CHAPTER 5

ADEQUACY OF PRENATAL CARE

Changes in Adequacy of Prenatal Care, 1996-2003

In 2003, in Massachusetts, adequacy of prenatal care as measured by the summary Adequacy of Prenatal Care and Utilization Index (APNCU)[16] fell slightly by less than 1% compared with 2002, 84.7% in 2002 to 84.5% in 2003 (Figure 15). Between 2002 and 2003, adequacy rates increased 2% for black non-Hispanic mothers, and decreased slightly for white non-Hispanic and Hispanic mothers (0.3% and 0.6%, respectively). In 2003, white non-Hispanic women had the highest percentage of adequate prenatal care (86.8%), followed by Asians (81.9%), Hispanics (78.5%), and black non-Hispanics (76.1%).

Components of the Adequacy of Prenatal Care Utilization Index

In Table 18, the two component indices, *initiation* and *received services* (visits), as well as the summary APNCU Index, are described. In 2003, the total percentage of mothers receiving adequate prenatal care ("adequate total") was 84.5%, including 44.5% of mothers who received "adequate basic" prenatal care (they began care in months 1-4 of pregnancy and received 80-109% of the expected number of prenatal visits), and 40.0% of mothers who received "adequate intensive" care (they began care in months 1-4 of pregnancy and received at least 110% of expected number of visits). Approximately 8% of mothers received "intermediate" care (they began care in months 5 or 6 of pregnancy and received 50-70% of expected number of visits). Approximately 1 out of 12 mothers (7.8%) received inadequate prenatal care in Massachusetts in 2003. This includes 235 mothers who received no prenatal care.

In 2003, more than 9 out of 10 Massachusetts mothers (92.8%) had adequate initiation of PNC (Table 18). Half (50.4%) began care in the third or fourth month of pregnancy ("adequate basic" initiation) while 42.5% began care in the first or second month of pregnancy ("adequate intensive" initiation). The sum of these two groups (50.4% + 42.5%) equals the total adequacy score ("adequate total") of 92.8% on the adequacy of initiation index.

Almost half (45.9%) of mothers had 80-109% of the expected number of prenatal care visits ("adequate basic" visits) (Table 18). In addition, 44.7% of mothers had at least 110% of the expected number of prenatal care visits ("adequate intensive" visits). A total of 90.5% (44.7% + 45.9%) of mothers received an adequate number of prenatal care visits.

Adequacy of Prenatal Care Utilization by Selected Maternal and Infant Characteristics

Adequacy of prenatal care increased with both age and educational level of the mother. Almost 9 out of 10 women ages 30 and above received adequate prenatal care; whereas, almost 1 in 5 women under age 18 had inadequate prenatal care (21.8%) (Table 19). Only 68.3% of women ages 18 and younger received adequate prenatal care, and 10.0% received intermediate prenatal care. Women with more education were more likely to receive adequate prenatal care: 90.4% of mothers with more than a college degree had adequate prenatal care, while only 70.7% of mothers with less than a high school education had adequate prenatal care. White non-Hispanic and Asian mothers had the highest adequacy levels, 86.8% and 81.9% respectively. Black non-Hispanic mothers had the lowest adequacy levels (76.1%), and Hispanic mothers had the second lowest (78.5%). Mothers who smoked during their pregnancies were over twice as likely to have inadequate prenatal care when compared with non-smokers, 15.8% vs. 7.1%. Mothers giving birth for the fourth or later time were almost twice as likely to have inadequate prenatal care compared with those giving birth for the first

[16] Milton Kotelchuck, see Appendix for details.

time (13.8% vs. 7.9%). Women who had multiple births were much more likely to receive adequate intensive services compared with mothers delivering a singleton: 82.2% vs. 37.9%. This in all likelihood reflects the higher risk and potential complications for delivery of multiple births. Similarly, women who delivered preterm infants (less than 37 weeks of gestation) were much more likely to have adequate intensive prenatal care than women who delivered at full term (37-42 weeks): 78.4% vs. 36.4%.

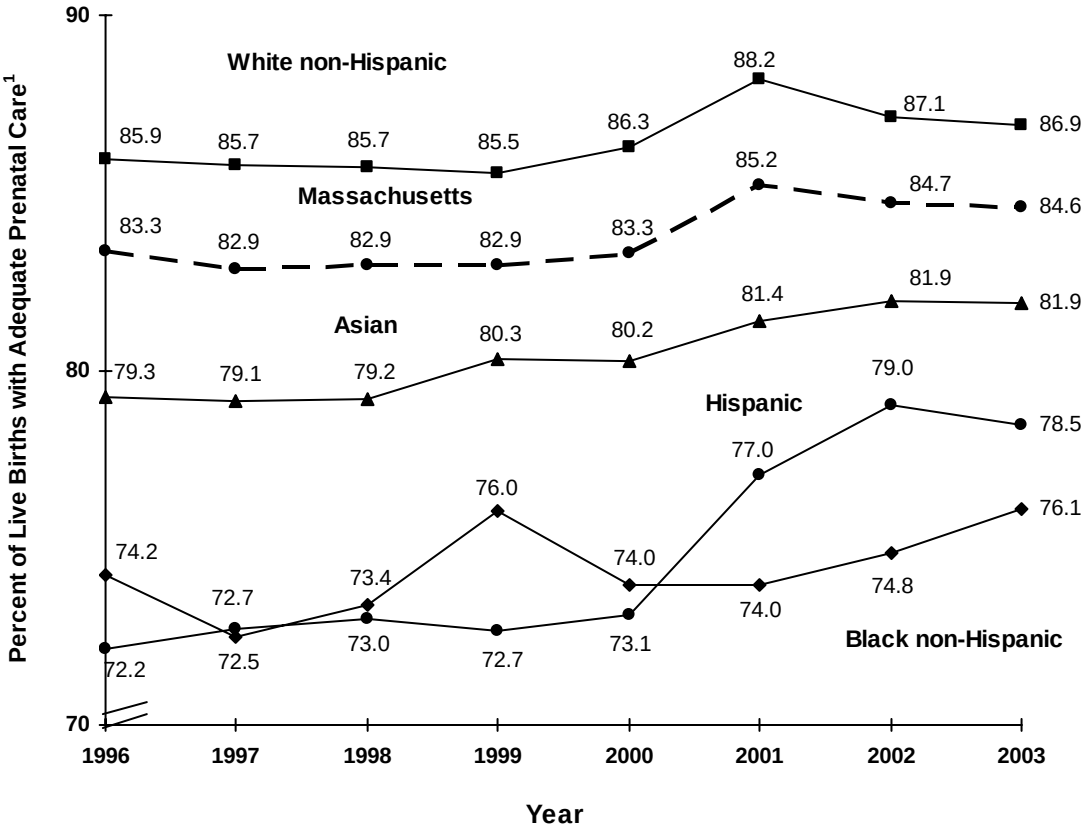
Adequacy of *Initiation* by Selected Maternal and Infant Characteristics

About 1 in 5 teenage mothers did not start prenatal care until their fifth month of pregnancy or had no prenatal care at all (Table 20). (This is the sum of intermediate and inadequate initiation, which equals 20.5% for all women less than 18 years old and 16% for women ages 18-19). Over 95% of mothers age 30 and above began prenatal care in their first four months of pregnancy (as shown by their adequate total scores in Table 20). White non-Hispanic mothers were more likely to have adequate prenatal care initiation (94.9%) than black non-Hispanic mothers (84.5%), Hispanic women (88.5%), and Asian women (90.1%). Mothers who smoked were over twice as likely to have inadequate prenatal care initiation compared with non-smoking mothers (5.9% vs. 2.3%).

Adequacy of *Received Services* (Visits) by Selected Maternal and Infant Characteristics

Older and more educated mothers had higher proportions of adequate PNC visits than did younger or less educated mothers (Table 21). The proportion of adequate prenatal visits by mothers' place of birth was lowest for mothers born in Puerto Rico and other U.S. Territories (87.1%). More than 4 out of 5 women (85.4%) delivering multiple births had an adequate intensive number of visits (at least 110% of the expected number of prenatal care visits adjusted for the length of pregnancy) compared with 42.6% of women who gave birth to singletons. Women who delivered LBW (<2,500 grams) infants were more likely to have adequate intensive care visits than women who delivered normal weight infants. Among those with inadequate visits, mothers who delivered LBW and VLBW infants had the largest percentage of inadequate visits.

Figure 15. Trends in Adequacy of Prenatal Care[1] by Race and Hispanic Ethnicity, Massachusetts: 1996-2003



PLEASE NOTE THAT THE VERTICAL SCALE OF GRAPH REPRESENTS A SMALL INTERVAL (from 70% to 90%) FOR PURPOSES OF VISUAL REPRESENTATION.

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

1. Based on the Adequacy of Prenatal Care Utilization (APNCU) Index.

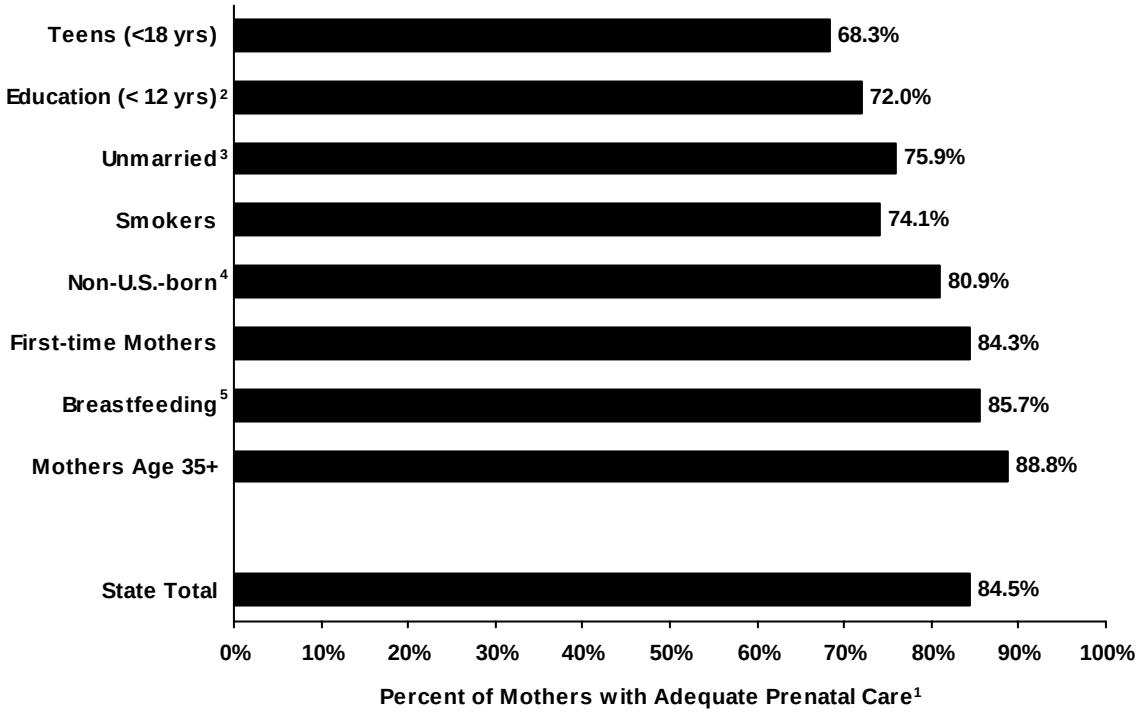
Table 18. Adequacy of Prenatal Care Utilization[1]: Summary and Component Indices, Massachusetts: 2003

	Adequate Total[2]		Adequate Intensive[3]		Adequate Basic[3]		Intermediate[3]		Inadequate[3]		Unknown[3]
	n	%	n	%	n	%	n	%	n	%	n
Summary Index[4]											
Adequacy of Prenatal Care Utilization	67,173	84.5	31,787	40.0	35,386	44.5	6,119	7.7	6,203	7.8	672
Component Indices[4]											
Adequacy of Initiation	73,809	92.8	33,748	42.5	40,061	50.4	3,611	4.5	2,075	2.6	672
Adequacy of Received Services (Visits)	71,979	90.5	35,509	44.7	36,470	45.9	6,648	8.4	868	1.1	672

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

1. Based on the Adequacy of Prenatal Care Utilization (APNCU) Index. 2. Adequate Total is the sum of Adequate Intensive and Adequate Basic categories. 3. For definitions of these categories, please see the Technical Notes in the Appendix. 4. For an explanation of the APNCU Index (summary index) and its component indices, please see Technical Notes in the Appendix.

Figure 16. Adequacy of Prenatal Care[1] for Selected Population Characteristics, Massachusetts: 2003



NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated. Characteristics of interest are not mutually exclusive, except as noted.

1. Based on the Adequacy of Prenatal Care Utilization (APNCU) Index. 2. Women 20 years of age and older. 3. Marital status at time of birth. 4. Non-U.S.-born includes women born outside of the 50 U.S. states, District of Columbia, and U.S. territories (Puerto Rico, U.S. Virgin Islands, Guam). 5. Mother was or was intending to breastfeed at the time the birth certificate was completed.

Table 19. Adequacy of Prenatal Care[1] by Selected Characteristics, Massachusetts: 2003

	Adequate Total[2]		Adequate Intensive		Adequate Basic		Intermediate		Inadequate		Unknown
	n	%	n	%	n	%	n	%	n	%	n
State Total	**67,173**	**84.5%**	**31,787**	**40.0%**	**35,386**	**44.5%**	**6,119**	**7.7%**	**6,203**	**7.8%**	**672**
Age	**Maternal Demographics**										
<18	1,029	68.3%	495	32.8%	534	35.4%	150	10.0%	328	21.8%	22
18-19	2,306	73.8%	1,076	34.4%	1,230	39.3%	285	9.1%	535	17.1%	40
20-24	9,014	76.7%	4,208	35.8%	4,806	40.9%	1,138	9.7%	1,601	13.6%	141
25-29	15,348	84.0%	7,192	39.4%	8,156	44.6%	1,496	8.2%	1,427	7.8%	165
30-34	23,332	87.5%	10,845	40.7%	12,487	46.8%	1,949	7.3%	1,375	5.2%	173
35-39	13,153	88.9%	6,378	43.1%	6,775	45.8%	897	6.1%	739	5.0%	100
40+	2,988	88.2%	1,590	46.9%	1,398	41.3%	203	6.0%	198	5.8%	30
Educational Attainment											
< than High School	5,517	70.7%	2,775	35.5%	2,742	35.1%	810	10.4%	1,479	18.9%	109
High School	15,824	80.9%	7,682	39.3%	8,142	41.6%	1,718	8.8%	2,017	10.3%	203
Some college	15,155	85.1%	7,471	41.9%	7,684	43.1%	1,300	7.3%	1,358	7.6%	131
College	18,990	88.8%	8,604	40.2%	10,386	48.6%	1,483	6.9%	904	4.2%	107
More than college	11,591	90.4%	5,205	40.6%	6,386	49.8%	796	6.2%	434	3.4%	61
Race/Hispanic Ethnicity											
Hispanic	7,581	78.5%	3,680	38.1%	3,901	40.4%	883	9.1%	1,197	12.4%	103
White non-Hispanic	49,704	86.8%	23,470	41.0%	26,234	45.8%	4,286	7.5%	3,263	5.7%	351
Black non-Hispanic	4,405	76.1%	2,165	37.4%	2,240	38.7%	421	7.3%	964	16.6%	112
Asian	4,253	81.9%	1,932	37.2%	2,321	44.7%	385	7.4%	552	10.6%	34
Other	1,178	76.7%	515	33.6%	663	43.2%	136	8.9%	221	14.4%	13
Birthplace											
U.S. States/D.C.	50,058	85.9%	23,807	40.8%	26,251	45.0%	4,501	7.7%	3,734	6.4%	451
Puerto Rico/U.S. Terr.	1,546	79.0%	749	38.3%	797	40.7%	193	9.9%	218	11.1%	26
Non-U.S.-Born	15,516	80.9%	7,211	37.6%	8,305	43.3%	1,420	7.4%	2,241	11.7%	180
Parity[3]	**Pregnancy-Related Factors**										
1	29,580	84.3%	13,834	39.4%	15,746	44.9%	2,707	7.7%	2,785	7.9%	214
2-3	33,354	85.6%	15,832	40.6%	17,522	45.0%	2,947	7.6%	2,670	6.9%	277
4+	4,170	77.6%	2,103	39.1%	2,067	38.5%	461	8.6%	742	13.8%	52
Smoking[4]											
Yes	4,482	74.1%	2,317	38.3%	2,165	35.8%	613	10.1%	954	15.8%	74
No	62,608	85.4%	29,431	40.1%	33,177	45.2%	5,490	7.5%	5,236	7.1%	532
Plurality	**Birth Outcomes**										
Singleton	63,633	84.0%	28,701	37.9%	34,932	46.1%	6,052	8.0%	6,054	8.0%	628
Multiple birth	3,540	94.2%	3,086	82.2%	454	12.1%	67	1.8%	149	4.0%	44
Birthweight											
<500 g	110	88.0%	102	81.6%	8	6.4%	2	--[4]	13	10.4%	5
500-1,499 g	874	91.4%	782	81.8%	92	9.6%	15	1.6%	67	7.0%	29
1,499-2,499 g	4,366	88.5%	3,526	71.5%	840	17.0%	169	3.4%	397	8.0%	68
2,500-3,999 g	54,443	84.0%	24,559	37.9%	29,884	46.1%	5,143	7.9%	5,195	8.0%	381
4,000+ g	7,368	84.8%	2,812	32.4%	4,556	52.4%	789	9.1%	530	6.1%	51
Gestational Age											
<28 weeks	446	90.5%	396	80.3%	50	10.1%	4	--[4]	43	8.7%	21
<37 weeks	6,180	90.1%	5,381	78.4%	799	11.6%	166	2.4%	516	7.5%	101
37-42 weeks	60,677	84.0%	26,286	36.4%	34,391	47.6%	5,922	8.2%	5,628	7.8%	366

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. Based on the Adequacy of Prenatal Care Utilization (APNCU) Index. See Glossary and Technical Notes in Appendix for definitions of Index and its categories. 2. Adequate Total is the sum of Adequate Intensive and Adequate Basic. 3. Parity is the number of live births including this birth. 4. Smoking during pregnancy is self-reported by the mother and should be interpreted with caution. 4. Calculations based on fewer than five events are excluded.

Table 20. Adequacy of Prenatal Care Initiation[1] by Selected Characteristics, Massachusetts: 2003

	Adequate Total[2]		Adequate Intensive		Adequate Basic		Intermediate		Inadequate		Unknown
	n	%	n	%	n	%	n	%	n	%	n
State Total	**73,809**	**92.8%**	**33,748**	**42.5%**	**40,061**	**50.4%**	**3,611**	**4.5%**	**2,075**	**2.6%**	**672**
Age					**Maternal Demographics**						
<18	1,197	79.4%	422	28.0%	775	51.4%	192	12.7%	118	7.8%	22
18-19	2,630	84.1%	992	31.7%	1,638	52.4%	343	11.0%	153	4.9%	40
20-24	10,272	87.4%	4,368	37.2%	5,904	50.2%	952	8.1%	529	4.5%	141
25-29	16,979	92.9%	7,860	43.0%	9,119	49.9%	805	4.4%	487	2.7%	165
30-34	25,412	95.3%	12,017	45.1%	13,395	50.3%	781	2.9%	463	1.7%	173
35-39	14,112	95.4%	6,630	44.8%	7,482	50.6%	428	2.9%	249	1.7%	100
40+	3,203	94.5%	1,456	43.0%	1,747	51.5%	110	3.2%	76	2.2%	30
Educational Attainment											
< than High School	6,431	82.4%	2,342	30.0%	4,089	52.4%	889	11.4%	486	6.2%	109
High School	17,697	90.5%	7,513	38.4%	10,184	52.1%	1,190	6.1%	672	3.4%	203
Some college	16,564	93.0%	7,555	42.4%	9,009	50.6%	805	4.5%	444	2.5%	131
College	20,575	96.2%	9,693	45.3%	10,882	50.9%	480	2.2%	322	1.5%	107
More than college	12,433	97.0%	6,598	51.5%	5,835	45.5%	240	1.9%	148	1.2%	61
Race/Hispanic Ethnicity											
Hispanic	8,548	88.5%	3,860	40.0%	4,688	48.5%	762	7.9%	351	3.6%	103
White non-Hispanic	54,311	94.9%	25,118	43.9%	29,193	51.0%	1,901	3.3%	1,041	1.8%	351
Black non-Hispanic	4,892	84.5%	2,282	39.4%	2,610	45.1%	477	8.2%	421	7.3%	112
Asian	4,676	90.1%	1,874	36.1%	2,802	54.0%	346	6.7%	168	3.2%	34
Other	1,322	86.1%	593	38.6%	729	47.5%	120	7.8%	93	6.1%	13
Birthplace											
U.S. States/D.C.	54,907	94.2%	25,308	43.4%	29,599	50.8%	2,233	3.8%	1,153	2.0%	451
Puerto Rico/U.S. Terr.	1,763	90.1%	781	39.9%	982	50.2%	133	6.8%	61	3.1%	26
Non-U.S.-Born	17,080	89.1%	7,620	39.7%	9,460	49.3%	1,237	6.5%	860	4.5%	180
Parity[3]					**Pregnancy-Related Factors**						
1	32,513	92.7%	15,034	42.9%	17,479	49.8%	1,614	4.6%	945	2.7%	214
2-3	36,542	93.8%	16,682	42.8%	19,860	51.0%	1,547	4.0%	882	2.3%	277
4+	4,681	87.1%	1,979	36.8%	2,702	50.3%	448	8.3%	244	4.5%	52
Smoking[4]											
Yes	5,174	85.5%	1,996	33.0%	3,178	52.5%	519	8.6%	356	5.9%	74
No	68,535	93.5%	31,710	43.2%	36,825	50.2%	3,084	4.2%	1,715	2.3%	532
Plurality					**Birth Outcomes**						
Singleton	70,189	92.7%	31,905	42.1%	38,284	50.5%	3,506	4.6%	2,044	2.7%	628
Multiple birth	3,620	96.4%	1,843	49.1%	1,777	47.3%	105	2.8%	31	0.8%	44
Birthweight											
<500 g	112	89.6%	49	39.2%	63	50.4%	7	5.6%	6	4.8%	5
500-1,499 g	901	94.2%	483	50.5%	418	43.7%	35	3.7%	20	2.1%	29
1,499-2,499 g	4,572	92.7%	2,145	43.5%	2,427	49.2%	232	4.7%	128	2.6%	68
2,500-3,999 g	59,998	92.6%	27,312	42.2%	32,686	50.5%	3,027	4.7%	1,756	2.7%	381
4,000+ g	8,213	94.5%	3,753	43.2%	4,460	51.3%	309	3.6%	165	1.9%	51
Gestational Age											
<28 weeks	454	92.1%	227	46.0%	227	46.0%	21	4.3%	18	3.7%	21
<37 weeks	6,394	93.2%	3,183	46.4%	3,211	46.8%	323	4.7%	145	2.1%	101
37-42 weeks	67,065	92.9%	30,430	42.1%	36,635	50.7%	3,256	4.5%	1,906	2.6%	366

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. Based on the Adequacy of Initiation Index, a component index of the APNCU Index. See Glossary and Technical Notes in Appendix for definitions of Index and its categories. 2. Adequate Total is the sum of Adequate Intensive and Adequate Basic. 3. Parity is the number of live births including this birth.
4. Smoking during pregnancy is self-reported by the mother and should be interpreted with caution. 4. Calculations based on fewer than five events are excluded.

Table 21. Adequacy of Prenatal Care Visits[1] by Selected Characteristics, Massachusetts: 2003

	Adequate Total[2]		Adequate Intensive		Adequate Basic		Intermediate		Inadequate		Unknown
	n	%	n	%	n	%	n	%	n	%	n
State Total	**71,979**	**90.5%**	**35,509**	**44.7%**	**36,470**	**45.9%**	**6,648**	**8.4%**	**868**	**1.1%**	**672**
Age	**Maternal Demographics**										
<18	1,289	85.5%	697	46.3%	592	39.3%	179	11.9%	39	2.6%	22
18-19	2,716	86.9%	1,399	44.8%	1,317	42.1%	339	10.8%	71	2.3%	40
20-24	10,241	87.1%	5,130	43.6%	5,111	43.5%	1,285	10.9%	227	1.9%	141
25-29	16,450	90.0%	8,020	43.9%	8,430	46.1%	1,617	8.9%	204	1.1%	165
30-34	24,405	91.6%	11,695	43.9%	12,710	47.7%	2,059	7.7%	192	0.7%	173
35-39	13,735	92.9%	6,854	46.3%	6,881	46.5%	950	6.4%	104	0.7%	100
40+	3,140	92.7%	1,711	50.5%	1,429	42.2%	218	6.4%	31	0.9%	30
Educational Attainment											
< than High School	6,629	84.9%	3,625	46.4%	3,004	38.5%	972	12.5%	205	2.6%	109
High School	17,356	88.7%	8,844	45.2%	8,512	43.5%	1,906	9.7%	297	1.5%	203
Some college	16,230	91.1%	8,301	46.6%	7,929	44.5%	1,401	7.9%	182	1.0%	131
College	19,719	92.2%	9,194	43.0%	10,525	49.2%	1,532	7.2%	126	0.6%	107
More than college	11,942	93.1%	5,490	42.8%	6,452	50.3%	824	6.4%	55	0.4%	61
Race/Hispanic Ethnicity											
Hispanic	8,538	88.4%	4,410	45.6%	4,128	42.7%	987	10.2%	136	1.4%	103
White non-Hispanic	52,221	91.2%	25,435	44.4%	26,786	46.8%	4,530	7.9%	502	0.9%	351
Black non-Hispanic	5,126	88.5%	2,729	47.1%	2,397	41.4%	522	9.0%	142	2.5%	112
Asian	4,684	90.3%	2,262	43.6%	2,422	46.7%	444	8.6%	62	1.2%	34
Other	1,353	88.1%	645	42.0%	708	46.1%	156	10.2%	26	1.7%	13
Birthplace											
U.S. States/D.C.	52,896	90.7%	26,005	44.6%	26,891	46.1%	4,814	8.3%	583	1.0%	451
Puerto Rico/U.S. Terr.	1,704	87.1%	865	44.2%	839	42.9%	220	11.2%	33	1.7%	26
Non-U.S.-Born	17,319	90.3%	8,613	44.9%	8,706	45.4%	1,608	8.4%	250	1.3%	180
Parity[3]	**Pregnancy-Related Factors**										
1	31,775	90.6%	15,546	44.3%	16,229	46.3%	2,921	8.3%	376	1.1%	214
2-3	35,416	90.9%	17,446	44.8%	17,970	46.1%	3,173	8.1%	382	1.0%	277
4+	4,717	87.8%	2,498	46.5%	2,219	41.3%	550	10.2%	106	2.0%	52
Smoking[4]											
Yes	5,163	85.4%	2,833	46.8%	2,330	38.5%	712	11.8%	174	2.9%	74
No	66,725	91.0%	32,633	44.5%	34,092	46.5%	5,917	8.1%	692	0.9%	532
Plurality	**Birth Outcomes**										
Singleton	68,310	90.2%	32,302	42.6%	36,008	47.5%	6,577	8.7%	852	1.1%	628
Multiple birth	3,669	97.7%	3,207	85.4%	462	12.3%	71	1.9%	16	0.4%	44
Birthweight											
<500 g	117	93.6%	107	85.6%	10	8.0%	2	--[4]	6	4.8%	5
500-1,499 g	911	95.3%	814	85.1%	97	10.1%	17	1.8%	28	2.9%	29
1,499-2,499 g	4,651	94.3%	3,760	76.2%	891	18.1%	198	4.0%	83	1.7%	68
2,500-3,999 g	58,493	90.3%	27,675	42.7%	30,818	47.6%	5,606	8.7%	682	1.1%	381
4,000+ g	7,794	89.7%	3,146	36.2%	4,648	53.5%	824	9.5%	69	0.8%	51
Gestational Age											
<28 weeks	468	94.9%	413	83.8%	55	11.2%	4	--[4]	21	4.3%	21
<37 weeks	6,545	95.4%	5,689	82.9%	856	12.5%	199	2.9%	118	1.7%	101
37-42 weeks	65,082	90.1%	29,676	41.1%	35,406	49.0%	6,410	8.9%	735	1.0%	366

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. Based on the Adequacy of Received Services (Visits) Index, a component index of the APNCU Index. See Glossary and Technical Notes in Appendix for definitions of Index and its categories. 2. Adequate Total is the sum of Adequate Intensive and Adequate Basic. 3. Parity is the number of live births including this birth. 4. Smoking during pregnancy is self-reported by the mother and should be interpreted with caution. 4. Calculations based on fewer than five events are excluded.

CHAPTER 6

PRENATAL CARE SOURCE OF PAYMENT

Prenatal Care Payment Source

In 2003, among all births to Massachusetts women, 70.0% were to mothers who had their prenatal care (PNC) paid for by private sources (commercial indemnity plans, commercial managed care organizations (HMO, PPO/IPP/IPA, etc.), or other private insurance) (Figure 17). Public entitlement programs, including Commonhealth, Medicaid/MassHealth and Healthy Start (a Massachusetts-funded program), covered the prenatal care expenses for 28.9% of all births to Massachusetts women in 2003 as compared with 28.5% in 2002. Although this year's increase over last is modest (1.4%), the percentage has increased each year from 1996 (24.2%) to 2003, which is an increase of 19%. Finally, 1.1% of all births were considered "self-pay", which often means that mothers had no sources of payment (0.7%) or had their care paid for by other sources (0.4%).

Contrasting of Women Who had Publicly Financed and Privately Insured Prenatal Care

Maternal and birth characteristics varied according to whether prenatal care was financed through public programs or through private insurance. Overall in Massachusetts, about 1 in 4 mothers had her prenatal care financed by Medicaid. However, Medicaid financing varied largely by race and Hispanic ethnicity. About half of Hispanic and black non-Hispanic mothers had their PNC financed by Medicaid; whereas, 23.0% of Asian and 15.3% of white non-Hispanic mother's PNC was Medicaid financed (Table 22).

Among women whose prenatal care was funded by Medicaid/MassHealth, 15.5% were under the age of 20. In contrast, only 2.0% of women whose prenatal care was privately insured were under age 20 (Table 22). Hispanic women had the highest proportion of mothers under the age of 20 with both publicly (20.0%) and privately (8.0%) funded prenatal care.

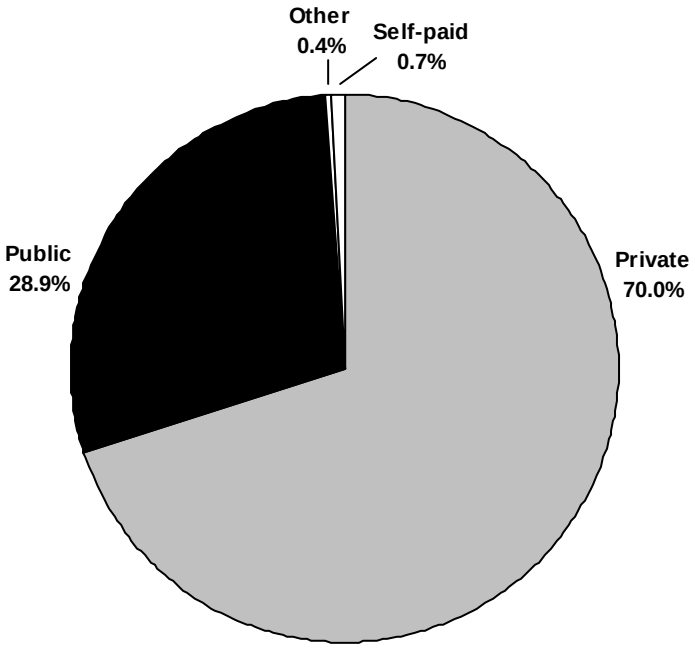
Overall, women whose prenatal care was publicly funded had a higher proportion of low birthweight (8.5%) than women whose prenatal care was privately insured (7.1%). However, this relationship between prenatal care payment source and low birthweight varied by race/ethnicity (Table 22). White non-Hispanic and Hispanic women with publicly financed prenatal care were more likely to have low birthweight infants when compared with those with private insurance. However, among black non-Hispanic and Asian women, there was little difference in infants' low birthweight based on prenatal care insurance source. Black non-Hispanic women with private insurance were somewhat more likely to have low birthweight infants (12.5%) compared with those with publicly financed insurance (11.3%).

Women whose prenatal care was publicly financed were less likely to receive adequate prenatal care. This was true overall and for each race and ethnicity group. For example, 69.0% of black non-Hispanic women whose prenatal care was publicly financed received adequate prenatal care, while 88.6% of black non-Hispanic women with private insurance received adequate prenatal care (Table 22).

Overall, women with publicly funded prenatal care were less likely to deliver by Cesarean section (25.5%), compared with women with private insurance (31.0%). Among mothers whose prenatal care was publicly funded, black non-Hispanics have the highest percentage of Cesarean section (28.5%) and Asians have the lowest rate (19.6%). Among mothers with private funding for prenatal care, black non-Hispanic mothers have the highest Cesarean section rate (34.3%), and Hispanics have the lowest (28.3%).

Women of all race and ethnicity groups whose prenatal care was publicly funded were less likely to report breastfeeding or the intent to breastfeed (69.2%) compared with women who had private insurance (81.8%). The lowest breastfeeding rates were found among Asian women (64.2%) and white non-Hispanic (61.8%) women (Table 22).

Figure 17. Distribution of Prenatal Care Payment Source[1], Massachusetts: 2003



NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

1. Private: Commercial indemnity plan, commercial managed care (HMO, PPO, IPP, IPA, and other), or other private insurance. Public: Government programs including Commonhealth, Healthy Start, Medicaid/MassHealth, and Medicare (may also be HMO or managed care), or free care. Other: Worker's Compensation and other sources.

Table 22. Birth Characteristics by Race/Hispanic Ethnicity and Source of Prenatal Care Payment (Public/Private) -- Massachusetts: 2003

Race/Ethnicity and Payment Source	Births[1]		Teen Births				Birthweight			
			<18 Years		<20 Years		Very Low[2]		Low[3]	
	n	%	n	%	n	%	n	%	N	%
STATE TOTAL[4]	**80,167**	**100.0**	**1,529**	**1.9**	**4,695**	**5.9**	**1,115**	**1.4**	**6,115**	**7.6**
Public	22,685	28.9	1,098	4.8	3,472	15.3	327	1.4	1,925	8.5
Medicaid[5]	17,948	22.9	889	5.0	2,783	15.5	265	1.5	1,532	8.5
Other Public[6]	4,737	6.0	209	4.4	689	14.5	62	1.3	393	8.3
Private[7]	54,913	70.0	380	0.7	1,073	2.0	697	1.3	3,889	7.1
White non-Hispanic	**57,604**	**100.0**	**593**	**1.0**	**2,223**	**3.9**	**714**	**1.2**	**4,038**	**7.0**
Public	10,398	18.5	345	3.3	1,454	14.0	107	1.0	793	7.6
Medicaid[5]	8,590	15.3	309	3.6	1,249	14.5	95	1.1	672	7.8
Other Public[6]	1,808	3.2	36	2.0	205	11.3	12	0.7	121	6.7
Private[7]	45,237	80.5	223	0.5	687	1.5	542	1.2	3,028	6.7
Black non-Hispanic	**5,902**	**100.0**	**201**	**3.4**	**557**	**9.4**	**185**	**3.1**	**715**	**12.1**
Public	3,417	58.9	167	4.9	446	13.1	97	2.8	387	11.3
Medicaid[5]	2,661	45.9	129	4.8	345	13.0	75	2.8	307	11.5
Other Public[6]	756	13.0	38	5.0	101	13.4	22	2.9	80	10.6
Private[7]	2,312	39.9	27	1.2	93	4.0	76	3.3	288	12.5
Hispanic	**9,764**	**100.0**	**619**	**6.3**	**1,581**	**16.2**	**128**	**1.3**	**805**	**8.2**
Public	6,614	68.2	498	7.5	1,312	19.8	87	1.3	565	8.5
Medicaid[5]	4,788	49.4	369	7.7	957	20.0	64	1.3	396	8.3
Other Public[6]	1,826	18.8	129	7.1	355	19.4	23	1.3	169	9.3
Private[7]	2,943	30.3	107	3.6	235	8.0	38	1.3	224	7.6
Asian	**5,224**	**100.0**	**69**	**1.3**	**182**	**3.5**	**60**	**1.1**	**421**	**8.1**
Public	1,392	26.9	52	3.7	140	10.1	23	1.7	111	8.0
Medicaid[5]	1,190	23.0	49	4.1	129	10.8	21	1.8	95	8.0
Other Public[6]	202	3.9	3	--[8]	11	5.4	2	--[8]	16	7.9
Private[7]	3,746	72.3	13	0.3	36	1.0	32	0.9	301	8.0
Other[9]	**1,548**	**100.0**	**45**	**2.9**	**146**	**9.4**	**24**	**1.6**	**126**	**8.1**
Public	851	56.2	35	4.1	117	13.7	13	1.5	68	8.0
Medicaid[5]	711	47.0	32	4.5	101	14.2	10	1.4	61	8.6
Other Public[6]	140	9.3	3	--[8]	16	11.4	3	--[8]	7	5.0
Private[7]	630	41.6	10	1.6	22	3.5	8	1.3	44	7.0

Table 22 (cont'd). Birth Characteristics by Race/Hispanic Ethnicity and Source of Prenatal Care Payment (Public/Private) -- Massachusetts: 2003

Race/Ethnicity and Payment Source	Prenatal Care: Adequate[10] n	Prenatal Care: Adequate[10] %	Prenatal Care: Began 1st Trimester n	Prenatal Care: Began 1st Trimester %	Cesarean Section n	Cesarean Section %	Breastfeeding[11] n	Breastfeeding[11] %
STATE TOTAL[4]	**67,173**	**84.5**	**66,789**	**83.9**	**23,392**	**29.3**	**61,388**	**78.1**
Public	16,801	74.8	16,125	71.6	5,773	25.5	15,656	69.2
Medicaid[5]	13,484	75.7	12,946	72.5	4,567	25.5	12,150	67.8
Other Public[6]	3,317	71.4	3,179	68.0	1,206	25.7	3,506	74.7
Private[7]	48,702	89.0	48,971	89.4	16,987	31.0	44,856	81.8
White non-Hispanic	**49,704**	**86.8**	**49,980**	**87.2**	**17,235**	**30.1**	**43,338**	**77.0**
Public	7,972	77.1	7,659	74.0	2,676	25.8	6,411	61.8
Medicaid[5]	6,604	77.2	6,352	74.2	2,195	25.6	5,111	59.6
Other Public[6]	1,368	76.6	1,307	73.0	481	26.8	1,300	72.5
Private[7]	40,307	89.4	40,872	90.5	14,064	31.2	36,369	80.6
Black non-Hispanic	**4,405**	**76.1**	**4,195**	**71.9**	**1,808**	**30.8**	**4,644**	**79.5**
Public	2,302	69.0	2,194	65.1	972	28.5	2,551	74.8
Medicaid[5]	1,857	71.2	1,766	67.0	756	28.5	2,005	75.4
Other Public[6]	445	61.3	428	58.2	216	28.7	546	72.6
Private[7]	2,037	88.6	1,932	83.9	787	34.3	2,007	87.1
Hispanic	**7,581**	**78.5**	**7,358**	**76.0**	**2,507**	**25.8**	**7,840**	**80.8**
Public	4,939	75.4	4,814	73.3	1,635	24.8	5,118	77.8
Medicaid[5]	3,658	77.0	3,576	75.1	1,202	25.2	3,733	78.1
Other Public[6]	1,281	71.4	1,238	68.6	433	24.0	1,385	76.8
Private[7]	2,544	86.7	2,447	83.3	830	28.3	2,574	87.6
Asian	**4,253**	**81.9**	**4,044**	**77.9**	**1,386**	**26.6**	**4,266**	**82.1**
Public	984	71.3	873	63.1	272	19.6	893	64.2
Medicaid[5]	846	71.6	746	63.0	223	18.7	738	62.0
Other Public[6]	138	69.0	127	63.5	49	24.4	155	77.1
Private[7]	3,228	86.4	3,130	83.7	1,096	29.3	3,322	88.7
Other[9]	**1,178**	**76.7**	**1,158**	**75.2**	**432**	**28.1**	**1,259**	**82.8**
Public	595	70.3	578	68.2	214	25.2	677	79.6
Medicaid[5]	512	72.3	502	70.8	187	26.4	559	78.7
Other Public[6]	83	60.1	76	55.1	27	19.3	118	84.3
Private[7]	549	87.8	549	87.6	198	31.6	552	87.6

NOTE: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.
1. In the "Births" column, percentages are based on race/ethnicity category totals (in column). For all other characteristics, percentages are based on the total number of births for the race/ethnicity by payment source for the row. 2. Very low birthweight: less than 1,500 grams or 3.3 pounds. 3. Low Birthweight: less than 2,500 grams or 5.5 pounds. 4. Total births do not equal Public + Private because Workers' Compensation, self-paid, and other are in the state total but not shown in the table. 5. Medicaid/MassHealth. 6. Other Public: Commonhealth, Healthy Start, Medicare, other government programs, and free care.
7. Private: commercial indemnity plans or commercial managed care orgs. (HMO, PPO, IPP, or IPA). 8. Calculations based on fewer than five events are excluded. 9. Other: Mothers who designated their race as American Indian or "Other." 10. Based on the Adequacy of Prenatal Care Utilization (APNCU) Index. 11. Mother was intending to breastfeed at the time the birth certificate was completed.

CHAPTER 7

CESAREAN SECTION DELIVERIES BY HOSPITAL

Introduction

In 2003, 81,310 births occurred in Massachusetts, which is a decrease of 14% since 1990 (94,406 births) (Table 23).

Please note: the percentages and rates provided in Tables 23, 24, 25, and 26 are based on occurrence births (births that occurred in Massachusetts but whose mothers are both Massachusetts and non-Massachusetts residents) and differ from data presented elsewhere in this report, which are based on only Massachusetts residents.

Cesarean Section Delivery by Facility

Cesarean section was the method of delivery for 29.5%[17] of the live births occurring in Massachusetts ("occurrence births") in 2003 (Table 23), up 5% from the 2002 rate of 28.2%. Since 1997, there has been a 49% increase in the percentage of Cesarean section deliveries in Massachusetts, from 19.8% in 1997 to 29.5% in 2003, after a steady decline in Cesarean sections from 1990 (22.5%) to 1997 (19.8%) (data not shown). Calculations are based on births with known method of delivery. Note: facility-specific highlights in this chapter focus on facilities with at least 40 births in the category of interest. Data for all facilities are provided in Tables 23 and 24.

In 2003, the following facilities had Cesarean section delivery rates at least 15% below or at least 15% above the state rate of 29.5% (Table 23):

Eleven facilities had cesarean section rates below 25.1% (15% below the state rate):

- Tobey Hospital
- Heywood Memorial Hospital
- Berkshire Medical Ctr.
- Mercy Medical Ctr.
- Holyoke Hospital
- Leominster Hospital
- Saint Vincent Hospital
- St. Luke's Hospital
- Mount Auburn Hospital
- Jordan Hospital
- Franklin Medical Ctr.

Eight facilities had cesarean section rates above 33.9% (15% above the state rate):

- Melrose-Wakefield Hospital
- Metrowest Med. Center-Framingham
- Saints Memorial Med. Ctr.
- North Adams Regional Hospital
- Caritas St. Elizabeth's Med. Ctr.
- Beth Israel Deaconess Med. Ctr.
- Holy Family Hospital and Med. Ctr.
- Tufts-New England Med. Ctr Hospital

[17] Percentages of method of delivery in Table 23 are calculated in following manner:

- Percentage of total Cesarean sections = (Total Cesarean Births / All Births) x 100.
- Percentage primary Cesarean sections = (Primary Cesarean Sections / (All Births - Repeat Cesarean Sections -VBACs)) x 100.
- Percentage repeat Cesarean sections = (Repeat Cesarean Sections / (Repeat Cesarean Sections + VBACs)) x 100.
- Percentage of vaginal birth after Cesarean section delivery (VBACs) = (VBAC deliveries / (Repeat Cesarean Sections + VBAC)) x 100. Please note: the sum of the percentages of repeat Cesarean section deliveries + VBACs = 100% of all deliveries of mothers with a prior Cesarean section.

Primary Cesarean Section Deliveries

The primary Cesarean section delivery rate is defined as the proportion of live births delivered by Cesarean section to mothers with no previous history of a Cesarean section. This rate was 21.4% statewide in 2003, up 4% from the 2002 rate of 20.5%.

In 2003, the following facilities had primary Cesarean section delivery rates at least 15% below or at least 15% above the state rate of 21.4% (Table 23):

Sixteen facilities had this rate below 18.2% (15% below the state rate):

Tobey Hospital	Lawrence General Hospital
Heywood Memorial Hospital	Harrington Memorial Hospital
Leominster Hospital	Anna Jaques Hospital
Mercy Medical Ctr.	Cape Cod Hospital
Berkshire Medical Ctr.	Jordan Hospital
St. Luke's Hospital	Franklin Medical Ctr.
Holyoke Hospital	Saint Vincent Hospital
Morton Hospital	Mount Auburn Hospital

Six facilities had this rate above 24.7% (15% above the state rate):

Saints Memorial Med. Ctr.	Caritas St. Elizabeth's Med. Ctr.
Holy Family Hospital and Med. Ctr.	Beth Israel Deaconess Med. Ctr.
North Adams Regional Hospital	Tufts-New England Med. Ctr. Hospital

Repeat Cesarean Section Deliveries

The proportion of live births delivered by Cesarean section to mothers with a prior Cesarean section is known as the repeat Cesarean section delivery rate. This rate was 87.5% in 2003, up 3% from the 2002 rate of 85.3%.

Repeat Cesarean section delivery rates were lowest at Heywood Memorial Hospital (73.9%), Berkshire Medical Center (74.7%), and Franklin Medical Center (77.6%). Facilities with high rates of repeat Cesarean section deliveries include Caritas Good Samaritan Medical Center (97.9%), Falmouth Hospital (100.0%), and Metrowest Medical Center-Framingham Union Campus (100.0%) (Table 23).

Vaginal Birth after Cesarean Section (VBAC) Deliveries

The proportion of live births delivered vaginally to mothers with a prior Cesarean section is known as the vaginal birth after a Cesarean section (VBAC) delivery rate. Since women with a history of Cesarean section delivery must deliver either by repeat Cesarean section or VBAC, these two percentages add to 100. In 2003, the VBAC rate was 12.5%, down 15% from the 2002 rate of 14.7%. In 1996, the VBAC rate peaked at 34.0% (trend data not shown), and it has been declining since then.

In 2003, only eight facilities had over 40 births delivered through VBAC. The VBAC delivery rate among these facilities ranged from 9.4% for South Shore Hospital to 21.2% for Saint Vincent Hospital. The other six facilities with over 40 births delivered through VBAC were Massachusetts General Hospital (12.9%), UMass Memorial Medical Center - West Campus (13.8%), Beverly Hospital (14.0%), Beth Israel Deaconess Medical Center (14.3%), Baystate Medical Center (16.0%), and Brigham and Women's Hospital (19.5%).

Since the sum of the percentage of repeat Cesarean section deliveries and vaginal births after Cesareans (VBACs) equals 100% of all births to mothers with a prior Cesarean section, facilities with the lowest repeat Cesarean section delivery rates had the highest VBAC rates. In 2003, as in 2002, none of the maternity facilities had a VBAC rate over 30%; whereas, in past years there were some facilities with VBAC rates over 40% (one in 2001, two in 2000, four in 1999, and 13 in 1998).

Cesarean Section Deliveries for Singleton Births

Cesarean section was the method of delivery for 29.1% of singleton births to mothers who gave birth to their first child in a Massachusetts licensed maternity facility in 2003 (Table 24), up 4% from the 2002 rate of 28.1% .

In 2003, the following facilities had cesarean section delivery rates for singleton births to mothers who gave birth to their first child at least 15% below and at least 15% above the state rate of 29.1% (Table 24):

Eleven facilities had this rate below 24.7% (15% below the state rate):

- Tobey Hospital
- Holyoke Hospital
- Heywood Memorial Hospital
- Berkshire Medical Ctr.
- Martha's Vineyard Hospital
- Leominster Hospital
- Morton Hospital
- Lawrence General Hospital
- St. Luke's Hospital
- UMass Memorial Med. Ctr. - West Campus
- Jordan Hospital

Thirteen facilities had this rate above 32.3% (15% above the state rate):

- Winchester Hospital
- Sturdy Memorial Hospital
- Saints Mem. Med. Ctr.
- Caritas St. Elizabeth's Ctr. of Boston
- Milford-Whitinsville Regional Hospital
- Metrowest Med. Ctr. -Framingham
- Beth Israel Deaconess Medical Ctr.
- Newton-Wellesley Hospital
- Emerson Hospital
- Caritas Good Samaritan Medical Ctr.
- Caritas Norwood Hospital
- Holy Family Hospital and Medical Ctr.
- North Adams Regional Hospital

In 2003, cesarean section was the method of delivery for 8.8% of singleton births to mothers having the second or later birth who had no prior cesarean section, compared with 8.7% in 2002. The following facilities had this rate at least 15% below and at least 15% above the state rate of 8.1% (Table 24):

Fifteen facilities had this rate below 7.5% (15% below the state rate):

- Heywood Memorial Hospital
- Franklin Medical Ctr
- Mount Auburn Hospital
- Jordan Hospital
- Cape Cod Hospital
- Tobey Hospital

Cooley Dickinson Hospital
Saint Vincent Hospital
Mercy Medical Center
Leominster Hospital
Berkshire Medical Ctr
St. Luke's Hospital
Anna Jaques Hospital
Caritas Norwood Hospital
Lawrence General Hospital

Thirteen facilities had this rate above 10.1% (15% above the state rate):

Massachusetts General Hospital
Holy Family Hospital and Med. Ctr.
Saints Memorial Med. Ctr.-St. John's
Caritas Good Samaritan Med. Center
Holyoke Hospital
North Shore Med. Ctr.- Salem Hospital
Beth Israel Deaconess Medical Center
Charlton Memorial Hospital
Melrose-Wakefield Hospital
Tufts-New England Medical Ctr. Hospital
Boston Medical Ctr.
Brockton Hospital
Mary Lane Hospital

In 2003, Cesarean section was the method of delivery for 87.3% of singleton births to mothers having their second or later birth who had prior Cesarean sections, up 3% from the 2002 rate of 84.8%. Heywood Memorial Hospital (71.0%) and Berkshire Medical Center (73.3%) had the lowest rates. Caritas Good Samaritan Medical Center (97.7%), Falmouth Hospital (100%), and Metrowest Medical Center-Framingham Union Campus (100%) had the highest rates (Table 24).

Table 23. Cesarean Section Deliveries and Vaginal Births after Cesarean Section (VBACs) by Licensed Maternity Facility[1], All Births, Massachusetts: 2003

Facility	Occurrence Births[2]	Total C-Sections		Primary C-Section[2]		Repeat C-Section[2]		VBACs[2]	
		n	%[3,4]	n	%[3,5]	n	%[3,6]	n	%[7]
State Total	**81,310**	**23,860**	**29.5**	**15,150**	**21.4**	**8,710**	**87.5**	**1,240**	**12.5**
Anna Jaques Hspt.	792	206	26.0	119	17.3	87	82.1	19	17.9
Baystate Med. Ctr.	4,283	1,145	27.7	741	20.3	404	84.0	77	16.0
Berkshire Med. Ctr.	788	170	21.6	108	15.3	62	74.7	21	25.3
Beth Israel Deaconess Med. Ctr.	5,035	1,819	36.1	1,191	27.7	628	85.7	105	14.3
Beverly Hspt.	2,312	647	28.0	396	19.6	251	86.0	41	14.0
Boston Med. Ctr.	2,087	555	26.6	361	19.4	194	86.2	31	13.8
Brigham And Women's Hspt.	9,402	2,925	31.2	2,014	24.5	911	80.5	220	19.5
Brockton Hspt.	1,219	364	29.9	254	23.5	110	79.1	29	20.9
Cambridge Hspt.	1,066	274	26.7	179	19.6	95	81.9	21	18.1
Cape Cod Hspt.	1,001	271	27.1	149	17.3	122	85.9	20	14.1
Caritas Good Samaritan Med. Ctr.	1,021	341	33.4	203	23.1	138	97.9	3	--[9]
Caritas Norwood Hspt.	644	210	32.7	138	24.6	72	87.8	10	12.2
Caritas St. Elizabeth's	1,464	520	35.6	341	27.0	179	91.3	17	8.7
Charlton Memorial Hspt.	1,729	504	29.1	329	21.4	175	90.2	19	9.8
Cooley Dickinson Hspt.	911	243	26.7	148	18.6	95	81.9	21	18.1
Emerson Hspt.	1,319	428	32.4	273	23.8	155	90.6	16	9.4
Fairview Hspt.	174	47	27.0	23	15.4	24	96.0	1	--[9]
Falmouth Hspt.	641	173	27.0	106	18.5	67	100.0	0	0.0
Franklin Med. Ctr.	464	116	25.0	71	17.5	45	77.6	13	22.4
Harrington Memorial Hspt.	462	117	25.9	68	17.3	49	84.5	9	15.5
Heywood Memorial Hspt.	597	117	19.6	66	12.5	51	73.9	18	26.1
Holy Family Hspt. And Med. Ctr.	1,386	502	36.2	317	26.6	185	95.4	9	4.6
Holyoke Hspt.	563	129	22.9	82	16.3	47	79.7	12	20.3
Jordan Hspt.	738	184	24.9	117	17.5	67	95.7	3	--[9]
Lawrence General Hspt.	1,742	498	28.6	244	16.6	254	94.4	15	5.6
Leominster Hspt.	1,215	291	24.1	158	14.8	133	91.7	12	8.3
Lowell General Hspt.	1,951	563	28.9	324	19.3	239	88.2	32	11.8
Martha's Vineyard Hspt.	137	41	29.9	21	18.1	20	95.2	1	--[9]
Mary Lane Hspt.	148	48	32.4	28	21.9	20	100.0	0	0.0

Table 23 (cont'd). Cesarean Section Deliveries and Vaginal Births After Cesarean Section (VBACs) by Licensed Maternity Facility[1], All Births, Massachusetts: 2003

Facility	Occurrence Births[2]	Total C-Sections		Primary C-Section[2]		Repeat C-Section[2]		VBACs[2]	
		n	%[3,4]	n	%[3,5]	n	%[3,6]	n	%[7]
Massachusetts General Hspt.	3,587	1,056	29.4	760	23.4	296	87.1	44	12.9
Melrose-Wakefield Hspt.	1,721	585	34.0	321	22.3	264	94.0	17	6.0
Mercy Med. Ctr.	1,406	306	21.8	193	15.2	113	83.7	22	16.3
Metrowest Med. Ctr.-Framingham Union Campus	2,211	751	34.0	466	24.2	285	100.0	0	0.0
Milford-Whitinsville Regional Hspt.	904	278	30.8	180	22.7	98	89.1	12	10.9
Morton Hspt.	523	151	29.4	70	16.5	81	92.0	7	8.0
Mount Auburn Hspt.	1,730	425	24.6	276	17.9	149	80.5	36	19.5
Nantucket Cottage Hspt.	96	25	26.0	13	15.5	12	100.0	0	0.0
Newton-Wellesley Hspt.	3,072	1,025	33.4	641	24.2	384	91.4	36	8.6
North Adams Regional Hspt.	303	106	35.0	70	26.7	36	87.8	5	12.2
North Shore Med. Ctr.. - Salem Hspt.	1,849	555	30.0	368	22.4	187	90.3	20	9.7
Saint Vincent Hspt.	1,842	443	24.4	287	17.8	156	78.8	42	21.2
Saints Memorial Medical Ctr.	724	246	34.0	161	25.3	85	96.6	3	3.4
South Shore Hspt.	4,162	1,218	29.3	724	20.0	494	90.6	51	9.4
St. Luke's Hspt.	1,527	371	24.5	206	15.5	165	88.2	22	11.8
Sturdy Memorial Hspt.	1,056	337	31.9	197	21.7	140	94.6	8	5.4
Tobey Hspt.	525	73	16.2	45	10.8	28	80.0	7	20.0
Tufts-New England Med. Ctr. Hspt.	1,419	521	36.7	342	28.1	179	89.1	22	10.9
UMass Memorial Med. Ctr. - West Campus	4,473	1,226	27.4	813	20.4	413	86.2	66	13.8
Winchester Hspt.	2,261	713	31.5	447	22.6	266	94.7	15	5.3

NOTES: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

1. A licensed maternity facility is a medical unit licensed by the Commonwealth for the care of women during pregnancy and childbirth. 2. See Glossary for definitions of occurrence births, primary and repeat Cesarean sections, and VBACs. The percentages provided in this table are based on occurrence births, and may differ from data, which are based on resident births, presented elsewhere in this book. 3. The percentage of Cesarean births reported is not adjusted for risk factors such as mother's age, birthweight, or complications of labor and delivery, which would influence the number of procedures in a particular facility. Caution should be used when comparing unadjusted percentages. 4. Percentage of total Cesarean sections= (total Cesarean births/all births) x 100. 5. Percentage primary Cesarean sections= (primary Cesarean sections/all births-repeat Cesarean sections-VBACs) x 100. 6. Percentage repeat Cesarean sections= (repeat Cesarean sections/ (repeat Cesarean sections + VBACs)) x100. 7. Percentage VBACs= (VBAC deliveries/ (repeat Cesarean sections + VBAC)) x 100. 8. This percentage is based on less than 40 total births (in denominator) and should be interpreted with caution. 9. Calculations based on fewer than five events are excluded.

Table 24. Cesarean Section Deliveries for Singleton Births by Licensed Maternity Facility[1] and Number of Previous Births, Massachusetts: 2003

Facility	First Birth			Second or Later Birth without prior C-section			Second or Later Birth with prior C-section		
	Births[2]	C-section		Births[2]	C-section		Births[2]	C-section	
		n	%[3]		n	%[3]		n	%[3]
State Total	**34,505**	**10,050**	**29.1**	**32,978**	**2,900**	**8.8**	**9,378**	**8,184**	**87.3**
Anna Jaques Hspt.	297	90	30.3	375	27	7.2	104	85	81.7
Baystate Med. Ctr.	1,618	450	27.8	1,785	145	8.1	454	380	83.7
Berkshire Med. Ctr.	351	75	21.4	334	23	6.9	79	58	73.4
Beth Israel Deaconess Med. Ctr.	2,198	765	34.8	1,799	199	11.1	689	589	85.5
Beverly Hspt.	949	268	28.2	988	77	7.8	284	243	85.6
Boston Med. Ctr.	900	226	25.1	919	112	12.2	218	190	87.2
Brigham And Women's Hspt.	4,227	1,229	29.1	3,313	301	9.1	968	774	80.0
Brockton Hspt.	531	165	31.1	511	66	12.9	137	108	78.8
Cambridge Hspt.	578	145	25.1	319	28	8.8	114	93	81.6
Cape Cod Hspt.	427	108	25.3	404	22	5.4	140	120	85.7
Caritas Good Samaritan Med. Ctr.	381	144	37.8	471	49	10.4	133	130	97.7
Caritas Norwood Hspt.	284	110	38.7	263	19	7.2	80	70	87.5
Caritas St. Elizabeth's	624	214	34.3	530	51	9.6	185	168	90.8
Charlton Memorial Hspt.	752	216	28.7	734	83	11.3	184	165	89.7
Cooley Dickinson Hspt.	383	108	28.2	380	24	6.3	114	93	81.6
Emerson Hspt.	524	187	35.7	572	44	7.7	167	151	90.4
Fairview Hspt.	78	20	25.6	69	3	--[5]	25	24	96.0
Falmouth Hspt.	289	82	28.4	280	24	8.6	65	65	100.0
Franklin Med. Ctr.	195	55	28.2	201	9	4.5	54	41	75.9
Harrington Memorial Hspt.	188	50	26.6	201	16	8.0	58	49	84.5
Heywood Memorial Hspt.	240	51	21.3	276	11	4.0	62	44	71.0
Holy Family Hspt. And Med. Ctr.	596	239	40.1	568	58	10.2	188	179	95.2
Holyoke Hspt.	242	47	19.4	254	28	11.0	55	45	81.8
Jordan Hspt.	362	89	24.6	282	15	5.3	68	65	95.6
Lawrence General Hspt.	663	157	23.7	768	56	7.3	262	247	94.3
Leominster Hspt.	516	115	22.3	537	36	6.7	138	126	91.3
Lowell General Hspt.	782	209	26.7	842	82	9.7	250	218	87.2
Martha's Vineyard Hspt.	63	14	22.2	51	5	9.8	21	20	95.2
Mary Lane Hspt.	53	17	32.1	75	11	14.7	18	18	100.0

Table 24 (cont'd). Cesarean Section Deliveries for Singleton Births by Licensed Maternity Facility and Number of Previous Births, Massachusetts: 2003

Facility	First Birth			Second or Later Birth without prior C-section			Second or Later Birth with prior C-section		
	Births[2]	C-section		Births[2]	C-section		Births[2]	C-section	
		n	%[3]		n	%[3]		n	%[3]
Massachusetts General Hspt.	1,696	507	29.9	1,378	141	10.2	300	257	85.7
Melrose-Wakefield Hspt.	708	208	29.4	682	79	11.6	273	258	94.5
Mercy Med. Ctr.	545	140	25.7	710	47	6.6	135	113	83.7
Metrowest Med. Cntr.-Framingham Union Campus	1,046	361	34.5	823	74	9.0	277	277	100.0
Milford-Whitinsville Regional Hspt.	393	135	34.4	385	37	9.6	107	95	88.8
Morton Hspt.	194	44	22.7	223	19	8.5	87	80	92.0
Mount Auburn Hspt.	819	218	26.6	670	34	5.1	183	147	80.3
Nantucket Cottage Hspt.	48	13	27.1	36	0	0.0	12	12	100.0
Newton-Wellesley Hspt.	1,271	446	35.1	1,233	102	8.3	407	371	91.2
North Adams Regional Hspt.	124	54	43.5	129	12	9.3	41	36	87.8
North Shore Med. Cntr. - Salem Hspt.	777	233	30.0	784	87	11.1	197	177	89.8
Saint Vincent Hspt.	786	205	26.1	781	50	6.4	190	148	77.9
Saints Memorial Medical Ctr.	337	115	34.1	281	29	10.3	86	83	96.5
South Shore Hspt.	1,613	455	28.2	1,814	144	7.9	519	470	90.6
St. Luke's Hspt.	615	146	23.7	685	47	6.9	181	159	87.8
Sturdy Memorial Hspt.	429	146	34.0	458	40	8.7	144	136	94.4
Tobey Hspt.	186	26	14.0	219	13	5.9	35	28	80.0
Tufts-New England Med. Ctr. Hspt.	549	174	31.7	495	60	12.1	175	155	88.6
UMass Memorial Med. Ctr. - West Campus	2,002	479	23.9	1,731	175	10.1	441	375	85.0
Winchester Hspt.	882	299	33.9	992	86	8.7	264	249	94.3

NOTES: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

1. A licensed maternity facility is a medical unit licensed by the Commonwealth for the care of women during pregnancy and childbirth. 2. Occurrence births (See Glossary for definition.) 3. The percentage of Cesarean births reported is not adjusted for risk factors such as mother's age, birthweight, or complications of labor and delivery, which would influence the number of procedures in a particular facility. Caution should be used when comparing unadjusted percentages. 4. This percentage is based on less than 40 total births (in denominator) and should be interpreted with caution. 5. Calculations based on fewer than five events are excluded.

CHAPTER 8

BIRTHS BY HOSPITAL AND COMMUNITY

Low Birthweight by Facility

In 2003, at least 10% of the births at six hospitals were low birthweight. These hospitals were (Table 25): Brigham and Women's Hospital (10.3%), Beth Israel Deaconess Medical Center (11.4%), UMass Memorial Medical Center - West Campus (11.4%), Baystate Medical Center (12.5%), Caritas St. Elizabeth's Medical Center of Boston (13.9%), and, Tufts-New England Medical Center Hospital (26.1%)

Publicly Funded Delivery by Facility

In eight hospitals, 50% or more of the deliveries were paid with public funds: St. Luke's Hospital (51.8%), Lawrence General Hospital (52.9%), Mary Lane Hospital (54.4%), Cambridge Hospital (56.7%), Brockton Hospital (57.1%), Mercy Medical Center (57.3%), Holyoke Hospital (65.5%), and, Boston Medical Center (85.3%). In five facilities, less than 10% of deliveries were paid with public funds: Birthplace at Wellesley (0%), Newton-Wellesley Hospital (2.4%), Emerson Hospital (3.7%), Winchester Hospital (5.3%), and South Shore Hospital (9.2%) (Table 25).

Adequacy of Prenatal Care by Facility

The facilities with the lowest reported rate of adequacy of prenatal care among mothers delivering in 2003 (i.e. less than 65%) were Boston Medical Center (52.3%), Tobey Hospital (52.9%), Berkshire Medical Center (56.1%), and Lowell General Hospital (63.8%). Beverly Hospital (95.1%), Saint Vincent Hospital (95.4%), North Shore Birth Center (95.5%), and Brigham and Women's Hospital (98.3%) reported the highest rate of mothers with adequate prenatal care (Table 25).

Low Birthweight in the 30 Largest Massachusetts Cities and Towns

In 2003, among the 30 largest cities and towns in the Commonwealth, low birthweight rates were highest in Peabody (11.4%), Lowell (10.5%), Brockton (10.2%), New Bedford (10%), Fall River (9.8%), Methuen (9.8%), and Springfield (9.5%). These communities had low birthweight rates 20% higher than the statewide rate of 7.6% (numbers are shown in Table 26A and rates are shown in Table 3A).

Table 25. Birth Characteristics by Licensed Maternity Facility[1], Massachusetts: 2003

Facility	Location	Occurrence Births[2] (n)	Low Birthweight[3] (%)	Public Payment for Delivery[4] (%)	Adequate Prenatal Care[5] (%)
STATE TOTAL[6]		**81,310**	**7.6**	**28.2**	**84.5**
Anna Jaques Hspt.	Newburyport	792	3.4	19.5	90.3
Baystate Medical Ctr.	Springfield	4,283	12.5	42.7	81.7
Berkshire Medical Ctr.	Pittsfield	788	5.3	38.4	56.1
Beth Israel Deaconess Medical Ctr.	Boston	5,035	11.4	17.7	93.4
Beverly Hspt.	Beverly	2,312	5.1	25.7	95.1
Birthplace At Wellesley	Wellesley	120	0.0	0.0	88.3
Boston Medical Ctr.	Boston	2,087	9.5	85.3	52.3
Brigham And Women's Hspt.	Boston	9,402	10.3	17.2	98.3
Brockton Hspt.	Brockton	1,219	8.2	57.1	79.0
Cambridge Birth Ctr.	Cambridge	92	--[7]	31.5	70.7
Cambridge Hspt.	Cambridge	1,066	2.7	56.7	76.4
Cape Cod Hspt.	Barnstable	1,001	2.9	38.1	88.3
Caritas Good Samaritan Medical Ctr.	Brockton	1,021	6.2	45.7	68.9
Caritas St. Elizabeth's Medical Ctr.	Boston	1,464	13.9	16.8	86.9
Caritas Norwood Hspt.	Norwood	644	3.7	15.4	82.7
Charlton Memorial Hspt.	Fall River	1,729	7.3	44.8	89.8
Cooley Dickinson Hspt.	Northampton	911	2.3	24.4	92.4
Emerson Hspt.	Concord	1,319	4.4	3.7	82.7
Fairview Hspt.	Great Barrington	174	2.9	47.7	79.7
Falmouth Hspt.	Falmouth	641	3.9	30.1	79.9
Franklin Medical Ctr.	Greenfield	464	3.4	37.7	86.4
Harrington Memorial Hspt.	Southbridge	462	1.8	47.7	88.9
Heywood Memorial Hspt.	Gardner	597	3.2	32.5	80.5
Holy Family Hospital And Medical Ctr.	Methuen	1,386	4.5	14.9	84.5
Holyoke Hspt.	Holyoke	563	3.6	65.5	79.4
Jordan Hspt.	Plymouth	738	4.7	25.5	71.0
Lawrence General Hspt.	Lawrence	1,742	7.1	52.9	87.7
Leominster Hspt.	Leominster	1,215	3.8	38.4	85.4
Lowell General Hspt.	Lowell	1,951	6.6	37.1	63.8
Martha's Vineyard Hspt.	Oak Bluffs	137	--[7]	37.5	89.8
Mary Lane Hspt.	Ware	148	3.4	54.4	81.8
Massachusetts General Hspt.	Boston	3,587	8.1	27.0	87.4
Melrose-Wakefield Hspt.	Melrose	1,721	5.1	19.1	89.8

Table 25. (cont'd) Births Characteristics by Licensed Maternity Facility[1], Massachusetts: 2003

Facility	Location	Occurrence Births[2] (n)	Low Birthweight[3] (%)	Public Payment for Delivery[4] (%)	Adequate Prenatal Care[5] (%)
Mercy Medical Ctr.	Springfield	1,406	4.3	57.3	80.3
Metrowest Medical Ctr.-Framingham Union Campus	Framingham	2,211	5.5	26.3	91.3
Milford-Whitinsville Regional Hspt.	Milford	904	2.9	16.5	88.9
Morton Hspt.	Taunton	523	5.3	45.2	76.7
Mount Auburn Hspt.	Cambridge	1,730	4.5	15.8	92.2
Nantucket Cottage Hspt.	Nantucket	96	5.2	29.2	78.9
Newton-Wellesley Hspt.	Newton	3,072	4.5	2.4	77.0
North Adams Regional Hspt.	North Adams	303	5.0	41.7	92.4
North Shore Birth Ctr.	Beverly	88	0.0	13.6	95.5
North Shore Medical Ctr. - Salem Hspt.	Salem	1,849	6.7	40.2	73.1
Saint Vincent Hspt.	Worcester	1,842	4.8	11.3	95.4
Saints Memorial Medical Ctr.	Lowell	724	5.9	34.2	83.1
South Shore Hspt.	Weymouth	4,162	5.7	9.2	93.3
St. Luke's Hspt.	New Bedford	1,527	6.9	51.8	80.7
Sturdy Memorial Hspt.	Attleboro	1,056	4.7	17.0	72.3
Tobey Hspt.	Wareham	525	3.6	28.2	52.9
Tufts-New England Medical Ctr. Hspt.	Boston	1,419	26.1	33.1	87.1
UMass Memorial Medical Center - West Campus	Worcester	4,473	11.4	32.3	69.4
Winchester Hspt.	Winchester	2,261	5.3	5.3	86.9
Other Hospitals		10	55.6	42.9	42.9
Home Births, En route, Other		318	9.7	20.3	67.3

NOTES: All percentages are calculated based on only those births with known values for the characteristic(s) of interest, unless otherwise stated.

1. A licensed maternity facility is a medical unit licensed by the Commonwealth for the care of women during pregnancy and childbirth. 2. See Glossary for definition of occurrence births. 3. Less than 2,500 grams (5.5 lbs.) 4. Public payment for delivery includes Medicaid/MassHealth, Commonhealth, Medicare, Healthy Start, other government programs, and free care. 5. Based on the APNCU Index. 6. The percentages provided in this row are based on occurrence births and may differ from data presented elsewhere in this book which are based on resident births. 7. Calculations based on values of 1-4 for medical characteristics of facilities with less than 200 births are suppressed based Guidelines for Release of Births Data, Center for Health Information, Statistics, Research and Evaluation, Massachusetts Department of Public Health.

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2003

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]
STATE TOTAL	**81,310**	**80,167**	**6,115**	**4,639**	**383**	**285**
Abington	0	212	13	9	0	0
Acton	0	224	12	0	0	0
Acushnet	0	104	--[1]	4	1	1
Adams	0	80	--[1]	8	0	0
Agawam	0	256	19	9	2	2
Alford	0	5	0	0	0	0
Amesbury	1	206	22	7	0	0
Amherst	2	184	11	10	0	0
Andover	2	293	18	3	2	0
Aquinnah (Gay Head)	0	0	0	0	0	0
Arlington	2	560	33	7	6	5
Ashburnham	0	62	--[1]	2	0	0
Ashby	0	37	0	2	0	0
Ashfield	1	15	--[1]	0	0	0
Ashland	0	260	22	1	2	1
Athol	1	141	9	15	1	1
Attleboro	1,056	622	46	45	0	0
Auburn	2	174	18	2	1	1
Avon	0	57	--[1]	1	0	0
Ayer	1	111	14	3	0	0
Barnstable	1,005	467	31	29	5	4
Barre	0	62	7	1	0	0
Becket	0	10	0	1	0	0
Bedford	0	142	13	2	0	0
Belchertown	2	159	19	6	0	0
Bellingham	1	234	25	12	1	1
Belmont	1	282	14	1	1	1
Berkley	0	74	5	4	0	0
Berlin	0	30	--[1]	0	0	0
Bernardston	0	16	--[1]	0	0	0
Beverly	2,400	480	41	15	1	1
Billerica	1	491	37	14	2	0
Blackstone	0	95	--[1]	5	0	0
Blandford	0	18	--[1]	5	0	0
Bolton	0	52	--[1]	1	0	0
Boston	23,028	7,823	700	573	48	37
Bourne	1	234	20	12	3	2
Boxborough	0	42	--[1]	1	0	0
Boxford	0	65	--[1]	0	0	0
Boylston	1	53	6	0	0	0
Braintree	0	410	24	6	0	0

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2003

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]
Brewster	1	65	--[1]	2	0	0
Bridgewater	0	265	15	4	2	2
Brimfield	1	23	--[1]	3	0	0
Brockton	2,241	1,493	152	148	8	6
Brookfield	0	32	--[1]	2	0	0
Brookline	0	691	51	1	2	2
Buckland	0	21	0	0	0	0
Burlington	1	290	16	1	0	0
Cambridge	2,897	1,079	73	27	3	3
Canton	0	277	32	6	5	5
Carlisle	2	35	--[1]	1	0	0
Carver	0	122	9	10	0	0
Charlemont	0	10	0	0	0	0
Charlton	1	151	9	9	0	0
Chatham	0	33	0	2	0	0
Chelmsford	3	370	32	4	2	1
Chelsea	0	657	46	68	3	2
Cheshire	0	30	--[1]	4	0	0
Chester	0	15	0	3	0	0
Chesterfield	0	8	0	0	0	0
Chicopee	2	600	41	59	4	2
Chilmark	1	7	0	0	0	0
Clarksburg	1	9	0	0	0	0
Clinton	1	192	13	14	1	1
Cohasset	0	107	7	0	0	0
Colrain	1	18	0	0	0	0
Concord	1,321	127	8	1	1	1
Conway	0	21	--[1]	0	0	0
Cummington	1	12	--[1]	1	0	0
Dalton	0	77	9	6	0	0
Danvers	1	232	20	7	2	1
Dartmouth	0	260	15	10	2	2
Dedham	0	294	21	8	0	0
Deerfield	1	37	0	0	0	0
Dennis	0	93	--[1]	4	1	1
Dighton	0	79	7	2	0	0
Douglas	0	123	10	4	0	0
Dover	1	64	5	0	0	0
Dracut	1	355	31	13	2	1
Dudley	0	119	12	2	0	0
Dunstable	1	41	--[1]	3	0	0
Duxbury	0	161	9	0	0	0
East Bridgewater	1	150	10	2	1	1
East Brookfield	0	34	--[1]	3	1	1
East Longmeadow	0	146	12	1	2	1

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2003

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]
Eastham	0	42	--[1]	1	0	0
Easthampton	3	171	9	11	1	1
Easton	0	236	10	5	0	0
Edgartown	0	47	--[1]	0	1	0
Egremont	1	11	0	0	0	0
Erving	0	20	--[1]	2	0	0
Essex	0	37	--[1]	0	0	0
Everett	1	592	46	41	2	1
Fairhaven	0	169	6	12	0	0
Fall River	1,731	1,262	123	163	7	5
Falmouth	643	304	21	19	3	2
Fitchburg	0	587	49	75	3	1
Florida	0	4	0	0	0	0
Foxborough	0	206	16	2	1	1
Framingham	2,214	1,000	69	38	5	4
Franklin	2	436	19	8	1	1
Freetown	0	82	11	4	0	0
Gardner	598	249	13	24	1	1
Georgetown	0	98	9	0	0	0
Gill	0	10	0	1	0	0
Gloucester	0	309	19	13	0	0
Goshen	1	16	0	0	0	0
Gosnold	0	2	0	0	0	0
Grafton	3	239	20	5	2	2
Granby	1	58	--[1]	0	0	0
Granville	0	14	0	0	1	1
Great Barrington	179	68	5	2	0	0
Greenfield	467	192	18	24	1	0
Groton	1	124	12	3	0	0
Groveland	0	74	--[1]	1	1	1
Hadley	0	50	7	1	0	0
Halifax	0	80	14	10	3	2
Hamilton	0	107	9	0	0	0
Hampden	0	35	--[1]	1	1	1
Hancock	0	5	0	0	0	0
Hanover	0	158	21	1	1	1
Hanson	0	130	5	6	0	0
Hardwick	0	29	7	2	0	0
Harvard	0	41	--[1]	0	1	0
Harwich	0	99	5	2	0	0
Hatfield	0	24	0	0	0	0
Haverhill	1	897	49	53	2	1
Hawley	0	0	0	0	0	0
Heath	0	5	0	0	0	0
Hingham	0	270	20	3	2	2

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2003

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]
Hinsdale	1	19	--[1]	1	0	0
Holbrook	0	118	9	4	1	1
Holden	0	196	11	6	1	1
Holland	0	25	5	1	0	0
Holliston	1	178	10	0	0	0
Holyoke	569	639	58	139	2	1
Hopedale	0	73	--[1]	1	0	0
Hopkinton	2	215	12	4	3	3
Hubbardston	0	53	--[1]	1	0	0
Hudson	1	217	16	11	2	2
Hull	0	116	6	1	2	2
Huntington	2	29	--[1]	4	0	0
Ipswich	1	152	27	1	5	5
Kingston	0	179	6	3	1	0
Lakeville	0	112	7	3	1	0
Lancaster	0	72	--[1]	1	0	0
Lanesborough	0	15	0	1	0	0
Lawrence	1,750	1,373	117	236	8	7
Lee	0	61	--[1]	2	1	0
Leicester	0	117	9	4	1	1
Lenox	2	34	--[1]	2	0	0
Leominster	1,215	568	33	43	4	2
Leverett	1	6	0	0	0	0
Lexington	1	219	11	0	0	0
Leyden	0	3	0	0	0	0
Lincoln	1	90	--[1]	0	1	0
Littleton	1	116	8	4	0	0
Longmeadow	1	132	13	0	0	0
Lowell	2,680	1,696	178	174	20	14
Ludlow	1	190	13	7	0	0
Lunenburg	0	90	9	3	1	1
Lynn	2	1,499	105	145	13	8
Lynnfield	0	138	12	1	3	3
Malden	2	801	60	29	3	3
Manchester-by-the-Sea	0	61	7	2	1	1
Mansfield	0	384	33	6	1	1
Marblehead	0	216	19	1	0	0
Marion	0	50	--[1]	1	0	0
Marlborough	1	576	47	24	1	1
Marshfield	1	327	13	4	0	0
Mashpee	0	147	6	6	1	1
Mattapoisett	0	47	5	1	0	0
Maynard	1	167	11	5	0	0
Medfield	1	129	9	0	0	0
Medford	4	584	47	15	1	0

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2003

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]
Medway	0	166	--[1]	2	0	0
Melrose	1,723	342	17	6	4	3
Mendon	0	61	--[1]	1	0	0
Merrimac	0	68	--[1]	0	0	0
Methuen	1,386	612	60	29	1	1
Middleborough	1	284	19	17	0	0
Middlefield	0	5	0	0	0	0
Middleton	0	93	--[1]	1	1	0
Milford	906	384	30	15	0	0
Millbury	2	139	11	4	1	1
Millis	0	113	7	1	0	0
Millville	0	36	--[1]	1	0	0
Milton	0	291	13	5	1	1
Monroe	0	1	0	0	0	0
Monson	0	85	6	2	0	0
Montague	3	95	5	10	0	0
Monterey	1	6	0	0	0	0
Montgomery	0	8	--[1]	0	0	0
Mount Washington	0	0	0	0	0	0
Nahant	2	40	--[1]	0	0	0
Nantucket	100	151	14	2	0	0
Natick	2	501	39	3	0	0
Needham	0	366	16	1	2	1
New Ashford	0	1	0	0	0	0
New Bedford	1,533	1,317	130	169	12	7
New Braintree	1	19	--[1]	1	0	0
New Marlborough	0	10	0	0	0	0
New Salem	0	7	0	0	0	0
Newbury	0	67	--[1]	0	0	0
Newburyport	797	224	13	2	4	4
Newton	3,074	759	54	3	2	2
Norfolk	1	118	6	2	0	0
North Adams	304	152	16	21	1	1
North Andover	0	353	23	4	1	1
North Attleboro	1	345	18	6	2	2
North Brookfield	1	43	--[1]	3	1	1
North Reading	0	150	13	1	0	0
Northampton	916	219	9	12	0	0
Northborough	0	183	10	2	0	0
Northbridge	0	213	16	9	2	1
Northfield	0	23	--[1]	2	0	0
Norton	0	210	11	11	0	0
Norwell	0	95	9	0	0	0
Norwood	647	413	31	9	3	3
Oak Bluffs	137	35	--[1]	0	0	0

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2003

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]
Oakham	0	28	0	0	0	0
Orange	0	81	6	6	0	0
Orleans	0	21	--[1]	1	0	0
Otis	0	13	0	0	0	0
Oxford	0	142	10	5	3	3
Palmer	2	159	10	9	1	0
Paxton	0	52	--[1]	0	0	0
Peabody	1	527	60	24	4	4
Pelham	0	9	0	0	0	0
Pembroke	2	248	14	3	1	1
Pepperell	0	171	13	7	0	0
Peru	0	10	0	1	0	0
Petersham	0	5	0	0	0	0
Phillipston	0	17	--[1]	1	0	0
Pittsfield	790	527	44	72	4	2
Plainfield	1	2	0	0	0	0
Plainville	0	106	6	3	0	0
Plymouth	744	734	46	28	5	5
Plympton	0	38	5	2	2	2
Princeton	0	28	--[1]	0	0	0
Provincetown	0	15	--[1]	0	0	0
Quincy	4	1,181	75	43	6	5
Randolph	1	412	40	10	3	3
Raynham	0	151	10	5	0	0
Reading	2	289	19	2	0	0
Rehoboth	0	88	9	3	0	0
Revere	0	706	51	50	1	1
Richmond	0	11	--[1]	0	0	0
Rochester	0	53	--[1]	4	0	0
Rockland	0	221	22	6	0	0
Rockport	0	38	--[1]	0	0	0
Rowe	0	3	0	0	0	0
Rowley	0	63	--[1]	1	0	0
Royalston	0	14	--[1]	0	0	0
Russell	2	24	--[1]	1	1	0
Rutland	1	98	6	3	0	0
Salem	1,854	564	36	34	2	1
Salisbury	0	93	--[1]	10	0	0
Sandisfield	0	6	--[1]	0	0	0
Sandwich	1	207	8	4	0	0
Saugus	0	295	22	6	0	0
Savoy	0	7	--[1]	0	0	0
Scituate	2	239	26	3	0	0
Seekonk	2	125	9	3	0	0
Sharon	0	162	11	0	0	0

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2003

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]
Sheffield	1	27	--[1]	0	0	0
Shelburne	1	23	0	1	0	0
Sherborn	0	43	6	0	0	0
Shirley	0	81	10	1	1	1
Shrewsbury	1	439	39	5	0	0
Shutesbury	3	17	0	1	0	0
Somerset	0	140	11	4	0	0
Somerville	6	924	80	46	2	2
South Hadley	0	121	--[1]	4	0	0
Southampton	1	53	--[1]	5	0	0
Southborough	0	132	10	1	2	2
Southbridge	462	270	14	37	4	1
Southwick	0	84	6	5	1	1
Spencer	1	122	--[1]	9	0	0
Springfield	5,699	2,423	230	479	11	6
Sterling	0	93	5	0	0	0
Stockbridge	0	11	--[1]	0	0	0
Stoneham	0	260	16	3	2	1
Stoughton	0	344	21	10	3	1
Stow	2	73	7	0	1	1
Sturbridge	0	120	5	0	1	0
Sudbury	1	219	11	0	0	0
Sunderland	0	42	6	2	0	0
Sutton	0	99	8	3	0	0
Swampscott	1	154	16	2	1	0
Swansea	1	155	15	10	0	0
Taunton	524	742	63	58	4	4
Templeton	2	70	6	8	2	2
Tewksbury	1	370	21	8	0	0
Tisbury	1	47	--[1]	2	0	0
Tolland	0	3	0	0	0	0
Topsfield	0	56	--[1]	0	0	0
Townsend	2	119	6	5	0	0
Truro	1	16	0	0	0	0
Tyngsborough	0	140	7	5	0	0
Tyringham	0	2	0	0	0	0
Upton	1	94	8	2	0	0
Uxbridge	0	159	5	2	2	1
Wakefield	0	313	31	2	2	2
Wales	0	27	--[1]	1	0	0
Walpole	1	297	16	4	0	0
Waltham	3	736	63	26	4	4
Ware	149	121	8	18	1	0
Wareham	526	247	16	21	1	0
Warren	0	74	5	7	1	1

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2003

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]
Warwick	0	6	0	0	0	0
Washington	0	7	0	0	0	0
Watertown	2	414	33	5	0	0
Wayland	1	131	10	0	1	0
Webster	1	236	14	14	0	0
Wellesley	122	318	15	0	1	1
Wellfleet	0	33	--[1]	0	0	0
Wendell	0	4	0	2	0	0
Wenham	0	42	--[1]	1	0	0
West Boylston	0	60	--[1]	3	0	0
West Bridgewater	0	85	--[1]	1	0	0
West Brookfield	0	32	--[1]	4	0	0
West Newbury	0	29	--[1]	0	0	0
West Springfield	0	313	18	23	3	3
West Stockbridge	0	11	0	0	0	0
West Tisbury	0	22	--[1]	1	0	0
Westborough	4	243	17	5	1	1
Westfield	2	436	26	24	0	0
Westford	0	286	25	0	0	0
Westhampton	0	21	--[1]	1	0	0
Westminster	0	68	--[1]	3	0	0
Weston	0	92	8	1	1	0
Westport	0	124	12	10	1	1
Westwood	0	179	16	0	1	1
Weymouth	4,170	729	60	28	6	5
Whately	0	7	0	1	0	0
Whitman	0	189	16	10	0	0
Wilbraham	0	122	19	2	0	0
Williamsburg	1	26	--[1]	3	0	0
Williamstown	1	51	--[1]	1	0	0
Wilmington	0	296	19	3	0	0
Winchendon	1	109	9	9	0	0
Winchester	2,264	250	22	2	0	0
Windsor	0	4	0	0	0	0
Winthrop	0	176	8	3	0	0
Woburn	0	489	32	14	3	2
Worcester	6,323	2,588	233	263	11	8
Worthington	1	11	0	1	0	0
Wrentham	1	135	8	2	1	1
Yarmouth	0	220	8	14	0	0

1. Values of 1-4 for medical characteristics of communities with less than 200 births are suppressed based on Guidelines for Release of Birth Data, Center for Health Information, Statistics, Research and Evaluation, Massachusetts Department of Public Health. 2. Births occurring in a geographical place (state, city/town) regardless of the residency of the mother. See Glossary for more details. 3. Births to mothers who report their usual place of residence as a particular geographical place (state, or city/town). See Glossary for more details. 4. Less than 2,500 grams (5.5 lbs.). 5. Death of a child whose age is less than one year. 6. Death of a child whose age is less than 28 days.

Table 26B. Birth Characteristics, Occurrence and Resident Births and Infant Deaths by County, Massachusetts: 2003

County Name	Occurrence Births[1]	Resident Births[2]			Deaths	
		Number	Low Birthweight[3]	Teen Births (15-19 years)	Infant[4]	Neonatal[5]
STATE TOTAL	**81,310**	**80,167**	**6,115**	**4,639**	**383**	**285**
Barnstable	1,652	1,996	110	96	13	10
Berkshire	1,281	1,284	98	122	6	3
Bristol	4,848	6,669	547	534	30	23
Dukes	139	160	7	3	1	0
Essex	8,199	9,555	735	599	52	39
Franklin	478	683	43	52	1	0
Hampden	6,279	5,777	485	774	29	18
Hampshire	1,081	1,299	77	77	2	1
Middlesex	16,225	18,469	1,402	572	80	59
Nantucket	100	151	14	2	0	0
Norfolk	4,952	8,353	563	168	38	33
Plymouth	3,518	6,305	485	301	30	24
Suffolk	23,028	9,362	805	694	52	40
Worcester	9,529	10,104	744	645	49	35

1. Births occurring in a geographical place (state, city/town) regardless of the residency of the mother. See Glossary for more details.
2. Births to mothers who report their usual place of residence as a particular geographical place (state, or city/town). See Glossary for more details. 3. Less than 2,500 grams (5.5 lbs.). 4. Death of a child whose age is less than one year. 5. Death of a child whose age is less than 28 days.

Table 26C. Birth Characteristics, Occurrence and Resident Births and Infant Deaths, Massachusetts Community Health Network Areas (CHNAs): 2003

Community Health Network Area (CHNA Number)	Occurrence Births[1]	Resident Births[2]			Deaths	
		Number	Low Birthweight[3]	Teen Births (15-19 years)	Infant[4]	Neonatal[5]
STATE TOTAL	**81,309**	**80,167**	**6,115**	**4,639**	**383**	**285**
Community Health Network of Berkshire County (1)	1,281	1,284	98	122	6	3
Upper Valley Health Web (Franklin County) (2)	479	860	56	68	2	1
Partnership for Health in Hampshire County (Northampton) (3)	1,079	1,270	76	73	2	1
The Community Health Connection (Springfield) (4)	5,704	3,822	339	537	23	15
Community Health Network of Southern Worcester County (5)	467	1,450	91	100	11	7
Community Partners for Health (Milford) (6)	910	2,173	130	65	6	4
Community Health Network of Greater Metro West (Framingham) (7)	2,234	5,242	365	108	20	17
Community Wellness Coalition (Worcester) (8)	6,332	4,057	352	292	17	14
Fitchburg/Gardner Community Health Network (9)	1,823	3,243	231	212	14	9
Greater Lowell Community Health Network (10)	2,687	3,749	334	221	26	16
Greater Lawrence Community Health Network (11)	3,138	2,724	220	273	13	9
Greater Haverhill Community Health Network (12)	799	1,884	113	74	7	6
Community Health Network North (Beverly/Gloucester) (13)	2,401	1,282	109	32	7	7
North Shore Community Health Network (14)	1,861	3,665	293	220	25	17
Greater Woburn/Concord/Littleton Community Health Network (15)	3,591	2,320	146	29	5	3
North Suburban Health Alliance (Medford/Malden/Melrose) (16)	1,732	3,331	249	99	14	10
Greater Cambridge/Somerville Community Health Network (17)	2,908	3,259	233	86	12	11
West Suburban Health Network (Newton/Waltham) (18)	3,200	2,808	198	39	11	9
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop) (19)	23,028	10,053	856	695	54	42
Blue Hills Community Health Alliance (Greater Quincy) (20)	4,824	4,702	354	114	28	26
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield) (21)	576	1,909	139	236	6	3
Greater Brockton Community Health Network (22)	2,242	3,149	250	194	15	11
South Shore Community Partners in Prevention (Plymouth) (23)	747	2,398	164	73	13	11
Greater Attleboro-Taunton Health & Education Response (24)	1,584	3,216	237	163	8	7
Partners for a Healthier Community (Fall River) (25)	1,732	1,681	161	187	8	6
Greater New Bedford Health & Human Services Coalition (26)	2,059	2,329	190	226	16	10
Cape and Islands Community Health Network (27)	1,891	2,307	131	101	14	10

1. Births occurring in a geographical place (state, city/town) regardless of the residency of the mother. See Glossary for more details. 2. Births to mothers who report their usual place of residence as a particular geographical place (state, city/town). See Glossary for more details. 3. Less than 2,500 grams (5.5 lbs.). 4. Death of a child whose age is less than one year. 5. Death of a child whose age is less than 28 days.

APPENDIX

TECHNICAL NOTES

1. DATA AVAILABILITY

This publication and other Department of Public Health publications and materials can be accessed on the Internet at:

http://www.state.ma.us/dph/pubstats.htm

Detailed information on 2003 births in Massachusetts, as well as access to other Department of Public Health data, is available on the Department's free, Internet-accessible data warehouse, **MassCHIP**. To register as a user, visit the MassCHIP website at http://masschip.state.ma.us, or call 1-888-MASCHIP (within MA only) or 617-624-5629.

2. DATA CAUTIONS

Limitations of small numbers:
Cells in some tables in this publication, and particularly those tables specific to the individual cities and towns, contain small numbers. Rates and proportions based on less than five observations are suppressed, and trends based upon small numbers should be interpreted cautiously.

Differences with previously published data
Numbers and rates in this publication may differ from those contained in previous reports because of updates of birth and death certificate files, or release of the most up-to-date population estimates for a given year (see Technical Note #4 for details on population files).

Self-reported data
Many items used in this publication, such as maternal smoking, education, and race/ethnicity are self-reported, and are subject to the usual limitations of this type of information.

3. CHANGES IN THE COLLECTION OF RACE AND ETHNICITY INFORMATION

Assignment of an Infant's Race/Ethnicity
Prior to 1989, the race/ethnicity of an infant was assigned by combining information on the race/ethnicity of the mother and the race/ethnicity of the father. Since 1989, Massachusetts has followed the recommendation of the National Center for Health Statistics of classifying births according to the self-reported race/ethnicity of the mother. Therefore, beginning in 1989, the race/ethnicity of an infant is identical to the self-reported race/ethnicity of the infant's mother.

Addition of Information on Hispanic Ethnicity
Beginning in 1986, an identifier for Hispanic ethnicity was added to the birth certificate; in 1989, an identifier for Hispanic ethnicity was added to the death certificate. Prior to these changes, most infants and mothers of Hispanic ethnicity were included with whites and it was not possible to accurately calculate Hispanic-specific rates of natality and mortality.

The ethnicity categories available on the Parent Worsheet for birth certificate are:

- Puerto Rican
- Dominican
- Mexican
- Cuban
- Colombian
- Salvadoran
- Other Central American
- Other South American
- Other Hispanic
- Chinese
- Vietnamese
- Cambodian
- Asian Indian
- Korean
- Filipino
- Japanese
- Laotian
- Pakistani
- Thai
- Hawaiian
- Other Asian/PI
- Cape Verdean
- Brazilian
- Other Portuguese
- Haitian
- Jamaican
- Barbadian
- Other West Indian/Caribbean Islander
- African American
- Nigerian
- Other African
- Lebanese
- Iranian
- Israeli
- Other Middle Eastern
- Native American
- European
- Native American
- European

4. POPULATION ESTIMATES

The source of the 2000 population estimates for Massachusetts is the Massachusetts Department of Public Health (DPH) Race-Allocated Census 2000 Estimates (MRACE) file. This file is based upon the U.S. Census 2000 SF1 file (released June, 2001) for Massachusetts, which contains data on population and housing for the 351 towns, 14 counties, and the state overall.

The MRACE file was derived from the Census 2000 file by allocating persons who indicated “some other race” or multiple races to the conventional DPH race categories: “White”, “Black or African American”, “Asian,” “Native American,” and "Hispanic." In Census 2000, unlike previous censuses, respondents were able to classify themselves by Hispanic ethnicity and by single or multi-race categories, including “some other race.” In order to make the DPH population 2000 file consistent with previous years’ population files, the MRACE file maintains the prior mutually exclusive race and Hispanic categories.

Population-based rates between 1991 and 1999 in this publication were calculated as follows:

- 1991-1998: Massachusetts Institute for Social and Economic Research (MISER) Population Estimates;

- 1999: Massachusetts Dept. of Public Health 1999 Population Estimate, which is a linear interpolation between the preliminary DPH Population 2000 file and the MISER 1998 Population Estimate.

5. DEFINITION AND IDENTIFICATION OF PREGNANCY-ASSOCIATED AND MATERNAL DEATHS

There are various ways to categorize a woman who dies during pregnancy, childbirth, or in the postpartum period. Two components are included in every definition of maternal death: the timing

of death in relation to the pregnancy and birth, and the causes of death. Two definitions are used in this report: maternal death and pregnancy-associated death. The traditional definition of maternal death can be found in the World Health Organization's *International Classification of Diseases* (ICD). WHO defines maternal deaths as women who died during pregnancy or within 42 days of delivery from causes related to pregnancy, childbirth or its management. Deaths from accidental or incidental causes are excluded. The National Center for Health Statistics uses the WHO definition to conduct surveillance on maternal death in the US.

Maternal deaths are restricted to women whose underlying causes of death were coded with ICD-9 codes 630-676 (from 1990-1998), or with ICD-10 codes O00-O99 (1999 forward).

The definition of a pregnancy-associated death was developed in 1986 by the Maternal Mortality Study Group, which is jointly chaired by American College of Obstetrics and Gynecology (ACOG) and the Centers for Disease Control and Prevention (CDC). Pregnancy-associated deaths differ from maternal deaths in two fundamental ways: all deaths are included irrespective of cause, and deaths that occurred between 42 and 364 days after delivery also are included.

6. CHANGE IN MEASUREMENT OF ADEQUACY OF PRENATAL CARE

Change in Adequacy of Prenatal Care Indicator since Massachusetts Births 2001:
(This discussion is based on excerpts from "An Overview of the APNCU Index" by Milton Kotelchuck, Sept. 1994, available online at:
http://www.mchlibrary.info/databases/HSNRCPDFs/Overview_APCUIndex.pdf. Accessed December 2003).

Beginning with *Massachusetts Births 2001*, adequacy of prenatal care is being measured using a new method. The Adequacy of Prenatal Care Utilization (APNCU) Index, developed by Dr. Milton Kotelchuck, has replaced the Kessner Index, which had been used in the *Advanced Data Births* and *Massachusetts Births* series. The APNCU Index is the standard used in Healthy People 2010 and by the majority of states. It improves upon the Kessner Index in various ways, the most important being the ability to distinguish between inadequate prenatal care due to the timing of initiation and inadequate care due to insufficient prenatal care visits. The APNCU Index also improves upon the Kessner Index by correcting some of its principal faults. First, the APNCU Index more accurately assesses adequacy of visits for term pregnancies; the Kessner Index characterizes 9 or more visits as adequate, due to an early computer database limitation, which only allowed for a single-digit number to record prenatal care visits. Other faults of the Kessner Index include its bias towards measurement of adequacy of initiation of care, and its various computational algorithms due to inadequate initial documentation.

Table 1 of this report provides a comparison of data on adequacy of prenatal care from 1996-2003 as measured by these two separate indices. Below are the definitions for the APNCU Index categories and its two component indices (initiation and received services), and the definition of the

Kessner Index categories. Also below is a short summary of the major differences in classification of adequacy of prenatal care using the Kessner Index and the APNCU Index.

The APNCU Index characterizes prenatal care (PNC) utilization by measuring two distinct components of prenatal care -- adequacy of initiation and adequacy of received services (visits). Each of these components is measured as an independent index, and the APNCU Index is a summary of these 2 component indices. As with the Kessner Index, the APNCU Index does not assess quality of the prenatal care that is delivered, only its utilization.

Adequacy of Prenatal Care Utilization (APNCU) Index: Definition of Categories

Category	Month Prenatal Care Began	% of Expected[1] Prenatal Care
Adequate Intensive	1, 2, 3, or 4	110% or more
Adequate Basic	1, 2, 3, or 4	80 – 109%
Intermediate	1, 2, 3, or 4	50 – 79%
Inadequate	Month 5 or later	Less than 50%
Unknown	Prenatal care information not recorded	

Component Indices of the APNCU Index: Definitions of Categories

Component Indices and Summary Index

The first component index is "Adequacy of Initiation," which describes the adequacy of when prenatal care began during pregnancy. The assumption underlying this scale is that the earlier PNC begins the better. The month or trimester prenatal care begins is widely used as a measure to assess the adequacy of timing of initiation of PNC, since it accurately and succinctly describes when PNC begins. The APNCU Index uses this measure to determine the “adequacy of initiation.”

The second component index, "Adequacy of Received Services” (visits), characterizes the adequacy of received PNC visits during the time period after prenatal care is begun until the delivery. This component attempts to characterize if the woman received the appropriate number of prenatal care visits for the time period in which she received PNC services. [The appropriate number of visits is based on recommendations of the American College of Obstetricians and Gynecologists for an uncomplicated pregnancy. For example, a woman beginning prenatal care during the first month of pregnancy who delivers during the 40th week of gestation (and has no complications with her pregnancy) should receive 14 visits].

The two component indices are measured independently from one another, and can be used as separate indices, since the policy and practice issues underlying whether women are beginning care early and whether they are receiving the recommended amount of visits may be quite distinct. However, because of the popularity and utility of using one overall adequacy of PNC index, the two component indices are combined into a single summary index – the “Adequacy of Prenatal Care Utilization (APNCU) Index.”

Index Categories

Both component indices and the summary index (APNCU Index) characterize PNC as one of five categories: “adequate intensive,” “adequate basic,” “intermediate,” “inadequate,” or “unknown.” The category "adequate basic" refers to the minimum recommended level of care (for a pregnancy with no complications), while "adequate intensive" refers to a level of care exceeding recommended standards. The sum of the "adequate basic" and "adequate intensive" categories is the total adequacy score. In addition, the “inadequate” category can be subdivided to isolate those women who received no PNC. [For definitions of categories, please see the Technical Notes in the Appendix.]

[For more detail on the methodology of the APNCU Index, please call Center for Health Information, Statistics, Research & Evaluation at 617-624-5600].

Adequacy of Initiation Index

Category	Month Prenatal Care Began
Adequate Intensive	1 or 2
Adequate Basic	3 or 4
Intermediate	5 or 6
Inadequate	Month 7 or later, or no PNC
Unknown	Prenatal care initiation information not recorded

Adequacy of Received Services (Visits) Index

Category	% of Expected[1] Prenatal Care Visits
Adequate Intensive	110% or more
Adequate Basic	80 – 109%
Intermediate	50 – 79%
Inadequate	Less than 50%
Unknown	Information on prenatal care visits not recorded

Kessner Index of Adequacy of Prenatal Care: Definition of Categories

Category	Trimester Care Began	Number of Visits
Adequate	1	9 or more
Intermediate	1	5-8
	2	5 or more
Inadequate	1	1-4
	2	1-4
	3	1 or more
No prenatal care	--	0
Unknown	Unknown	Unknown

Summary of Major Differences in Categorization of Adequacy of Prenatal Care between the Kessner Index and the APNCU Index

The two different methods used in the Kessner Index and APNCU Index to calculate adequacy of prenatal care can result in differences in how each one classifies adequacy of prenatal care. These differences only occur under certain conditions, not in all cases (see "Explanation" column).

The Kessner Index classifies prenatal care as…	… but the APNCU Index classifies prenatal care as …	Explanation
Intermediate	Adequate Basic	This is primarily due to the fact that the APNCU Index allows for prenatal care in the 4th month of pregnancy to be considered adequate if the mother received 80-109% of expected visits, whereas the Kessner Index only allows for care begun in the first trimester (months 1-3) to be considered adequate.
Intermediate	Inadequate	This is primarily due to the fact that the APNCU categorizes any prenatal care beginning after month 4 as "inadequate" whereas the Kessner Index allows for care beginning in months 5 or 6 with 5 or more visits to be "intermediate."
Adequate	Intermediate	This is primarily due to the consideration of "expected" visits (based on when the mother initiated care and the length of gestation) using the APNCU Index, which bases expected visits on the ACOG recommendations,[1] which can be as high as 14 visits if a gestational period is 40 weeks, whereas the Kessner Index considers 9 visits sufficient in all cases.
Adequate	Adequate Intensive	The APNCU Index added an "Adequate Intensive" category, which is not used in the Kessner Index. This allows analysis of situations in which more than normal care is received (e.g. women with high risk conditions, pregnancy complications).

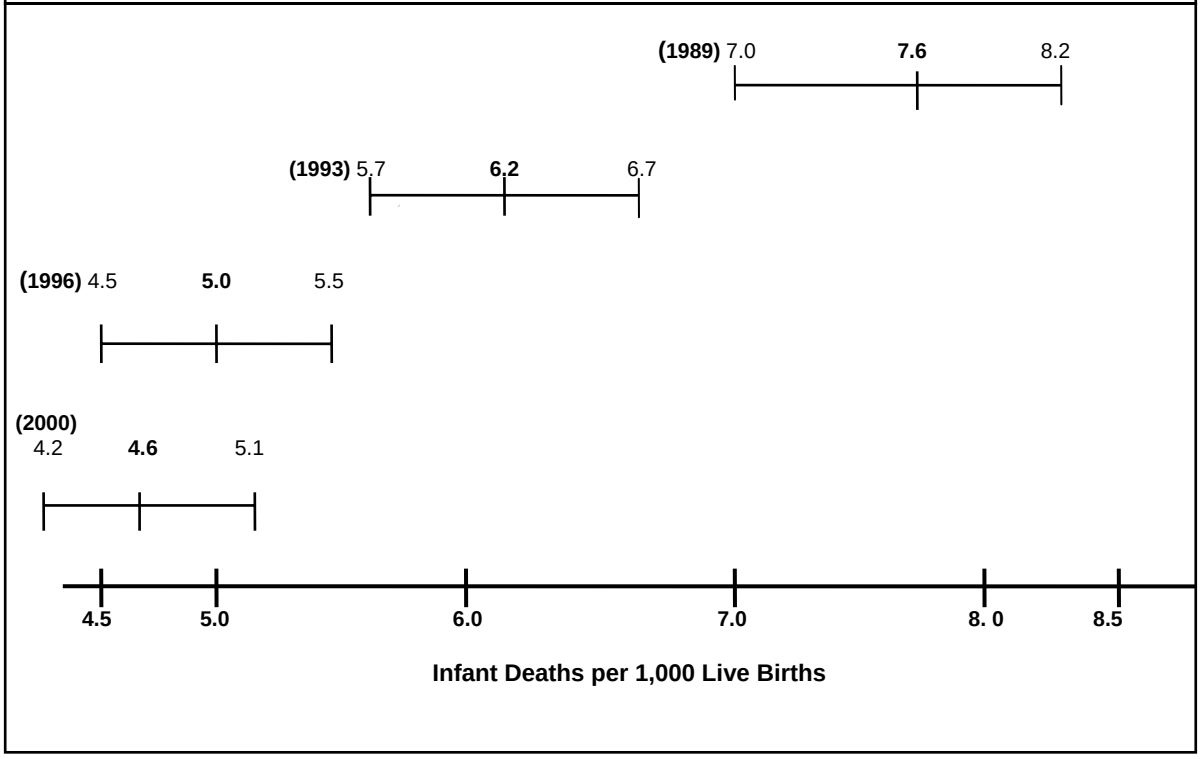
18. The number of "expected" visits is determined based on standards set by the American College of Obstetricians and Gynecologists (ACOG).

CONFIDENCE INTERVALS AND INFANT MORTALITY RATES

Beginning in the 1992 Advance Data: Births publication, 95% confidence intervals were added to the calculation of infant mortality rates (IMRs). The confidence interval (CI) provides a measure of stability of the IMR and a basis for comparing rates to determine if they are statistically different. Rates can be compared for the same group in different years, or for different groups in the same year. The width of the CI reflects the stability of the IMR. For example, a narrow CI reflects high stability, and a wide interval reflects low stability. If the CIs around two IMRs being compared do not overlap, the difference between the two rates is statistically significant. The following table and chart illustrate the concept of statistically significant differences using actual data from 1989, 1993, 1996, and 2000.

Comparison of Infant Mortality Rates and Confidence Intervals for Selected Years

Year	IMR (per 1,000 births)	95% Confidence Interval
1989	7.6	(7.0-8.2)
1993	6.2	(5.7-6.7)
1996	5.0	(4.5-5.5)
2000	4.6	(4.2-5.1)



The difference between the 1993 IMR and 1996 IMR is statistically significant – the confidence intervals do not overlap. The same is true for the differences between the 1989 IMR and each annual IMR for 1993, 1996, and 2000. However, the difference between the 1996 and 2000 IMRs is not statistically significant, since their confidence intervals overlap.

95% Confidence Intervals for Infant Mortality Rates, by Race and Hispanic Ethnicity, Massachusetts: 1990-2003

	Total[1]		White non-Hispanic		Black non-Hispanic		Hispanic		Asian	
Year	n	**Rate**[2] (C.I.)	n	**Rate**[2] (C.I.)	n	**Rate**[2] (C.I.)	n	**Rate**[2] (C.I.)	n	**Rate**[2] (C.I.)
1990	649	**7.0** (6.5, 7.5)	442	**6.1** (5.5, 6.7)	98	**13.7** (11.0, 16.4)	77	**9.1** (7.1, 11.1)	24	**7.0** (4.2, 10.0)
1991	577	**6.5** (6.0, 7.0)	381	**5.5** (4.9, 6.1)	101	**15.0** (12.1, 17.9)	80	**9.4** (7.3, 11.5)	14	**4.2** (2.0, 6.4)
1992	569	**6.5** (6.0, 7.0)	371	**5.5** (4.9, 6.1)	110	**16.4** (13.4, 19.4)	67	**7.9** (6.0, 9.8)	16	**4.9** (2.5, 7.3)
1993	523	**6.2** (5.7, 6.7)	346	**5.3** (4.7, 5.9)	84	**13.1** (10.3, 15.9)	77	**9.3** (7.2, 11.4)	13	**3.9** (1.8, 6.0)
1994	499	**6.0** (5.4, 6.5)	343	**5.3** (4.7, 5.9)	79	**12.6** (9.8, 15.4)	64	**7.6** (5.7, 9.4)	8	**2.4** (0.7, 4.0)
1995	419	**5.1** (4.6, 5.6)	275	**4.4** (3.8, 4.9)	65	**11.1** (8.4, 13.8)	58	**7.2** (5.3, 9.0)	19	**5.5** (3.0, 8.0)
1996	403	**5.0** (4.5, 5.5)	289	**4.7** (4.1, 5.2)	63	**11.4** (8.6, 14.2)	40	**5.1** (3.5, 6.7)	8	**2.2** (0.7, 3.7)
1997	425	**5.3** (4.8, 5.8)	294	**4.8** (4.2, 5.3)	64	**11.7** (8.8, 14.5)	55	**6.7** (4.9, 8.4)	10	**2.6** (1.0, 4.2)
1998	414	**5.1** (4.6, 5.6)	294	**4.6** (4.1, 5.2)	64	**10.6** (7.9, 13.3)	55	**6.7** (5.0, 8.4)	10	**2.7** (1.0, 4.3)
1999	418	**5.2** (4.7, 5.7)	285	**4.7** (4.2, 5.3)	72	**12.3** (9.5, 15.1)	49	**5.5** (4.0, 7.1)	8	**1.9** (0.6, 3.3)
2000	377	**4.6** (4.2, 5.1)	232	**3.8** (3.4, 4.3)	74	**12.8** (9.9, 15.7)	48	**5.2** (3.7, 6.6)	19	**4.1** (2.2, 5.9)
2001	407	**5.0** (4.5, 5.5)	245	**4.1** (3.6, 4.7)	71	**12.1** (9.3, 14.9)	69	**7.3** (5.6, 9.1)	15	**3.1** (1.6, 4.7)
2002	397	**4.9** (4.4, 5.4)	239	**4.1** (3.6, 4.6)	69	**11.6** (8.9, 14.3)	67	**7.0** (5.3, 8.7)	16	**3.0** (1.5, 4.5)
2003	383	**4.8** (4.3, 5.3)	235	**4.1** (3.6, 4.6)	75	**12.7** (9.8, 15.5)	55	**5.6** (4.1, 7.1)	14	**2.7** (1.3, 4.1)

[1]Deaths of infants of unknown race are excluded except for the total calculation. For rate computations, births of infants of unknown race are allocated into the race categories according to the distribution of births of known race.
[2]Rates are expressed per 1,000 live births.

In 2003, the black non-Hispanic infant mortality rate was 12.7 deaths per 1,000 live births (95% CI: 9.8, 15.5), which was three times greater than the white non-Hispanic infant mortality rate of 4.0 (95% CI: 3.5, 4.6). The difference in these two rates was statistically significant. The rate of infant mortality for black non-Hispanics was also significantly elevated compared with both Hispanics (95% CI: 4.1, 7.0) and Asians (95% CI: 1.3, 4.1) in 2003.

DEFINITION OF RATES AND RATIOS

Age-Specific Birth Rate

The number of children born to women in a specific age group divided by the population of women in that specific age group, multiplied by 1,000.

$$\text{Age-Specific Birth Rate} = \frac{\text{Number of births to females ages X to Y years}}{\text{Number of females ages X to Y years in the population}} \times 1{,}000$$

Birth Rate

(See Age-Specific Birth Rate, Crude Birth Rate, Fertility Rate, and Teen Birth Rate)

Cesarean Section Rates

$$\text{Total C-section rate} = \frac{\text{Number of C-section births}}{\text{Number of occurrence births}} \times 100$$

$$\text{Primary C-section rate} = \frac{\text{Number of primary C-section births}}{\text{[Number of occurrence births-(number of repeat C-section births+VBACs)]}} \times 100$$

$$\text{Repeat C-section rate} = \frac{\text{Number of repeat C-section births}}{\text{(Number of repeat C-section births+number of VBACs)}} \times 100$$

$$\text{VBAC rate} = \frac{\text{Number of VBACs}}{\text{(Number of repeat C-section births+number of VBACs)}} \times 100$$

Crude Birth Rate

$$\text{Crude Birth rate} = \frac{\text{Number of resident live births}}{\text{Total resident population}} \times 1{,}000$$

Fertility Rate (sometimes referred to as "Birth Rate")

$$\text{Fertility rate} = \frac{\text{Number of births to females ages 15-44 years}}{\text{Number of females ages 15-44 years in the population}} \times 1{,}000$$

Fetal Mortality Rate

$$\text{Fetal Mortality Rate} = \frac{\text{Number of fetal deaths}}{\text{Number of fetal deaths plus live births in the same year}} \times 1{,}000$$

Feto-Infant Mortality Rate

$$\text{Feto-Infant Mortality Rate} = \frac{\text{Number of fetal deaths + Number of infant deaths}}{\text{Number of fetal deaths + live births in the same year}} \times 1{,}000$$

(Refer to the definitions of Fetal Mortality Rate and Infant Mortality Rate for more details.)

Infant Mortality Rate (IMR)
The death rate among infants less than one year old, per 1,000 live births.

$$\text{Infant Mortality Rate} = \frac{\text{Number of resident deaths of infants less than one year old in a year}}{\text{Number of resident live births in the same year}} \times 1{,}000$$

Interpregnancy Interval (IPI)
Interpregnancy interval is the time, in months, between the date of last menstrual period of current pregnancy and the date of previous live birth. IPI is calculated for each mother currently giving birth to their second or later child.

$$\%\text{Short IPI} = \frac{\text{Number of mothers giving birth to their 2nd or later child with IPI <12 months}}{\text{Number of mothers giving birth to their 2nd or later child in the same year}} \times 100$$

$$\%\text{ IPI 12 to 35 months} = \frac{\text{Number of mothers giving birth to their 2nd or later child with IPI between 12 and 35 months}}{\text{Number of mothers giving birth to their 2nd or later child in the same year}} \times 100$$

$$\%\text{ IPI 36+ months} = \frac{\text{Number of mothers giving birth to their 2nd or later child with IPI >=36 months}}{\text{Number of mothers giving birth to their 2nd or later child in the same year}} \times 100$$

Maternal Mortality Ratio (MMR)
The number of maternal deaths per 100,000 live occurrence births. The term "ratio" is used instead of "rate" in this report because the numerator includes some maternal deaths that were not related to live-born infants and thus were not included in the denominator.

$$\text{Maternal Mortality Ratio (MMR)} = \frac{\text{Number of maternal deaths}}{\text{Number of occurrence live births in the same year}} \times 100{,}000$$

Neonatal Mortality Rate (NMR)

The death rate among infants less than 28 days of age, per 1,000 live births.

$$\text{Neonatal Mortality Rate} = \frac{\text{Number of resident deaths of infants less than 28 days of age in a year}}{\text{Number of resident live births in the same year}} \times 1{,}000$$

Perinatal Mortality Rate

$$\text{Perinatal Mortality Rate} = \frac{\text{Number of fetal deaths from 28 weeks gestation plus infant deaths (less than 7 days old)}}{\text{Number of fetal deaths plus live births in the same year}} \times 1{,}000$$

Post Neonatal Mortality Rate

The death rate among infants 28 days of age to less than one year old, per 1,000 live births.

$$\text{Post Neonatal Mortality Rate} = \frac{\text{Number of resident deaths of infants 28 days of age to less than one year of age in a year}}{\text{Number of resident live births in the same year}} \times 1{,}000$$

Pregnancy-Associated Mortality Ratio (PAMR)

The number of pregnancy-associated deaths per 100,000 live occurrence births. The term "ratio" is used instead of rate in this report because the numerator includes some maternal deaths that were not related to live-born infants and thus were not included in the denominator.

$$\text{Pregnancy-Associated Mortality Ratio (PAMR)} = \frac{\text{Number of pregnancy-associated deaths}}{\text{Number of occurrence live births in the same year}} \times 100{,}000$$

Teen Birth Rate

$$\text{Teen birth rate} = \frac{\text{Number of births to females ages 15-19 years old}}{\text{Number of females ages 15-19 years old in the population}} \times 1{,}000$$

Total Rate of Change

Total rate of change between two numbers or rates is expressed as a percentage in this report (e.g. The Massachusetts birth rate decreased by 12% from 1990 to 1996.):

$$\frac{Pn-Po}{Po} \times 100$$

where, Pn = rate during later time period
Po = rate during earlier time period

Population Estimates for Massachusetts Communities, 2000

TOWN NAME	COUNTY	CHNA	POPULATION
Abington	Plymouth	22	14,605
Acton	Middlesex	15	20,331
Acushnet	Bristol	26	10,161
Adams	Berkshire	1	8,809
Agawam	Hampden	4	28,144
Alford	Berkshire	1	399
Amesbury	Essex	12	16,450
Amherst	Hampshire	3	34,874
Andover	Essex	11	31,247
Aquinnah (Gay Head)	Dukes	27	344
Arlington	Middlesex	17	42,389
Ashburnham	Worcester	9	5,546
Ashby	Middlesex	9	2,845
Ashfield	Franklin	2	1,800
Ashland	Middlesex	7	14,674
Athol	Worcester	2	11,299
Attleboro	Bristol	24	42,068
Auburn	Worcester	8	15,901
Avon	Norfolk	22	4,443
Ayer	Middlesex	9	7,287
Barnstable	Barnstable	27	47,821
Barre	Worcester	9	5,113
Becket	Berkshire	1	1,755
Bedford	Middlesex	15	12,595
Belchertown	Hampshire	3	12,968
Bellingham	Norfolk	6	15,314
Belmont	Middlesex	17	24,194
Berkley	Bristol	24	5,749
Berlin	Worcester	9	2,380
Bernardston	Franklin	2	2,155
Beverly	Essex	13	39,862
Billerica	Middlesex	10	38,981
Blackstone	Worcester	6	8,804
Blandford	Hampden	4	1,214
Bolton	Worcester	9	4,148
Boston	Suffolk	19	589,141
Bourne	Barnstable	27	18,721
Boxborough	Middlesex	15	4,868
Boxford	Essex	12	7,921
Boylston	Worcester	8	4,008
Braintree	Norfolk	20	33,828
Brewster	Barnstable	27	10,094
Bridgewater	Plymouth	22	25,185
Brimfield	Hampden	5	3,339
Brockton	Plymouth	22	94,304
Brookfield	Worcester	5	3,051
Brookline	Norfolk	19	57,107
Buckland	Franklin	2	1,991
Burlington	Middlesex	15	22,876
Cambridge	Middlesex	17	101,355
Canton	Norfolk	20	20,775
Carlisle	Middlesex	15	4,717
Carver	Plymouth	23	11,163
Charlemont	Franklin	2	1,358
Charlton	Worcester	5	11,263
Chatham	Barnstable	27	6,625
Chelmsford	Middlesex	10	33,858
Chelsea	Suffolk	19	35,080
Cheshire	Berkshire	1	3,401
Chester	Hampden	21	1,308
Chesterfield	Hampshire	3	1,201
Chicopee	Hampden	21	54,653
Chilmark	Dukes	27	843
Clarksburg	Berkshire	1	1,686
Clinton	Worcester	9	13,435
Cohasset	Norfolk	20	7,261
Colrain	Franklin	2	1,813
Concord	Middlesex	15	16,993
Conway	Franklin	2	1,809
Cummington	Hampshire	3	978
Dalton	Berkshire	1	6,892
Danvers	Essex	14	25,212
Dartmouth	Bristol	26	30,666
Dedham	Norfolk	18	23,464
Deerfield	Franklin	2	4,750
Dennis	Barnstable	27	15,973
Dighton	Bristol	24	6,175
Douglas	Worcester	6	7,045
Dover	Norfolk	18	5,558
Dracut	Middlesex	10	28,562
Dudley	Worcester	5	10,036
Dunstable	Middlesex	10	2,829
Duxbury	Plymouth	23	14,248
East Bridgewater	Plymouth	22	12,974
East Brookfield	Worcester	5	2,097
East Longmeadow	Hampden	4	14,100
Eastham	Barnstable	27	5,453
Easthampton	Hampshire	3	15,994
Easton	Bristol	22	22,299
Edgartown	Dukes	27	3,779
Egremont	Berkshire	1	1,345
Erving	Franklin	2	1,467
Essex	Essex	13	3,267
Everett	Middlesex	16	38,037
Fairhaven	Bristol	26	16,159
Fall River	Bristol	25	91,938
Falmouth	Barnstable	27	32,660
Fitchburg	Worcester	9	39,102
Florida	Berkshire	1	676
Foxborough	Norfolk	7	16,246
Framingham	Middlesex	7	66,910
Franklin	Norfolk	6	29,560
Freetown	Bristol	26	8,472
Gardner	Worcester	9	20,770
Georgetown	Essex	12	7,377
Gill	Franklin	2	1,363
Gloucester	Essex	13	30,273
Goshen	Hampshire	3	921
Gosnold	Dukes	27	86
Grafton	Worcester	8	14,894
Granby	Hampshire	3	6,132
Granville	Hampden	4	1,521
Great Barrington	Berkshire	1	7,527
Greenfield	Franklin	2	18,168
Groton	Middlesex	9	9,547
Groveland	Essex	12	6,038
Hadley	Hampshire	3	4,793
Halifax	Plymouth	23	7,500
Hamilton	Essex	13	8,315
Hampden	Hampden	4	5,171
Hancock	Berkshire	1	721
Hanover	Plymouth	23	13,164
Hanson	Plymouth	23	9,495
Hardwick	Worcester	9	2,622
Harvard	Worcester	9	5,981
Harwich	Barnstable	27	12,386
Hatfield	Hampshire	3	3,249
Haverhill	Essex	12	58,969
Hawley	Franklin	2	336
Heath	Franklin	2	805
Hingham	Plymouth	20	19,882
Hinsdale	Berkshire	1	1,872
Holbrook	Norfolk	22	10,785
Holden	Worcester	8	15,621

Population Estimates for Massachusetts Communities, 2000, continued

TOWN NAME	COUNTY	CHNA	POPULATION
Holland	Hampden	5	2,407
Holliston	Middlesex	7	13,801
Holyoke	Hampden	21	39,838
Hopedale	Worcester	6	5,907
Hopkinton	Middlesex	7	13,346
Hubbardston	Worcester	9	3,909
Hudson	Middlesex	7	18,113
Hull	Plymouth	20	11,050
Huntington	Hampshire	21	2,174
Ipswich	Essex	13	12,987
Kingston	Plymouth	23	11,780
Lakeville	Plymouth	24	9,821
Lancaster	Worcester	9	7,380
Lanesborough	Berkshire	1	2,990
Lawrence	Essex	11	72,043
Lee	Berkshire	1	5,985
Leicester	Worcester	8	10,471
Lenox	Berkshire	1	5,077
Leominster	Worcester	9	41,303
Leverett	Franklin	2	1,663
Lexington	Middlesex	15	30,355
Leyden	Franklin	2	772
Lincoln	Middlesex	15	8,056
Littleton	Middlesex	15	8,184
Longmeadow	Hampden	4	15,633
Lowell	Middlesex	10	105,167
Ludlow	Hampden	21	21,209
Lunenburg	Worcester	9	9,401
Lynn	Essex	14	89,050
Lynnfield	Essex	14	11,542
Malden	Middlesex	16	56,340
Manchester	Essex	13	5,228
Mansfield	Bristol	24	22,414
Marblehead	Essex	14	20,377
Marion	Plymouth	26	5,123
Marlborough	Middlesex	7	36,255
Marshfield	Plymouth	23	24,324
Mashpee	Barnstable	27	12,946
Mattapoisett	Plymouth	26	6,268
Maynard	Middlesex	7	10,433
Medfield	Norfolk	7	12,273
Medford	Middlesex	16	55,765
Medway	Norfolk	6	12,448
Melrose	Middlesex	16	27,134
Mendon	Worcester	6	5,286
Merrimac	Essex	12	6,138
Methuen	Essex	11	43,789
Middleborough	Plymouth	24	19,941
Middlefield	Hampshire	3	542
Middleton	Essex	11	7,744
Milford	Worcester	6	26,799
Millbury	Worcester	8	12,784
Millis	Norfolk	7	7,902
Millville	Worcester	6	2,724
Milton	Norfolk	20	26,062
Monroe	Franklin	2	93
Monson	Hampden	4	8,359
Montague	Franklin	2	8,489
Monterey	Berkshire	1	934
Montgomery	Hampden	4	654
Mt. Washington	Berkshire	1	130
Nahant	Essex	14	3,632
Nantucket	Nantucket	27	9,520
Natick	Middlesex	7	32,170
Needham	Norfolk	18	28,911
New Ashford	Berkshire	1	247
New Bedford	Bristol	26	93,768
New Braintree	Worcester	9	927
New Marlborough	Berkshire	1	1,494
New Salem	Franklin	2	929
Newbury	Essex	12	6,717
Newburyport	Essex	12	17,189
Newton	Middlesex	18	83,829
Norfolk	Norfolk	7	10,460
North Adams	Berkshire	1	14,681
North Andover	Essex	11	27,202
North Attleboro	Bristol	24	27,143
North Brookfield	Worcester	5	4,683
North Reading	Middlesex	16	13,837
Northampton	Hampshire	3	28,978
Northborough	Worcester	7	14,013
Northbridge	Worcester	6	13,182
Northfield	Franklin	2	2,951
Norton	Bristol	24	18,036
Norwell	Plymouth	20	9,765
Norwood	Norfolk	20	28,587
Oak Bluffs	Dukes	27	3,713
Oakham	Worcester	9	1,673
Orange	Franklin	2	7,518
Orleans	Barnstable	27	6,341
Otis	Berkshire	1	1,365
Oxford	Worcester	5	13,352
Palmer	Hampden	4	12,497
Paxton	Worcester	8	4,386
Peabody	Essex	14	48,129
Pelham	Hampshire	3	1,403
Pembroke	Plymouth	23	16,927
Pepperell	Middlesex	9	11,142
Peru	Berkshire	1	821
Petersham	Worcester	2	1,180
Phillipston	Worcester	2	1,621
Pittsfield	Berkshire	1	45,793
Plainfield	Hampshire	3	589
Plainville	Norfolk	7	7,683
Plymouth	Plymouth	23	51,701
Plympton	Plymouth	23	2,637
Princeton	Worcester	9	3,353
Provincetown	Barnstable	27	3,431
Quincy	Norfolk	20	88,025
Randolph	Norfolk	20	30,963
Raynham	Bristol	24	11,739
Reading	Middlesex	16	23,708
Rehoboth	Bristol	24	10,172
Revere	Suffolk	19	47,283
Richmond	Berkshire	1	1,604
Rochester	Plymouth	26	4,581
Rockland	Plymouth	23	17,670
Rockport	Essex	13	7,767
Rowe	Franklin	2	351
Rowley	Essex	12	5,500
Royalston	Worcester	2	1,254
Russell	Hampden	4	1,657
Rutland	Worcester	9	6,353
Salem	Essex	14	40,407
Salisbury	Essex	12	7,827
Sandisfield	Berkshire	1	824
Sandwich	Barnstable	27	20,136
Saugus	Essex	14	26,078
Savoy	Berkshire	1	705
Scituate	Plymouth	20	17,863
Seekonk	Bristol	24	13,425
Sharon	Norfolk	20	17,408
Sheffield	Berkshire	1	3,335
Shelburne	Franklin	2	2,058
Sherborn	Middlesex	7	4,200
Shirley	Middlesex	9	6,373

Population Estimates for Massachusetts Communities, 2000, continued

TOWN NAME	COUNTY	CHNA	POPULATION
Shrewsbury	Worcester	8	31,640
Shutesbury	Franklin	2	1,810
Somerset	Bristol	25	18,234
Somerville	Middlesex	17	77,478
South Hadley	Hampshire	3	17,196
Southampton	Hampshire	3	5,387
Southborough	Worcester	7	8,781
Southbridge	Worcester	5	17,214
Southwick	Hampden	4	8,835
Spencer	Worcester	5	11,691
Springfield	Hampden	4	152,082
Sterling	Worcester	9	7,257
Stockbridge	Berkshire	1	2,276
Stoneham	Middlesex	16	22,219
Stoughton	Norfolk	22	27,149
Stow	Middlesex	7	5,902
Sturbridge	Worcester	5	7,837
Sudbury	Middlesex	7	16,841
Sunderland	Franklin	2	3,777
Sutton	Worcester	6	8,250
Swampscott	Essex	14	14,412
Swansea	Bristol	25	15,901
Taunton	Bristol	24	55,976
Templeton	Worcester	9	6,799
Tewksbury	Middlesex	10	28,851
Tisbury	Dukes	27	3,755
Tolland	Hampden	4	426
Topsfield	Essex	13	6,141
Townsend	Middlesex	9	9,198
Truro	Barnstable	27	2,087
Tyngsborough	Middlesex	10	11,081
Tyringham	Berkshire	1	350
Upton	Worcester	6	5,642
Uxbridge	Worcester	6	11,156
Wakefield	Middlesex	16	24,804
Wales	Hampden	5	1,737
Walpole	Norfolk	7	22,824
Waltham	Middlesex	18	59,226
Ware	Hampshire	3	9,707
Wareham	Plymouth	26	20,335
Warren	Worcester	5	4,776
Warwick	Franklin	2	750
Washington	Berkshire	1	544
Watertown	Middlesex	17	32,986
Wayland	Middlesex	7	13,100
Webster	Worcester	5	16,415
Wellesley	Norfolk	18	26,613
Wellfleet	Barnstable	27	2,749
Wendell	Franklin	2	986
Wenham	Essex	13	4,440
West Boylston	Worcester	8	7,481
West Bridgewater	Plymouth	22	6,634
West Brookfield	Worcester	5	3,804
West Newbury	Essex	12	4,149
West Springfield	Hampden	4	27,899
West Stockbridge	Berkshire	1	1,416
West Tisbury	Dukes	27	2,467
Westborough	Worcester	7	17,997
Westfield	Hampden	21	40,072
Westford	Middlesex	10	20,754
Westhampton	Hampshire	3	1,468
Westminster	Worcester	9	6,907
Weston	Middlesex	18	11,469
Westport	Bristol	25	14,183
Westwood	Norfolk	18	14,117
Weymouth	Norfolk	20	53,988
Whately	Franklin	2	1,573
Whitman	Plymouth	22	13,882
Wilbraham	Hampden	4	13,473
Williamsburg	Hampshire	3	2,427
Williamstown	Berkshire	1	8,424
Wilmington	Middlesex	15	21,363
Winchendon	Worcester	9	9,611
Winchester	Middlesex	15	20,810
Windsor	Berkshire	1	875
Winthrop	Suffolk	19	18,303
Woburn	Middlesex	15	37,258
Worcester	Worcester	8	172,648
Worthington	Hampshire	3	1,270
Wrentham	Norfolk	7	10,554
Yarmouth	Barnstable	27	24,807

1. Massachusetts Department of Public Health (DPH) Race-Allocated Census 2000 Estimates (MRACE), released January, 2002.

Population Estimates for Massachusetts Community Health Network Areas (CHNA) and Counties, 2000[1]

CHNA	POPULATION	COUNTY	POPULATION
1. Community Health Network of Berkshire County	134,953	Barnstable	222,230
2. Upper Valley Health Web (Franklin County)	86,889	Berkshire	134,953
3. Partnership for Health in Hampshire County (Northampton)	150,077	Bristol	534,678
4. The Community Health Connection (Springfield)	291,665	Dukes	14,987
5. Community Health Network of Southern Worcester County	113,702	Essex	723,419
6. Community Partners for Health (Milford)	152,117	Franklin	71,535
7. Community Health Network of Greater Metro West (Framingham)	374,478	Hampden	456,228
8 .Community Wellness Coalition (Worcester)	289,834	Hampshire	152,251
9. Fitchburg/Gardner Community Health Network	250,362	Middlesex	1,465,396
10. Greater Lowell Community Health Network	270,083	Nantucket	9,520
11. Greater Lawrence Community Health Network	182,025	Norfolk	650,308
12. Greater Haverhill Community Health Network	144,275	Plymouth	472,822
13. Community Health Network North (Beverly/Gloucester)	118,280	Suffolk	689,807
14. North Shore Community Health Network	278,839	Worcester	750,963
15. Greater Woburn/Concord/Littleton Community Health Network	208,406		
16. North Suburban Health Alliance (Medford/Malden/Melrose)	261,844	**STATE**	**6,349,097**
17. Greater Cambridge/Somerville Community Health Network	278,402		
18. West Suburban Health Network (Newton/Waltham)	253,187		
19. Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	746,914		
20. Blue Hills Community Health Alliance (Greater Quincy)	365,457		
21. Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield)	159,254		
22. Greater Brockton Community Health Network	232,260		
23. South Shore Community Partners in Prevention (Plymouth)	180,609		
24. Greater Attleboro-Taunton Health & Education Response	242,659		
25. Partners for a Healthier Community (Fall River)	140,256		
26. Greater New Bedford Health & Human Services Coalition	195,533		
27. Cape and Islands Community Health Network	246,737		

1. Massachusetts Department of Public Health (DPH) Race-Allocated Census 2000 Estimates (MRACE), released January, 2002.

GLOSSARY

Adequacy of Prenatal Care Utilization (APNCU) Index

The Adequacy of Prenatal Care Utilization Index, developed by Dr. Milton Kotelchuck, is the measure used in this publication to classify the adequacy of prenatal care received by Massachusetts resident mothers. (*Please note: Beginning with Births 2001 publication, the Kessner Index was used to measure adequacy of prenatal care; please see definition for Kessner Index below*.) The APNCU Index has five categories (adequate intensive, adequate basic, intermediate, inadequate, and unknown), based on the month of pregnancy in which prenatal care begins and the percent of expected prenatal care visits for the time period during which a woman receives prenatal care services. Please see Technical Notes for more details.

Birthweight

The weight of an infant recorded at the time of delivery. It may be recorded in either pounds/ounces or grams. If recorded in pounds/ounces, it is converted to grams for use in this report.

1 pound = 453.6 grams
1,000 grams = 2 pounds and 3 ounces

Birthweight Categories

Normal birthweight (NBW):	An infant's weight of 2,500 grams (approximately 5.5 pounds) or more recorded at birth.
Low birthweight (LBW):	An infant's weight of less than 2,500 grams (5.5 pounds) recorded at birth.
Very low birthweight (VLBW):	An infant's weight of less than 1,500 grams (3.3 pounds) recorded at birth.

Cesarean Section or C-Section

Primary: A mother's first Cesarean section delivery.
Repeat: A Cesarean delivery that has been preceded by at least one Cesarean delivery.

Community Health Network Areas (CHNAs)

The Department of Public Health, in collaboration with health service providers, coalition members, and interested citizens, has designated 27 areas for community health planning. It is the Department's intention to foster in each of these areas the development of Community Health Networks – consortia of health care providers, human service agencies, schools, churches, youth, parents, elders, advocacy groups, and individual consumers – to address the health needs of the community. These community coalitions will participate in monitoring outcomes and progress of strategies and responses to those health needs.

It is hoped the Networks will mobilize around key health issues impacting the community, promote prevention efforts, enhance access to care, provide opportunities for more collaboration among agencies, and create a client-centered, outcome-oriented health service delivery system. Community Health Networks will also promote efficiency in service delivery by working to reduce duplication and overlap, and by identifying gaps in service.

Community Health Network Areas (cont.)

A Community Health Network Area (CHNA) is defined as an aggregation of cities and towns. In the current publication, we have presented some data by CHNA. To determine which cities and towns make up a particular CHNA, the table on pages 128-130 provides the appropriate CHNA code for each city and town.

The data published in this volume reflect the definitions of CHNAs instituted in January 1997 and the corresponding CHNA names.

Confidence Intervals

The confidence interval (CI) for the infant mortality rate (IMR) is a range of values that has a 95% chance of including the underlying risk of an infant death. Observed rates are subject to statistical variation; even if the underlying risk of infant death is identical in two subpopulations, the observed IMRs for the subpopulations may differ because of random variation. The confidence interval describes the precision of observed IMR as an estimate of the underlying risk of infant death, with a wider interval indicating less certainty about this estimate. The width of the interval reflects the size of the subpopulation and the number of infant deaths; smaller subpopulations with fewer infant deaths lead to wider confidence intervals.

Ethnicity

See the section in the Technical Notes of the Appendix entitled: “Changes in the Collection of Race and Ethnicity Information.”

Fetal Death

A stillbirth delivered, extracted or expulsed, at 20 weeks gestation or more and/or weighs 350 grams or more.

Feto-Infant Mortality Rate

The combined number of fetal deaths and infant deaths per 1000 live births and fetal deaths.

Healthy Start

A Massachusetts-funded program providing services and financing for prenatal care to low-income pregnant women who lack health insurance, but do not qualify for Medicaid.

Infant

A child whose age is less than one year (365 days).

Infant Death

Death of a child whose age is less than one year.

Kessner Index (Adequacy of Prenatal Care)
A measure of adequacy of prenatal care, used in *Advance Data: Births* and *Massachusetts Births* publications prior to 2001. The Kessner Index classifies prenatal care as one of 5 categories (adequate, intermediate, inadequate, no prenatal care, and unknown), based on the trimester in which prenatal care began and the number of prenatal visits. The classification adjusts for gestational age to allow for proper classification of premature births, and is as follows:

Category	Trimester Care Began	Number of Visits
Adequate	1	9 or more
Intermediate	1	5-8
	2	5 or more
Inadequate	1	1-4
	2	1-4
	3	1 or more
No prenatal care	--	0
Unknown	Unknown	Unknown

Live Birth
A live birth is any infant who breathes or shows any other evidence of life (such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles) after separation from the mother's uterus, regardless of the duration of gestation.

Low Birthweight (LBW)
See Birthweight Categories.

Maternal Death
The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by pregnancy or its management, but not from accidental or incidental causes.

Mother's Birthplace
In this publication, birth characteristics are presented according to mother's birthplace: those who were born in the 50 states and District of Columbia, or "U.S. States / D.C."; those who were born in Puerto Rico, the US Virgin Islands, and Guam, or "Puerto Rico/U.S. Territories"; and those who were born outside of the U.S. and Puerto Rico/U.S. territories, or "Non-U.S.-Born".

Neonatal
Infants under 28 days of age.

Neonatal Death
Death of a child whose age is less than 28 days.

Non-U.S.-Born Women
See Mother's Birthplace.

Occurrence Birth
A birth occurring in the Commonwealth of Massachusetts, regardless of the residency of the mother. For individual cities/towns, an occurrence birth represents any birth occurring in that city/town, regardless of the residence of the mother. See Resident Birth.

Parity
The total number of live infants ever born to a woman, including the current birth.

Perinatal
Referring to the time period immediately before and after birth.

Perinatal Death
Death to a fetus of 28 weeks gestation or older or a live-born infant less than 7 days old.

Plurality
The number of births to a woman produced in the same gestational period. A singleton is the birth of one infant; twins represent the births of two infants, etc.

Post Neonatal
A child whose age is at least 28 days, but less than one year.

Post Neonatal Death
Death of a child whose age is at least 28 days, but less than one year.

Prenatal Care Source of Payment
Categories used in this publication include:

Public = Government programs including Commonhealth, Healthy Start, Medicaid/MassHealth, and Medicare (may be HMO or managed care), or free care;
Private = Commercial indemnity plan, commercial managed care (HMO, PPO, IPP, IPA, and other), or other private insurance;
Other = Worker's Compensation and other sources;
Self-paid.

Pregnancy-Associated Death
The death of a woman while pregnant or within one year of termination of pregnancy, irrespective of cause.

Race
See the section in the Technical Notes in the Appendix entitled: "Changes in the Collection of Race and Ethnicity Information."

Resident Birth
The birth of an infant whose mother reports that her usual place of residence is in Massachusetts. In Massachusetts, a resident is a person with a permanent address in one of the 351 cities or towns. Vital statistics data may be presented in terms either of residence or occurrence. All data in this publication, except all data in Tables 22, 23, 24, and selected data in Table 25 are resident data. Resident data include all events that occur to residents of the Commonwealth, wherever they occur. Occurrence data include all events that occur within the state, whether to residents or nonresidents. There is an exchange agreement among the 50

states, District of Columbia, Puerto Rico, Virgin Islands, Guam, and Canada that provides for exchange of copies of birth and death records. These records are used for statistical purposes only, and allow each state or province to track the births and deaths of its residents.

Vaginal Birth After Cesarean (VBAC)
A vaginal delivery of an infant to a mother who has had at least one prior Cesarean section delivery.

Very Low Birthweight (VLBW)
An infant's weight of less than 1,500 grams (3.3 pounds) recorded at birth.

Massachusetts Birth Certificate: 2003

USE ONLY STATE APPROVED RIBBONS AND MASS. STANDARD INK
AS REQUIRED BY GEN. LAWS, CHAP. 66, SECT. 4

The Commonwealth of Massachusetts
DEPARTMENT OF PUBLIC HEALTH
REGISTRY OF VITAL RECORDS AND STATISTICS
STANDARD CERTIFICATE OF LIVE BIRTH

STATE USE ONLY

1. RECORD NUMBER

768283

1A. CERTIFICATE NUMBER (DPH USE ONLY)

2. FACILITY NUMBER

22A. SOCIAL SECURITY CARD

INITIALS

22B. RESIDENT COPY

INITIALS

1. OCCURRENCE

R-101 • 100M • 10-98

CHILD

3. PLACE OF BIRTH
3C. CITY/TOWN
3B. COUNTY
3A. FACILITY NAME-IF NOT IN FACILITY, NUMBER AND STREET
3D. REGISTERED NUMBER

NAME 4A. FIRST 4B. MIDDLE 4C. LAST

SAMPLE

5. SEX | 6A. PLURALITY | 6B. BIRTH ORDER | 7. TIME | 8. DATE OF BIRTH (Month, Day, Year)

CERTIFIER

9A. NAME | 9B. TITLE
9C. CERTIFIER TYPE | 9D. LICENSE NUMBER
9E. NUMBER AND STREET | 9F. CITY/TOWN | 9G. STATE | 9H. ZIP CODE

MOTHER

NAME 10A. FIRST 10B. MIDDLE 10C. LAST 10D. MAIDEN SURNAME

BIRTHPLACE 11A. CITY/TOWN 11B. STATE/COUNTRY | 12. DATE OF BIRTH (Month, Day, Year)

RESIDENCE (Do not use mailing address) 13A. NUMBER AND STREET | 13B. CITY/TOWN | 13C. COUNTY | 13D. STATE | 13E. ZIP CODE

FATHER

NAME 14A. FIRST 14B. MIDDLE 14C. LAST

BIRTHPLACE 15A. CITY/TOWN 15B. STATE/COUNTRY | 16. DATE OF BIRTH (Month, Day, Year)

INFORMANT

17A. I (WE) CERTIFY THAT THE PERSONAL INFORMATION APPEARING ABOVE IS TRUE AND CORRECT. | 17B. RELATIONSHIP TO CHILD

17C. DATE SIGNED (Month, Day, Year) | 17D. MAILING ADDRESS (If different from item # 13 above) NUMBER AND STREET | CITY | STATE | ZIP CODE

CLERK

18. DATE OF RECORD (Month, Day, Year) | 19. SUPPLEMENT FILED (Month, Day, Year) | 20. CLERK/REGISTRAR

21. DPH USE ONLY

Massachusetts Births 2003 Evaluation Form

TO OUR READERS:
In an attempt to better serve our users, we are enclosing this evaluation form. Please take the time to complete this questionnaire and return it to the address at the bottom of the page. Thank you.

What tables and charts do you find most useful?
What tables and charts do you find least useful?
Are there other tables and charts that you would like added to this publication? If yes, please describe them in detail.
Do you have other comments or suggestions?
Name (optional): **Address:** **(For those who received the publication by mail)** Is the mailing label address correct? If not, please correct the address. Thank you.

Please return your comments to:

Dr. James K. West
Research and Epidemiology Program
Center for Health Information, Statistics, Research and Evaluation
Massachusetts Department of Public Health
250 Washington Street, 6th floor, Boston, MA 02108

Place stamp here

Dr. James K. West
Research and Epidemiology Program
Center for Health Information, Statistics, Research & Evaluation
Massachusetts Department of Public Health
250 Washington Street, 6th floor
Boston, MA 02108
