	746.01, 746.02	746.00 – 746.01
	(For CCHD screening*, 746.01 only)	(For CCHD screening*, 746.00 only)
Tricuspid valve atresia and stenosis	746.1	746.10 (exclude 746.105) (For CCHD screening*, 746.10 exclude 746.105 and 746.106)
Ebstein anomaly	746.2	746.20
Aortic valve stenosis	746.3	746.30
Hypoplastic left heart syndrome	746.7	746.70
Patent ductus arteriosus	747.0	747.00
Coarctation of aorta	747.10	747.10 – 747.19
Total anomalous pulmonary		
venous return (TAPVR)	747.41	747.42
Orofacial		
Cleft palate without cleft lip	749.0	749.00 – 749.09
Cleft lip with and without cleft palate	749.1, 749.2	749.10 – 749.29
Choanal atresia	748.0	748.0

Birth defects	ICD-9-CM codes	CDC/BPA codes
Gastrointestinal		
Esophageal atresia/tracheoesophageal fistula	750.3	750.30 – 750.35
Rectal and large intestinal atresia/stenosis	751.2	751.20 – 751.24
Pyloric stenosis	750.5	750.51
Hirschsprung disease (congenital megacolon)	751.3	751.30 – 751.34
Biliary atresia	751.61	751.65
Genitourinary		
Renal agenesis/hypoplasia	753.0	753.00 – 753.01
Bladder exstrophy	753.5	753.50
Obstructive genitourinary defect	753.2, 753.6	753.20–29 and 753.60–69
Hypospadias	752.61	752.60 – 752.62 (exclude 752.61 and 752.621)
Epispadias	752.62	752.61
Musculoskeletal		
Reduction deformity, upper limbs	755.20 – 755.29	755.20 – 755.29
Reduction deformity, lower limbs	755.30 – 755.39	755.30 – 755.39
Gastroschisis	756.79	756.71
Omphalocele	756.79	756.70
Congenital hip dislocation	754.30, .31, .35	754.30
Diaphragmatic hernia	756.6	756.61
Chromosomal		
Trisomy 13	758.1	758.10 – 758.19
Down syndrome (trisomy 21)	758.0	758.00 – 758.09
Trisomy 18	758.2	758.20 – 758.29
Other		
Fetus or newborn affected by maternal alcohol use	760.71	760.71
Amniotic bands	No code	658.80

ICD-9-CM, International Classification of Diseases, 9th Revision, Clinical Modification; CDC/BPA, Centers for Disease Control and Prevention/ British Pediatric Association Classification of Diseases; NBDPN, National Birth Defects Protection Network; w/o, without; CCHD, critical congenital heart defect.

* The primary targets for critical congenital heart defect (CCHD) screening include hypoplastic left heart syndrome, pulmonary atresia with intact septum, tetralogy of Fallot, total anomalous pulmonary venous return, dextro-Transposition of great arteries (d-TGA), tricuspid atresia, and truncus arteriosus.

Table 2

a Down Syndrome Counts and Prevalence by Maternal Age, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal age (years)							
State	**<20**	**20–24**	**25–29**	**30–34**	**35–39**	**401**	**Total***	**Notes**
Live births								
Alaska[p]	7	15	11	16	21	17	87	1
	12.9	***9.2***	***6.7***	***14.6***	***39.1***	***121.3***	***15.6***	
Department of Defense[p]	20	165	156	167	160	112	804	6
	6.5	***8.6***	***8.9***	***16.7***	***37.7***	***125.4***	***14.1***	
Florida[p]	84	222	207	269	400	301	1483	
	7.2	***7.6***	***6.6***	***10.8***	***30.0***	***91.5***	***13.0***	
Indiana[p]	32	59	88	119	119	98	515	10
	6.9	***4.9***	***6.8***	***13.5***	***31.9***	***106.9***	***11.9***	
Louisiana[a]	11	23	30	35	42	37	178	12
	6.1	***5.3***	***7.8***	***14.9***	***39.7***	***157.3***	***13.1***	
Minnesota[a]	6	9	22	39	59	48	183	16
	4.8	***4.8***	***6.5***	***11.8***	***34.3***	***110.5***	***15.3***	
Nevada[p]	13	24	35	42	62	46	258	23
	4.4	***6.0***	***6.2***	***10.1***	***29.0***	***89.0***	***13.3***	
New Jersey[p]	17	54	68	140	196	154	672	22
	5.0	***5.7***	***4.8***	***8.5***	***20.7***	***66.0***	***12.2***	
New York[p]	52	151	197	312	414	358	1484	
	6.2	***6.1***	***6.1***	***9.7***	***21.9***	***70.6***	***12.2***	
Vermont[p]	2	3	7	6	12	9	39	30
	8.9	***4.2***	***7.9***	***7.4***	***28.3***	***91.6***	***12.3***	
Washington[p]	.	.	.	.	.	.	461	31
	.	.	.	.	.	.	***13.0***	
West Virginia[p]	2	11	8	11	8	6	70	32
	1.5	***3.5***	***2.7***	***6.1***	***10.9***	***52.2***	***6.9***	

a Down Syndrome Counts and Prevalence by Maternal Age, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal age (years)							
State	**<20**	**20–24**	**25–29**	**30–34**	**35–39**	**401**	**Total***	**Notes**
Live births and stillbirths								
Arizona[a]	35	68	89	122	137	121	572	3
	6.1	***5.4***	***6.6***	***12.1***	***28.0***	***91.3***	***11.8***	
Delaware[a]	0	6	4	13	9	10	43	5
	0.0	***6.7***	***3.9***	***16.1***	***22.3***	***112.2***	***12.0***	
Illinois[p]	61	118	155	217	310	249	1121	9
	7.2	***6.2***	***6.4***	***9.9***	***28.1***	***99.7***	***12.9***	
Kansas[p]	8	32	38	34	40	36	203	11
	3.9	***5.8***	***6.2***	***8.2***	***23.1***	***97.6***	***10.2***	
Kentucky[p]	19	38	50	56	84	47	303	
	5.2	***4.5***	***6.1***	***10.6***	***37.9***	***90.9***	***10.7***	
Maryland[p]	24	46	45	75	116	93	401	14
	7.5	***5.8***	***4.4***	***7.6***	***20.8***	***64.8***	***10.5***	
Massachusetts[a]	16	42	55	105	146	122	486	13
	7.0	***6.9***	***5.9***	***9.0***	***20.9***	***71.7***	***12.8***	
Maine[p]	4	14	18	13	23	9	81	15
	7.5	***8.2***	***9.1***	***8.5***	***30.4***	***56.0***	***12.2***	
Michigan[p]	45	99	147	176	205	127	821	
	7.5	***6.8***	***8.3***	***12.4***	***31.4***	***87.9***	***13.5***	
Mississippi[p]	8	35	36	53	46	16	194	
	2.2	***4.8***	***5.9***	***15.8***	***33.5***	***56.4***	***8.8***	
Missouri[p]	34	72	89	108	137	68	508	17
	9.3	***7.8***	***9.2***	***16.8***	***48.8***	***117.3***	***15.7***	
North Dakota[p]	2	4	7	12	8	7	41	19
	6.1	***3.5***	***4.5***	***12.5***	***21.3***	***91.4***	***9.2***	
Nebraska[p]	5	25	46	53	50	48	227	20

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a Down Syndrome Counts and Prevalence by Maternal Age, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal age (years)							
State	**<20**	**20–24**	**25–29**	**30–34**	**35–39**	**401**	**Total***	**Notes**
	4.6	***7.6***	***10.6***	***17.3***	***39.5***	***182.6***	***17.0***	
Ohio[p]	15	19	39	23	39	30	165	
	9.2	***4.8***	***8.9***	***7.3***	***26.9***	***102.4***	***11.1***	
Tennessee[p]	46	97	109	97	144	93	586	
	8.6	***7.8***	***9.2***	***12.2***	***40.4***	***128.2***	***14.0***	
Virginia[p]	27	83	76	139	147	125	732	29
	6.3	***6.8***	***5.2***	***10.6***	***21.1***	***74.0***	***13.8***	
Wisconsin[p]	17	41	58	115	114	85	430	
	5.9	***5.3***	***5.5***	***14.0***	***31.8***	***113.4***	***12.8***	
All Pregnancy Outcomes								
Arkansas[a]	17	39	46	45	52	39	238	2
	5.9	***5.9***	***8.1***	***13.8***	***39.8***	***150.8***	***11.9***	
Colorado[p]	31	58	98	130	221	153	715	4
	9.7	***7.4***	***10.2***	***15.3***	***49.1***	***150.4***	***20.6***	
Georgia/CDC[a]	26	50	71	110	163	96	535	7
	12.4	***8.9***	***10.2***	***15.7***	***40.2***	***94.3***	***20.0***	
Iowa[a]	19	32	57	55	80	55	299	8
	11.0	***6.4***	***8.6***	***12.4***	***44.9***	***150.6***	***15.0***	
North Carolina[a]	55	106	118	152	205	132	771	18
	7.6	***6.2***	***6.8***	***10.9***	***30.3***	***93.9***	***12.1***	
New Hampshire[a]	2	14	13	18	14	7	70	21
	4.8	***10.1***	***6.7***	***9.4***	***14.4***	***32.4***	***10.2***	
Oklahoma[a]	21	59	60	48	76	67	332	24
	5.8	***6.9***	***7.6***	***10.6***	***40.7***	***174.0***	***12.3***	
Puerto Rico[a]	29	56	46	59	78	56	324	25
	7.1	***7.7***	***7.8***	***16.2***	***50.1***	***161.6***	***14.2***	

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a Down Syndrome Counts and Prevalence by Maternal Age, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal age (years)							
State	**<20**	**20–24**	**25–29**	**30–34**	**35–39**	**401**	**Total***	**Notes**
Rhode Island[p]	2	8	12	13	24	16	84	26
	3.8	***6.5***	***7.9***	***8.9***	***29.5***	***86.0***	***14.6***	
South Carolina[a]	16	25	33	26	54	35	189	27
	6.9	***4.7***	***6.4***	***7.2***	***32.9***	***101.1***	***10.3***	
Texas[a]	173	302	338	436	570	390	2209	28
	7.9	***6.8***	***7.7***	***13.4***	***36.7***	***119.3***	***13.7***	
Utah[a]	14	55	73	85	95	79	401	
	8.0	***7.8***	***7.7***	***13.9***	***43.7***	***188.2***	***14.8***	

b Down Syndrome Counts and Prevalence by Maternal Race/Ethnicity, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal race/ethnicity						
State	**White non-Hispanic**	**Black non-Hispanic**	**Hispanic**	**Asian and Pacific Islanders Non-Hispanic**	**American Indian/ Alaska Native Non-Hispanic**	**Total***	**Notes**
Live births							
Alaska[p]	44	.	.	.	28	87	1
	13.0	.	.	.	***20.0***	***15.6***	
Department of Defense[p]	550	105	90	35	9	804	6
	14.6	***12.9***	***14.2***	***13.6***	***8.6***	***14.1***	
Florida[p]	667	314	423	45	4	1483	
	13.2	***12.7***	***12.9***	***14.6***	***17.9***	***13.0***	
Indiana[p]	403	37	53	15	1	515	10
	12.6	***6.6***	***13.7***	***15.5***	***12.8***	***11.9***	
Louisiana[a]	106	54	9	8	<5	178	12
	15.0	***9.9***	***12.9***	***31.7***	.	***13.1***	
Minnesota[a]	89	45	25	15	3	183	16
	14.1	***20.3***	***17.9***	***9.9***	***19.9***	***15.3***	

b Down Syndrome Counts and Prevalence by Maternal Race/Ethnicity, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal race/ethnicity						
State	**White non-Hispanic**	**Black non-Hispanic**	**Hispanic**	**Asian and Pacific Islanders Non-Hispanic**	**American Indian/ Alaska Native Non-Hispanic**	**Total***	**Notes**
Nevada[p]	84	24	125	17	1	258	23
	10.3	***13.7***	***16.7***	***11.1***	***4.4***	***13.3***	
New Jersey[p]	307	102	200	38	3	672	22
	12.0	***12.3***	***14.0***	***7.0***	***48.1***	***12.2***	
New York[p]	735	263	357	92	1	1484	
	12.4	***13.3***	***12.9***	***7.3***	***4.3***	***12.2***	
Vermont[p]	36	1	1	0	0	39	30
	12.0	***26.7***	***26.2***	***0.0***	***0.0***	***12.3***	
Washington[p]	.	.	.	.	.	461	31
	.	.	.	.	.	***13.0***	
West Virginia[p]	48	3	0	0	0	70	32
	5.1	***8.2***	***0.0***	***0.0***	***0.0***	***6.9***	
Live births and stillbirths							
Arizona[a]	239	19	253	16	35	571	3
	11.7	***9.8***	***12.2***	***10.2***	***11.5***	***11.8***	
Delaware[a]	28	7	4	4	0	43	5
	14.6	***7.3***	***7.4***	***25.4***	***0.0***	***12.0***	
Illinois[p]	753	149	165	39	1	1121	9
	16.4	***9.8***	***7.9***	***8.4***	***8.1***	***12.9***	
Kansas[p]	130	6	36	5	0	203	11
	9.2	***4.3***	***11.0***	***8.8***	***0.0***	***10.2***	
Kentucky[p]	248	28	17	4	1	303	
	10.5	***10.8***	***11.8***	***10.2***	***29.7***	***10.7***	
Maryland[p]	199	112	45	26	1	401	14
	11.3	***8.8***	***8.8***	***10.0***	***12.3***	***10.5***	
Massachusetts[a]	315	53	75	28	3	486	13

b Down Syndrome Counts and Prevalence by Maternal Race/Ethnicity, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal race/ethnicity						
State	**White non-Hispanic**	**Black non-Hispanic**	**Hispanic**	**Asian and Pacific Islanders Non-Hispanic**	**American Indian/ Alaska Native Non-Hispanic**	**Total***	**Notes**
	12.3	***15.9***	***13.9***	***9.7***	***38.4***	***12.8***	
Maine[p]	71	1	3	0	1	81	15
	11.5	***5.8***	***29.3***	***0.0***	***17.8***	***12.2***	
Michigan[p]	578	136	39	31	3	821	
	13.7	***12.4***	***8.8***	***14.6***	***10.5***	***13.6***	
Mississippi[p]	100	77	9	1	1	194	
	9.1	***7.8***	***12.0***	***4.3***	***6.5***	***8.8***	
Missouri[p]	395	48	40	18	4	508	17
	16.1	***9.8***	***22.2***	***23.0***	***27.0***	***15.7***	
North Dakota[p]	35	1	0	2	0	41	19
	9.8	***13.9***	***0.0***	***33.2***	***0.0***	***9.2***	
Nebraska[p]	163	10	42	5	1	227	20
	16.5	***11.5***	***20.6***	***16.0***	***4.8***	***17.0***	
Ohio[p]	126	27	8	3	1	165	
	11.1	***10.9***	***11.6***	***9.6***	***46.3***	***11.1***	
Tennessee[p]	393	116	64	10	0	586	
	14.0	***13.3***	***16.5***	***12.2***	***0.0***	***14.0***	
Virginia[p]	322	114	113	43	0	732	29
	10.6	***9.9***	***16.2***	***11.7***	***0.0***	***13.8***	
Wisconsin[p]	307	26	65	27	5	430	
	12.3	***7.4***	***19.3***	***19.1***	***9.2***	***12.8***	
All pregnancy outcomes							
Arkansas[a]	176	26	33	3	0	238	2
	13.1	***6.7***	***15.5***	***6.9***	***0.0***	***11.9***	
Colorado[p]	295	30	169	17	1	715	4
	14.3	***19.4***	***15.7***	***14.6***	***4.0***	***20.6***	

b Down Syndrome Counts and Prevalence by Maternal Race/Ethnicity, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal race/ethnicity						
State	**White non-Hispanic**	**Black non-Hispanic**	**Hispanic**	**Asian and Pacific Islanders Non-Hispanic**	**American Indian/ Alaska Native Non-Hispanic**	**Total***	**Notes**
Georgia/CDC[a]	173	165	127	25	2	535	7
	23.0	***16.1***	***20.2***	***15.4***	***78.1***	***20.0***	
Iowa[a]	237	8	38	10	0	299	8
	14.1	***9.6***	***23.3***	***20.6***	***0.0***	***15.0***	
North Carolina[a]	434	143	143	26	14	771	18
	12.2	***9.5***	***13.8***	***13.1***	***16.0***	***12.1***	
New Hampshire[a]	49	1	1	3	1	70	21
	7.9	***8.8***	***12.8***	***12.4***	***64.5***	***10.2***	
Oklahoma[a]	203	24	67	6	32	332	24
	11.8	***9.8***	***18.9***	***9.9***	***10.6***	***12.3***	
Puerto Rico[a]	0	0	324	0	0	324	25
	.	.	***14.2***	.	.	***14.2***	
Rhode Island[p]	48	5	16	2	0	84	26
	13.4	***10.1***	***13.4***	***7.9***	***0.0***	***14.6***	
South Carolina[a]	109	52	21	4	0	189	27
	10.6	***8.7***	***12.4***	***12.8***	***0.0***	***10.3***	
Texas[a]	703	182	1232	67	3	2209	28
	12.7	***9.9***	***15.3***	***11.2***	***10.3***	***13.7***	
Utah[a]	285	5	84	14	3	401	
	13.7	***19.4***	***19.3***	***15.5***	***8.8***	***14.8***	

* Total includes unknown maternal age.

[a] Active case-finding

[p] Passive case-finding (with or without case confirmation).

* Total includes unknown race.

[a] active case-finding

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$p_{\text{passive-case finding (with or without case confirmation).}}$

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Table 3

a Trisomy 18 Counts and Prevalence by Maternal Age, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal Age (Years)							
State	**<20**	**20–24**	**25–29**	**30–34**	**35–39**	**401**	**Total***	**Notes**
Live births								
Alaska[p]	<6	<6	<6	<6	<6	<6	10	1
	.	.	.	.	.	.	1.8	
Department of Defense[p]	5	14	27	14	18	16	99	6
	1.6	***0.7***	***1.5***	***1.4***	***4.2***	***17.9***	***1.7***	
Florida[p]	12	43	34	39	40	49	217	
	1.0	***1.5***	***1.1***	***1.6***	***3.0***	***14.9***	***1.9***	
Indiana[p]	3	5	12	11	8	13	53	10
	0.6	***0.4***	***0.9***	***1.2***	***2.1***	***14.2***	***1.2***	
Louisiana[a]	<5	<5	7	<5	5	<5	24	12
	.	.	***1.8***	.	***4.7***	.	***1.8***	
Minnesota[a]	3	1	3	3	6	8	24	16
	2.4	***0.5***	***0.9***	***0.9***	***3.5***	***18.4***	***2.0***	
Nevada[p]	4	3	5	4	2	9	32	23
	1.4	***0.7***	***0.9***	***1.0***	***0.9***	***17.4***	***1.7***	
New Jersey[p]	1	9	6	11	17	13	57	22
	0.3	***1.0***	***0.4***	***0.7***	***1.8***	***5.6***	***1.0***	
New York[p]	5	19	22	19	42	39	146	
	0.6	***0.8***	***0.7***	***0.6***	***2.2***	***7.7***	***1.2***	
Vermont[p]	0	2	0	0	0	1	3	30
	0.0	***2.8***	***0.0***	***0.0***	***0.0***	***10.2***	***0.9***	
West Virginia[p]	1	1	3	1	0	3	11	32
	0.8	***0.3***	***1.0***	***0.6***	***0.0***	***26.1***	***1.1***	
Live births and stillbirths								
Arizona[a]	3	15	23	17	12	18	89	3

a Trisomy 18 Counts and Prevalence by Maternal Age, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal Age (Years)							
State	**<20**	**20–24**	**25–29**	**30–34**	**35–39**	**401**	**Total***	**Notes**
	0.5	***1.2***	***1.7***	***1.7***	***2.4***	***13.6***	***1.8***	
Delaware[a]	1	1	2	1	2	3	10	5
	2.8	***1.1***	***2.0***	***1.2***	***5.0***	***33.7***	***2.8***	
Illinois[p]	7	23	27	27	51	38	192	9
	0.8	***1.2***	***1.1***	***1.2***	***4.6***	***15.2***	***2.2***	
Kansas[p]	0	4	4	5	5	7	26	11
	0.0	***0.7***	***0.7***	***1.2***	***2.9***	***19.0***	***1.3***	
Kentucky[p]	1	5	3	4	14	6	45	
	0.3	***0.6***	***0.4***	***0.8***	***6.3***	***11.6***	***1.6***	
Maryland[p]	4	10	14	20	23	36	108	14
	1.2	***1.3***	***1.4***	***2.0***	***4.1***	***25.1***	***2.8***	
Massachusetts[a]	4	11	7	10	10	20	62	13
	1.7	***1.8***	***0.7***	***0.9***	***1.4***	***11.7***	***1.6***	
Michigan[p]	6	21	28	25	20	28	132	
	1.0	***1.4***	***1.6***	***1.8***	***3.1***	***19.4***	***2.2***	
Mississippi[p]	1	7	7	8	7	2	32	
	0.3	***1.0***	***1.2***	***2.4***	***5.1***	***7.0***	***1.5***	
Missouri[p]	5	17	14	13	18	16	83	17
	1.4	***1.9***	***1.4***	***2.0***	***6.4***	***27.6***	***2.6***	
North Dakota[p]	0	3	1	0	1	0	5	19
	0.0	***2.6***	***0.6***	***0.0***	***2.7***	***0.0***	***1.1***	
Nebraska[p]	2	7	11	7	8	8	43	20
	1.8	***2.1***	***2.5***	***2.3***	***6.3***	***30.4***	***3.2***	
Ohio[p]	2	2	2	1	6	10	23	
	1.2	***0.5***	***0.5***	***0.3***	***4.1***	***34.1***	***1.5***	
Tennessee[p]	9	18	17	4	18	10	76	

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a Trisomy 18 Counts and Prevalence by Maternal Age, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal Age (Years)							
State	**<20**	**20–24**	**25–29**	**30–34**	**35–39**	**401**	**Total***	**Notes**
	1.7	***1.5***	***1.4***	***0.5***	***5.0***	***13.8***	***1.8***	
Virginia[p]	4	7	7	21	19	17	89	29
	0.9	***0.6***	***0.5***	***1.6***	***2.7***	***10.1***	***1.7***	
Wisconsin[p]	6	6	15	13	10	16	66	
	2.1	***0.8***	***1.4***	***1.6***	***2.8***	***21.3***	***2.0***	
All pregnancy outcomes								
Arkansas[a]	6	6	9	9	11	14	55	2
	2.1	***0.9***	***1.6***	***2.8***	***8.4***	***54.1***	***2.7***	
Colorado[p]	6	17	19	31	44	39	164	4
	1.9	***2.2***	***2.0***	***3.7***	***9.8***	***38.3***	***4.7***	
Georgia/CDC[a]	2	13	11	14	36	53	131	7
	1.0	***2.3***	***1.6***	***2.0***	***8.9***	***52.1***	***4.9***	
Iowa[a]	7	4	13	16	17	12	69	8
	4.1	***0.8***	***2.0***	***3.6***	***9.5***	***32.9***	***3.5***	
North Carolina[a]	16	36	22	26	43	36	181	18
	2.2	***2.1***	***1.3***	***1.9***	***6.4***	***25.6***	***2.8***	
New Hampshire[a]	0	1	2	2	1	5	11	21
	0.0	***0.7***	***1.0***	***1.0***	***1.0***	***23.1***	***1.6***	
Oklahoma[a]	6	13	10	10	9	8	56	24
	1.7	***1.5***	***1.3***	***2.2***	***4.8***	***20.8***	***2.1***	
Puerto Rico[a]	13	11	16	10	22	11	83	25
	3.2	***1.5***	***2.7***	***2.7***	***14.1***	***31.7***	***3.6***	
Rhode Island[p]	1	2	2	3	5	4	19	26
	1.9	***1.6***	***1.3***	***2.0***	***6.2***	***21.5***	***3.3***	
South Carolina[a]	6	5	9	2	8	11	41	27
	2.6	***0.9***	***1.7***	***0.6***	***4.9***	***31.8***	***2.2***	

a Trisomy 18 Counts and Prevalence by Maternal Age, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal Age (Years)							
State	**<20**	**20–24**	**25–29**	**30–34**	**35–39**	**401**	**Total***	**Notes**
Texas[a]	32	73	66	70	113	94	448	28
	1.5	***1.6***	***1.5***	***2.2***	***7.3***	***28.8***	***2.8***	
Utah[a]	4	12	22	19	22	20	99	
	2.3	***1.7***	***2.3***	***3.1***	***10.1***	***47.6***	***3.7***	

b Trisomy 18 Counts and Prevalence by Maternal Race/Ethnicity, 2006–2010 (Prevalence per 10,000 Live Births)

	Maternal race/ethnicity						
State	**White non-Hispanic**	**Black non-Hispanic**	**Hispanic**	**Asian and Pacific Islanders**	**American Indian/ Alaska Native**	**Total***	**Notes**
Live births							
Alaska[p]	<6	.	.	.	<6	10	1
	.	.	.	.	.	1.8	
Department of Defense[p]	70	9	14	5	0	99	6
	1.9	***1.1***	***2.2***	***1.9***	***0.0***	***1.7***	
Florida[p]	80	67	59	6	0	217	
	1.6	***2.7***	***1.8***	***1.9***	***0.0***	***1.9***	
Indiana[p]	37	9	5	1	0	53	10
	1.2	***1.6***	***1.3***	***1.0***	***0.0***	***1.2***	
Louisiana[a]	15	5	<5	<5	0	24	12
	2.1	***0.9***	.	.	***0.0***	***1.8***	
Minnesota[a]	11	8	1	4	0	24	16
	1.7	***3.6***	***0.7***	***2.6***	***0.0***	***2.0***	
Nevada[p]	9	1	19	2	0	32	23
	1.1	***0.6***	***2.5***	***1.3***	***0.0***	***1.7***	
New Jersey[p]	20	15	17	5	0	57	22
	0.8	***1.8***	***1.2***	***0.9***	***0.0***	***1.0***	
New York[p]	54	38	41	10	0	146	

b Trisomy 18 Counts and Prevalence by Maternal Race/Ethnicity, 2006–2010 (Prevalence per 10,000 Live Births)

State	Maternal race/ethnicity: White non-Hispanic	Black non-Hispanic	Hispanic	Asian and Pacific Islanders	American Indian/ Alaska Native	Total*	Notes
	0.9	***1.9***	***1.5***	***0.8***	***0.0***	***1.2***	
Vermont[p]	3	0	0	0	0	3	30
	1.0	***0.0***	***0.0***	***0.0***	***0.0***	***0.9***	
West Virginia[p]	9	1	0	0	0	11	32
	1.0	***2.7***	***0.0***	***0.0***	***0.0***	***1.1***	
Live births and stillbirths							
Arizona[a]	36	3	35	5	10	89	3
	1.8	***1.5***	***1.7***	***3.2***	***3.3***	***1.8***	
Delaware[a]	4	3	2	1	0	10	5
	2.1	***3.1***	***3.7***	***6.4***	***0.0***	***2.8***	
Illinois[p]	109	35	36	11	0	192	9
	2.4	***2.3***	***1.7***	***2.4***	***0.0***	***2.2***	
Kansas[p]	14	1	9	0	0	26	11
	1.0	***0.7***	***2.7***	***0.0***	***0.0***	***1.3***	
Kentucky[p]	40	1	3	0	0	45	
	1.7	***0.4***	***2.1***	***0.0***	***0.0***	***1.6***	
Maryland[p]	59	21	15	6	0	108	14
	3.4	***1.6***	***2.9***	***2.3***	***0.0***	***2.8***	
Massachusetts[a]	29	11	15	4	0	62	13
	1.1	***3.3***	***2.8***	***1.4***	***0.0***	***1.6***	
Michigan[p]	86	33	5	3	0	132	
	2.0	***3.0***	***1.1***	***1.4***	***0.0***	***2.2***	
Mississippi[p]	16	13	2	0	0	32	
	1.5	***1.3***	***2.7***	***0.0***	***0.0***	***1.5***	
Missouri[p]	61	12	7	2	0	83	17
	2.5	***2.4***	***3.9***	***2.6***	***0.0***	***2.6***	
North Dakota[p]	4	0	0	1	0	5	19

b Trisomy 18 Counts and Prevalence by Maternal Race/Ethnicity, 2006–2010 (Prevalence per 10,000 Live Births)

	Maternal race/ethnicity						
State	**White non-Hispanic**	**Black non-Hispanic**	**Hispanic**	**Asian and Pacific Islanders**	**American Indian/ Alaska Native**	**Total***	**Notes**
	1.1	***0.0***	***0.0***	***16.6***	***0.0***	***1.1***	
Nebraska[p]	31	5	5	0	1	43	20
	3.1	***5.7***	***2.5***	***0.0***	***4.8***	***3.2***	
Ohio[p]	15	8	0	0	0	23	
	1.3	***3.2***	***0.0***	***0.0***	***0.0***	***1.5***	
Tennessee[p]	51	14	10	1	0	76	
	1.8	***1.6***	***2.6***	***1.2***	***0.0***	***1.8***	
Virginia[p]	43	17	7	7	0	89	29
	1.4	***1.5***	***1.0***	***1.9***	***0.0***	***1.7***	
Wisconsin[p]	50	7	6	2	0	66	
	2.0	***2.0***	***1.8***	***1.4***	***0.0***	***2.0***	
All pregnancy outcomes							
Arkansas[a]	38	11	6	0	0	55	2
	2.8	***2.8***	***2.8***	***0.0***	***0.0***	***2.7***	
Colorado[p]	35	3	33	5	0	164	4
	1.7	***1.9***	***3.1***	***4.3***	***0.0***	***4.7***	
Georgia/CDC[a]	47	33	17	10	1	131	7
	6.3	***3.2***	***2.7***	***6.2***	***39.1***	***4.9***	
Iowa[a]	53	6	8	1	0	69	8
	3.2	***7.2***	***4.9***	***2.1***	***0.0***	***3.5***	
North Carolina[a]	99	38	25	10	2	181	18
	2.8	***2.5***	***2.4***	***5.0***	***2.3***	***2.8***	
New Hampshire[a]	6	0	0	0	0	11	21
	1.0	***0.0***	***0.0***	***0.0***	***0.0***	***1.6***	
Oklahoma[a]	37	9	2	1	7	56	24
	2.1	***3.7***	***0.6***	***1.6***	***2.3***	***2.1***	
Puerto Rico[a]	0	0	83	0	0	83	25

b Trisomy 18 Counts and Prevalence by Maternal Race/Ethnicity, 2006–2010 (Prevalence per 10,000 Live Births)

	Maternal race/ethnicity						
State	**White non-Hispanic**	**Black non-Hispanic**	**Hispanic**	**Asian and Pacific Islanders**	**American Indian/ Alaska Native**	**Total***	**Notes**
	.	.	***3.6***	.	.	***3.6***	
Rhode Island[p]	11	1	4	0	0	19	26
	3.1	***2.0***	***3.4***	***0.0***	***0.0***	***3.3***	
South Carolina[a]	22	13	6	0	0	41	27
	2.1	***2.2***	***3.5***	***0.0***	***0.0***	***2.2***	
Texas[a]	147	49	223	22	0	448	28
	2.7	***2.7***	***2.8***	***3.7***	***0.0***	***2.8***	
Utah[a]	75	5	15	1	1	99	
	3.6	***19.4***	***3.4***	***1.1***	***2.9***	***3.7***	

*Total includes unknown maternal age.

[a]active case-finding

[p]passive case-finding (with or without case confirmation).

*Total includes unknown race.

[a]active case-finding

[p]passive case-finding (with or without case confirmation).

Table 4

a Trisomy 13 Counts and Prevalence by Maternal Age, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal age (years)							
State	**<20**	**20–24**	**25–29**	**30–34**	**35–39**	**40+**	**Total***	**Notes**
Live births								
Alaska[p]	<6	<6	<6	<6	<6	<6	7	1
	.	.	.	.	.	.	1.3	
Department of Defense[p]	4	19	17	16	6	4	68	6
	1.3	***1.0***	***1.0***	***1.6***	***1.4***	***4.5***	***1.2***	
Florida[p]	5	20	21	20	21	13	100	
	0.4	***0.7***	***0.7***	***0.8***	***1.6***	***4.0***	***0.9***	
Indiana[p]	0	5	4	8	5	1	23	10
	0.0	***0.4***	***0.3***	***0.9***	***1.3***	***1.1***	***0.5***	
Louisiana[a]	<5	<5	<5	0	0	<5	9	12
	.	.	.	***0.0***	***0.0***	.	***0.7***	
Minnesota[a]	0	4	1	1	4	1	11	16
	0.0	***2.1***	***0.3***	***0.3***	***2.3***	***2.3***	***0.9***	
Nevada[p]	1	4	0	3	1	1	12	23
	0.3	***1.0***	***0.0***	***0.7***	***0.5***	***1.9***	***0.6***	
New Jersey[p]	1	2	2	5	4	3	17	22
	0.3	***0.2***	***0.1***	***0.3***	***0.4***	***1.3***	***0.3***	
New York[p]	4	21	22	16	13	14	90	
	0.5	***0.8***	***0.7***	***0.5***	***0.7***	***2.8***	***0.7***	
Vermont[p]	0	0	0	1	0	0	1	30
	0.0	***0.0***	***0.0***	***1.2***	***0.0***	***0.0***	***0.3***	
West Virginia[p]	0	1	1	0	1	0	6	32
	0.0	***0.3***	***0.3***	***0.0***	***1.4***	***0.0***	***0.6***	
Live births and stillbirths								
Arizona[a]	5	13	11	8	10	6	53	3

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a Trisomy 13 Counts and Prevalence by Maternal Age, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal age (years)							
State	**<20**	**20–24**	**25–29**	**30–34**	**35–39**	**40+**	**Total***	**Notes**
	0.9	***1.0***	***0.8***	***0.8***	***2.0***	***4.5***	***1.1***	
Delaware[a]	0	0	0	0	1	0	1	5
	0.0	***0.0***	***0.0***	***0.0***	***2.5***	***0.0***	***0.3***	
Illinois[p]	7	18	19	26	25	7	106	9
	0.8	***1.0***	***0.8***	***1.2***	***2.3***	***2.8***	***1.2***	
Kansas[p]	0	2	3	1	3	0	13	11
	0.0	***0.4***	***0.5***	***0.2***	***1.7***	***0.0***	***0.7***	
Kentucky[p]	3	11	6	1	2	1	25	
	0.8	***1.3***	***0.7***	***0.2***	***0.9***	***1.9***	***0.9***	
Maryland[p]	3	2	5	11	9	10	40	14
	0.9	***0.3***	***0.5***	***1.1***	***1.6***	***7.0***	***1.0***	
Massachusetts[a]	2	4	5	2	8	5	26	13
	0.9	***0.7***	***0.5***	***0.2***	***1.1***	***2.9***	***0.7***	
Michigan[p]	4	10	16	14	5	5	57	
	0.7	***0.7***	***0.9***	***1.0***	***0.8***	***3.5***	***0.9***	
Mississippi[p]	3	0	4	8	1	0	16	
	0.8	***0.0***	***0.7***	***2.4***	***0.7***	***0.0***	***0.7***	
Missouri[p]	4	10	9	7	8	4	42	17
	1.1	***1.1***	***0.9***	***1.1***	***2.9***	***6.9***	***1.3***	
Nebraska[p]	1	4	9	5	2	1	22	20
	0.9	***1.2***	***2.1***	***1.6***	***1.6***	***3.8***	***1.6***	
Ohio[p]	0	3	3	3	1	2	12	
	0.0	***0.8***	***0.7***	***0.9***	***0.7***	***6.8***	***0.8***	
Tennessee[p]	3	9	11	5	6	1	35	
	0.6	***0.7***	***0.9***	***0.6***	***1.7***	***1.4***	***0.8***	
Virginia[p]	4	8	7	10	11	11	54	29

a Trisomy 13 Counts and Prevalence by Maternal Age, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal age (years)							
State	**<20**	**20–24**	**25–29**	**30–34**	**35–39**	**40+**	**Total***	**Notes**
	0.9	***0.7***	***0.5***	***0.8***	***1.6***	***6.5***	***1.0***	
Wisconsin[p]	2	2	8	6	7	2	27	
	0.7	***0.3***	***0.8***	***0.7***	***2.0***	***2.7***	***0.8***	
All pregnancy outcomes								
Arkansas[a]	2	5	6	6	2	1	22	2
	0.7	***0.8***	***1.1***	***1.8***	***1.5***	***3.9***	***1.1***	
Colorado[p]	2	8	8	29	30	7	89	4
	0.6	***1.0***	***0.8***	***3.4***	***6.7***	***6.9***	***2.6***	
Georgia/CDC[a]	1	7	7	13	11	6	45	7
	0.5	***1.2***	***1.0***	***1.9***	***2.7***	***5.9***	***1.7***	
Iowa[a]	0	5	14	5	4	5	33	8
	0.0	***1.0***	***2.1***	***1.1***	***2.2***	***13.7***	***1.7***	
North Carolina[a]	8	17	14	17	13	7	76	18
	1.1	***1.0***	***0.8***	***1.2***	***1.9***	***5.0***	***1.2***	
New Hampshire[a]	0	0	0	1	1	2	5	21
	0.0	***0.0***	***0.0***	***0.5***	***1.0***	***9.3***	***0.7***	
Oklahoma[a]	1	9	11	3	5	2	31	24
	0.3	***1.0***	***1.4***	***0.7***	***2.7***	***5.2***	***1.2***	
Puerto Rico[a]	3	6	4	6	8	3	30	25
	0.7	***0.8***	***0.7***	***1.6***	***5.1***	***8.7***	***1.3***	
Rhode Island[p]	0	2	1	1	5	0	10	26
	0.0	***1.6***	***0.7***	***0.7***	***6.2***	***0.0***	***1.7***	
South Carolina[a]	3	3	6	4	2	2	20	27
	1.3	***0.6***	***1.2***	***1.1***	***1.2***	***5.8***	***1.1***	
Texas[a]	15	46	40	35	34	21	191	28
	0.7	***1.0***	***0.9***	***1.1***	***2.2***	***6.4***	***1.2***	

a Trisomy 13 Counts and Prevalence by Maternal Age, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal age (years)							
State	**<20**	**20–24**	**25–29**	**30–34**	**35–39**	**40+**	**Total***	**Notes**
Utah[a]	2	12	10	14	13	5	56	
	1.1	***1.7***	***1.1***	***2.3***	***6.0***	***11.9***	***2.1***	

b Trisomy 13 Counts and Prevalence by Maternal Race/Ethnicity, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal race/ethnicity						
State	**White non-Hispanic**	**Black non-Hispanic**	**Hispanic**	**Asian and Pacific Islanders Non-Hispanic**	**American Indian/ Alaska Native Non-Hispanic**	**Total***	**Notes**
Live births							
Alaska[p]	<6	.	.	.	<6	7	1
	.	.	.	.	.	1.3	
Department of Defense[p]	40	19	7	1	0	68	6
	1.1	***2.3***	***1.1***	***0.4***	***0.0***	***1.2***	
Florida[p]	42	32	23	0	0	100	
	0.8	***1.3***	***0.7***	***0.0***	***0.0***	***0.9***	
Indiana[p]	14	4	5	0	0	23	10
	0.4	***0.7***	***1.3***	***0.0***	***0.0***	***0.5***	
Louisiana[a]	<5	<5	<5	0	0	9	12
	.	.	.	***0.0***	***0.0***	***0.7***	
Minnesota[a]	2	5	4	0	0	11	16
	0.3	***2.3***	***2.9***	***0.0***	***0.0***	***0.9***	
Nevada[p]	5	1	5	0	0	12	23
	0.6	***0.6***	***0.7***	***0.0***	***0.0***	***0.6***	
New Jersey[p]	5	4	6	1	0	17	22
	0.2	***0.5***	***0.4***	***0.2***	***0.0***	***0.3***	
New York[p]	42	18	22	8	0	90	
	0.7	***0.9***	***0.8***	***0.6***	***0.0***	***0.7***	

b Trisomy 13 Counts and Prevalence by Maternal Race/Ethnicity, 2006 to 2010 (Prevalence per 10,000 Live Births)

State	Maternal race/ethnicity: White non-Hispanic	Black non-Hispanic	Hispanic	Asian and Pacific Islanders Non-Hispanic	American Indian/ Alaska Native Non-Hispanic	Total*	Notes
Vermont[p]	1	0	0	0	0	1	30
	0.3	***0.0***	***0.0***	***0.0***	***0.0***	***0.3***	
West Virginia[p]	3	0	0	0	0	6	32
	0.3	***0.0***	***0.0***	***0.0***	***0.0***	***0.6***	
Live births and stillbirths							
Arizona[a]	16	4	24	7	2	53	3
	0.8	***2.1***	***1.2***	***4.5***	***0.7***	***1.1***	
Delaware[a]	1	0	0	0	0	1	5
	0.5	***0.0***	***0.0***	***0.0***	***0.0***	***0.3***	
Illinois[p]	70	19	12	4	0	106	9
	1.5	***1.3***	***0.6***	***0.9***	***0.0***	***1.2***	
Kansas[p]	4	0	2	2	0	13	11
	0.3	***0.0***	***0.6***	***3.5***	***0.0***	***0.7***	
Kentucky[p]	18	2	3	0	0	25	
	0.8	***0.8***	***2.1***	***0.0***	***0.0***	***0.9***	
Maryland[p]	21	13	3	2	0	40	14
	1.2	***1.0***	***0.6***	***0.8***	***0.0***	***1.0***	
Massachusetts[a]	18	3	5	0	0	26	13
	0.7	***0.9***	***0.9***	***0.0***	***0.0***	***0.7***	
Michigan[p]	37	12	3	2	0	57	
	0.9	***1.1***	***0.7***	***0.9***	***0.0***	***0.9***	
Mississippi[p]	6	9	0	1	0	16	
	0.5	***0.9***	***0.0***	***4.3***	***0.0***	***0.7***	
Missouri[p]	26	8	6	2	0	42	17
	1.1	***1.6***	***3.3***	***2.6***	***0.0***	***1.3***	
Nebraska[p]	14	2	5	0	0	22	20

b Trisomy 13 Counts and Prevalence by Maternal Race/Ethnicity, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal race/ethnicity						
State	**White non-Hispanic**	**Black non-Hispanic**	**Hispanic**	**Asian and Pacific Islanders Non-Hispanic**	**American Indian/ Alaska Native Non-Hispanic**	**Total***	**Notes**
	1.4	***2.3***	***2.5***	***0.0***	***0.0***	***1.6***	
Ohio[p]	10	2	0	0	0	12	
	0.9	***0.8***	***0.0***	***0.0***	***0.0***	***0.8***	
Tennessee[p]	17	12	3	1	0	35	
	0.6	***1.4***	***0.8***	***1.2***	***0.0***	***0.8***	
Virginia[p]	17	7	11	1	0	54	29
	0.6	***0.6***	***1.6***	***0.3***	***0.0***	***1.0***	
Wisconsin[p]	20	3	3	1	0	27	
	0.8	***0.9***	***0.9***	***0.7***	***0.0***	***0.8***	
All pregnancy outcomes							
Arkansas[a]	16	4	2	0	0	22	2
	1.2	***1.0***	***0.9***	***0.0***	***0.0***	***1.1***	
Colorado[p]	22	1	14	1	1	89	4
	1.1	***0.6***	***1.3***	***0.9***	***4.0***	***2.6***	
Georgia/CDC[a]	13	24	3	0	0	45	7
	1.7	***2.3***	***0.5***	***0.0***	***0.0***	***1.7***	
Iowa[a]	24	1	4	1	0	33	8
	1.4	***1.2***	***2.5***	***2.1***	***0.0***	***1.7***	
North Carolina[a]	34	23	14	2	1	76	18
	1.0	***1.5***	***1.3***	***1.0***	***1.1***	***1.2***	
New Hampshire[a]	3	1	0	0	0	5	21
	0.5	***8.8***	***0.0***	***0.0***	***0.0***	***0.7***	
Oklahoma[a]	20	4	2	0	5	31	24
	1.2	***1.6***	***0.6***	***0.0***	***1.7***	***1.2***	
Puerto Rico[a]	0	0	30	0	0	30	25
	.	.	***1.3***	.	.	***1.3***	

b Trisomy 13 Counts and Prevalence by Maternal Race/Ethnicity, 2006 to 2010 (Prevalence per 10,000 Live Births)

	Maternal race/ethnicity						
State	**White non-Hispanic**	**Black non-Hispanic**	**Hispanic**	**Asian and Pacific Islanders Non-Hispanic**	**American Indian/ Alaska Native Non-Hispanic**	**Total***	**Notes**
Rhode Island[p]	2	2	3	1	0	10	26
	0.6	***4.0***	***2.5***	***3.9***	***0.0***	***1.7***	
South Carolina[a]	8	10	1	0	0	20	27
	0.8	***1.7***	***0.6***	***0.0***	***0.0***	***1.1***	
Texas[a]	63	23	94	10	0	191	28
	1.1	***1.3***	***1.2***	***1.7***	***0.0***	***1.2***	
Utah[a]	37	2	16	1	0	56	
	1.8	***7.8***	***3.7***	***1.1***	***0.0***	***2.1***	

* Total includes unknown maternal age.

[a] active case-finding

[p] passive case-finding (with or without case confirmation).

* Total includes unknown race.

[a] active case-finding

[p] passive case-finding (with or without case confirmation).

Table 5

Change in Prevalence[a] of Down Syndrome, Trisomy 18, and Trisomy 13 by Pregnancy Outcomes

State category by pregnancy outcomes	Down syndrome (Trisomy 21)			Trisomy 18			Trisomy 13		
	2000–2004[b]	2006–2010	PR(95% CI)	2000–2004[b]	2006–2010	PR (95% CI)	2000–2004[b]	2006–2010	PR (95% CI)
Live births only[c] (n56)	12.17	12.33	1.01 (0.97,1.06)	1.23	1.41	1.15 (1.01,1.32)	0.87	0.70	0.80 (0.67,0.96)
Live births and stillbirths[d] (n59)	11.96	12.84	1.07 (1.03,1.12)	1.65	1.93	1.17 (1.05,1.30)	0.85	0.97	1.13 (0.97,1.32)
All pregnancy outcomes[e] (n59)	13.36	14.44	1.08 (1.04,1.12)	2.51	3.19	1.27 (1.17,1.38)	1.25	1.42	1.14 (1.01,1.28)

PR, prevalence ratio; CI, confidence intervals.

[a] Prevalence per 10,000 live births.

[b] Only states that reported for both periods were included. See footnotes 3–5 for the specific states. Source: NBDPN. Population-based Birth Defects Surveillance Data from Selected States, 2000–2004. Birth Defects Res A Clin Mol Teratol. 2007 Dec;79(12):874–942.

[c] States included Alaska, Florida, Indiana, New Jersey, New York, and West Virginia.

[d] States included Arizona, Delaware, Illinois, Massachusetts, Michigan, Mississippi, Tennessee, Virginia, and Wisconsin.

[e] States included Arkansas, Colorado, CDC/Georgia, Iowa, North Carolina, Oklahoma, Puerto Rico, Texas, and Utah.