CHAPTER 5

ADEQUACY OF PRENATAL CARE

Changes in Adequacy of Prenatal Care, 1996-2004

In 2004 in Massachusetts, adequacy of prenatal care as measured by the summary Adequacy of Prenatal Care and Utilization Index (APNCU)[20] has remained about the same compared to 84.6% in 2003 (Figure 15). In 2004, white non-Hispanic women continue having the highest percentage of adequate prenatal care (86.6%), followed by Asians (83.0%), Hispanics (76.7%), and black non-Hispanics (76.6%). Please note: APNCU is an assessment of the timing and number of prenatal care visits and not an evaluation of the quality of care delivered.

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 2004, the total percentage of mothers receiving adequate prenatal care ("adequate total") was 84.2%, including 44.2% 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 (8%) received inadequate prenatal care in Massachusetts in 2004. This later group includes mothers who received no prenatal care.

In 2004, more than 9 out of 10 Massachusetts mothers (92.5%) had adequate initiation of PNC (Table 18). More than half (51.3%) began care in the third or fourth month of pregnancy ("adequate basic" initiation) while 41.2% began care in the first or second month of pregnancy ("adequate intensive" initiation). The sum of these two groups equals the total adequacy score ("adequate total") of 92.5% on the adequacy of initiation index.

Almost half (45.7%) of mothers had 80-109% of the expected number of prenatal care visits ("adequate basic" visits) (Table 18). In addition, 44.8% of mothers had at least 110% of the expected number of prenatal care visits ("adequate intensive" visits). A total of 90.5% 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; however, approximately 7 in 10 women under age 18 (69.0%) received adequate prenatal care (Table 19). Women with more education were more likely to receive adequate prenatal care: 90.2% of mothers with more than a college degree had adequate prenatal care, while only 70.2% of mothers with less than a high school education had adequate prenatal care. White non-Hispanic and Asian mothers had the highest adequacy levels, 86.6% and 83.0% respectively. Hispanic and black non-Hispanic mothers had the lowest adequacy levels (76.7% and 76.6% respectively). Mothers who smoked during their pregnancies were over twice as likely to have inadequate prenatal care when compared with non-smokers, 17.2% vs. 7.4%. 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 time (15.0% vs. 8.1%). Women who had multiple

[20] An Overview of the APNCU Index" by Milton Kotelchuck, Sept. 1994, available online at: http://www.mchlibrary.info/databases/HSNRCPDFs/Overview_APCUIndex.pdf

births were much more likely to receive adequate intensive services compared with mothers delivering a singleton: 81.0% vs. 38.0%. 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): 79.4% vs. 36.1%.

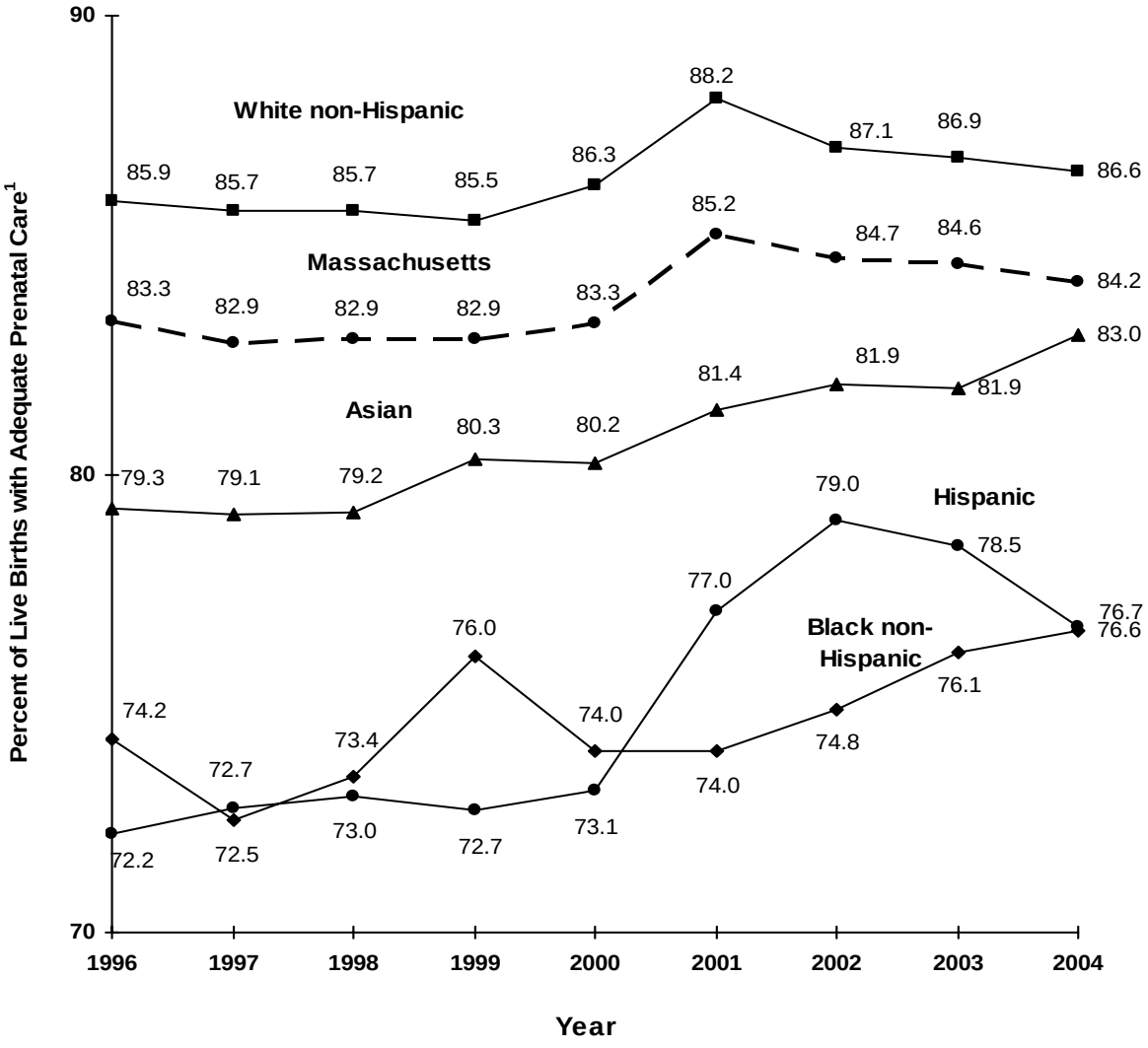
Adequacy of *Initiation* by Selected Maternal and Infant Characteristics

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 22% for all women less than 18 years old and 17% 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). More than 9 out of 10 white non-Hispanic mothers and Asian mothers (94.5% and 91.0%, respectively) had adequate prenatal care initiation compared to black non-Hispanic mothers (85.4%) and Hispanic women (86.7%). Mothers who smoked were over twice as likely to have inadequate prenatal care initiation compared with non-smoking mothers (6.5% vs. 2.5%).

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%). Smoking mothers during pregnancy were 3 times as likely as non smoking mothers to have inadequate prenatal care visits (3% vs. 1%). More than 4 out of 5 women (85.0%) 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 42.8% 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: 1996-2004



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. Please note: The APNCU is an assessment of the timing and number of prenatal care visits and not an evaluation of the quality of care delivered.

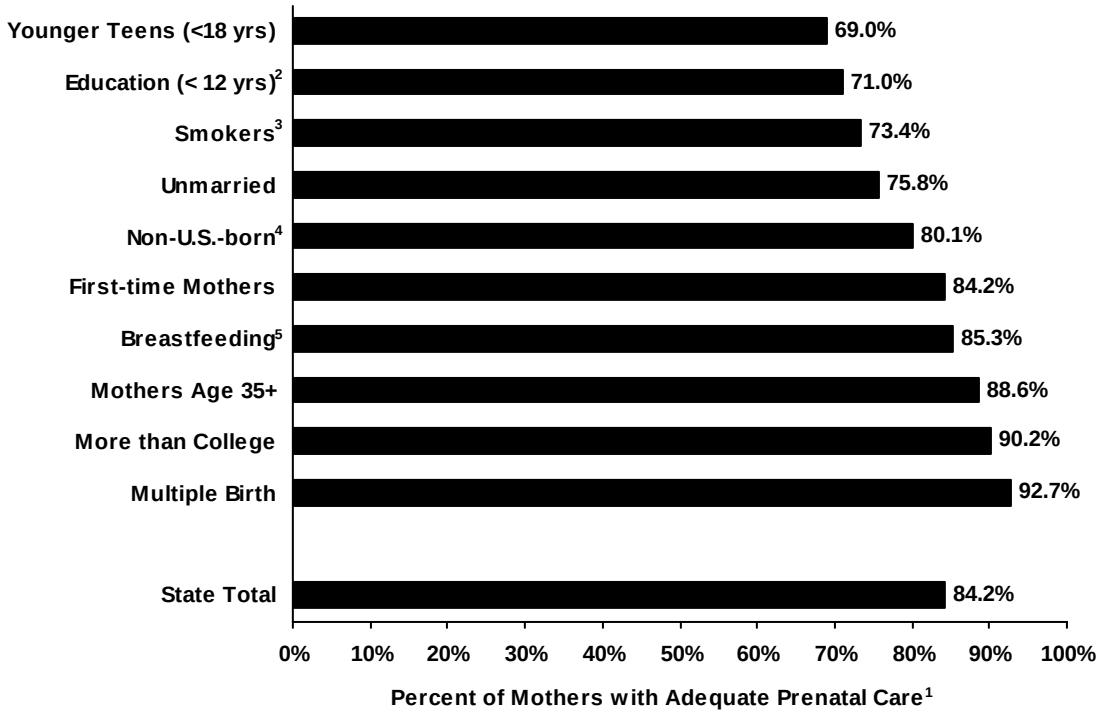
Table 18. Adequacy of Prenatal Care Utilization[1]: Summary and Component Indices, Massachusetts: 2004

	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	**65,362**	**84.2**	**31,062**	**40.0**	**34,300**	**44.2**	**5,938**	**7.6**	**6,322**	**8.1**	**838**
Component Indices[4]											
Adequacy of Initiation	71,799	92.5	31,944	41.2	39,855	51.3	3,626	4.7	2,197	2.8	838
Adequacy of Received Services (Visits)	70,246	90.5	34,784	44.8	35,462	45.7	6,505	8.4	871	1.1	838

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 Maternal Characteristics, Massachusetts: 2004



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: 2004

	Adequate Total[2]		Adequate Intensive		Adequate Basic		Intermediate		Inadequate		Unknown
	n	%	n	%	n	%	n	%	n	%	n
State Total	**65,362**	**84.2%**	**31,062**	**40.0%**	**34,300**	**44.2%**	**5,938**	**7.6%**	**6,322**	**8.1%**	**838**
Age					**Maternal Demographics**						
<18	1,021	69.0	503	34.0	518	35.0	121	8.2	337	22.8	17
18-19	2,200	71.9	1,048	34.3	1,152	37.7	304	9.9	555	18.1	46
20-24	8,867	76.9	4,179	36.2	4,688	40.7	1,016	8.8	1,648	14.3	139
25-29	14,690	83.1	6,849	38.7	7,841	44.3	1,504	8.5	1,494	8.4	226
30-34	22,373	87.5	10,303	40.3	12,070	47.2	1,847	7.2	1,350	5.3	234
35-39	13,152	88.6	6,468	43.6	6,684	45.1	954	6.4	730	4.9	141
40+	3,058	88.5	1,712	49.5	1,346	38.9	191	5.5	208	6.0	33
Educational Attainment											
< than High School	5,593	70.2	2,876	36.1	2,717	34.1%	826	10.4	1,552	19.5	132
High School	15,185	80.6	7,301	38.8	7,884	41.8%	1,535	8.1	2,121	11.3	231
Some college	14,449	84.7	7,225	42.3	7,224	42.3%	1,311	7.7	1,302	7.6	236
College	18,932	88.8	8,396	39.4	10,536	49.4%	1,504	7.1	880	4.1	101
More than college	11,130	90.2	5,230	42.4	5,900	47.8%	756	6.1	448	3.6	75
Race/Hispanic Ethnicity											
Hispanic	7,429	76.7	3,587	37.0	3,842	39.6%	885	9.1	1,377	14.2	107
White non-Hispanic	47,512	86.6	22,442	40.9	25,070	45.7%	4,052	7.4	3,297	6.0	461
Black non-Hispanic	4,522	76.6	2,305	39.0	2,217	37.5%	459	7.8	924	15.6	148
Asian	4,509	83.0	2,093	38.5	2,416	44.5%	403	7.4	518	9.5	24
Other	1,347	79.9	612	36.3	735	43.6%	135	8.0	203	12.0	45
Birthplace											
U.S. States/D.C.	48,133	85.8	22,917	40.9	25,216	44.9%	4,206	7.5	3,759	6.7	582
Puerto Rico/U.S. Terr.	1,530	79.5	727	37.8	803	41.7%	153	8.0	241	12.5	25
Non-U.S.-Born	15,674	80.1	7,403	37.8	8,271	42.3%	1,574	8.0	2,321	11.9	223
Parity[3]					**Pregnancy-Related Factors**						
1	28,988	84.2	13,524	39.3	15,464	44.9%	2,643	7.7	2,790	8.1	281
2-3	32,249	85.3	15,435	40.8	16,814	44.5%	2,841	7.5	2,727	7.2	375
4+	4,049	76.5	2,065	39.0	1,984	37.5%	449	8.5	793	15.0	85
Smoking[4]											
Yes	4,211	73.4	2,233	38.9	1,978	34.5%	539	9.4	988	17.2	71
No	61,090	85.1	28,797	40.1	32,293	45.0%	5,395	7.5	5,318	7.4	715
Plurality					**Birth Outcomes**						
Singleton	61,914	83.8	28,048	38.0	33,866	45.8%	5,866	7.9	6,123	8.3	774
Multiple birth	3,448	92.7	3,014	81.0	434	11.7%	72	1.9	199	5.4	64
Birthweight											
<500 g	95	89.6	87	82.1	8	7.5%	0	0.0	11	10.4	19
500-1,499 g	877	89.4	810	82.6	67	6.8%	23	2.3	81	8.3	42
1,499-2,499 g	4,251	86.8	3,483	71.2	768	15.7%	152	3.1	492	10.1	82
2,500-3,999 g	53,320	83.9	24,090	37.9	29,230	46.0%	5,036	7.9	5,184	8.2	533
4,000+ g	6,800	84.2	2,574	31.9	4,226	52.3%	727	9.0	552	6.8	56
Gestational Age											
<28 weeks	409	89.3	384	83.8	25	5.5%	10	2.2	39	8.5	37
<37 weeks	6,314	89.5	5,603	79.4	711	10.1%	175	2.5	569	8.1	164
37-42 weeks	58,924	83.7	25,398	36.1	33,526	47.6%	5,746	8.2	5,724	8.1	537

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: 2004

	Adequate Total[2]		Adequate Intensive		Adequate Basic		Intermediate		Inadequate		Unknown
	n	%	n	%	n	%	n	%	n	%	n
State Total	**71,799**	**92.5%**	**31,944**	**41.2%**	**39,855**	**51.3%**	**3,626**	**4.7%**	**2,197**	**2.8%**	**838**
Age					**Maternal Demographics**						
<18	1,153	78.0	382	25.8	771	52.1%	203	13.7	123	8.3	17
18-19	2,534	82.8	973	31.8	1,561	51.0%	332	10.9	193	6.3	46
20-24	9,980	86.5	4,081	35.4	5,899	51.2%	972	8.4	579	5.0	139
25-29	16,327	92.3	7,315	41.4	9,012	50.9%	859	4.9	502	2.8	226
30-34	24,365	95.3	11,266	44.1	13,099	51.2%	748	2.9	457	1.8	234
35-39	14,174	95.5	6,481	43.7	7,693	51.9%	398	2.7	264	1.8	141
40+	3,264	94.4	1,445	41.8	1,819	52.6%	114	3.3	79	2.3	33
Educational Attainment											
< than High School	6,521	81.8	2,295	28.8	4,226	53.0%	927	11.6	523	6.6	132
High School	16,865	89.5	7,149	37.9	9,716	51.6%	1,234	6.5	742	3.9	231
Some college	15,868	93.0	7,077	41.5	8,791	51.5%	744	4.4	450	2.6	236
College	20,529	96.3	9,819	46.1	10,710	50.2%	473	2.2	314	1.5	101
More than college	11,935	96.8	5,572	45.2	6,363	51.6%	241	2.0	158	1.3	75
Race/Hispanic Ethnicity											
Hispanic	8,403	86.7	3,626	37.4	4,777	49.3%	827	8.5	461	4.8	107
White non-Hispanic	51,855	94.5	23,558	42.9	28,297	51.6%	1,897	3.5	1,109	2.0	461
Black non-Hispanic	5,043	85.4	2,186	37.0	2,857	48.4%	475	8.0	387	6.6	148
Asian	4,944	91.0	1,872	34.5	3,072	56.6%	329	6.1	157	2.9	24
Other	1,507	89.4	675	40.1	832	49.4%	96	5.7	82	4.9	45
Birthplace											
U.S. States/D.C.	52,668	93.9	23,807	42.4	28,861	51.4%	2,200	3.9	1,230	2.2	582
Puerto Rico/U.S. Terr.	1,710	88.9	730	37.9	980	50.9%	144	7.5	70	3.6	25
Non-U.S.-Born	17,391	88.9	7,387	37.7	10,004	51.1%	1,282	6.6	896	4.6	223
Parity[3]					**Pregnancy-Related Factors**						
1	31,823	92.5	14,331	41.6	17,492	50.8%	1,579	4.6	1,019	3.0	281
2-3	35,329	93.4	15,725	41.6	19,604	51.8%	1,597	4.2	891	2.4	375
4+	4,565	86.3	1,819	34.4	2,746	51.9%	448	8.5	278	5.3	85
Smoking[4]											
Yes	4,823	84.1	1,838	32.0	2,985	52.0%	540	9.4	375	6.5	71
No	66,909	93.2	30,084	41.9	36,825	51.3%	3,080	4.3	1,814	2.5	715
Plurality					**Birth Outcomes**						
Singleton	68,269	92.4	30,186	40.8	38,083	51.5%	3,498	4.7	2,136	2.9	774
Multiple birth	3,530	94.9	1,758	47.3	1,772	47.6%	128	3.4	61	1.6	64
Birthweight											
<500 g	95	89.6	40	37.7	55	51.9%	3	--[4]	8	7.5	19
500-1,499 g	906	92.4	483	49.2	423	43.1%	48	4.9	27	2.8	42
1,499-2,499 g	4,435	90.6	2,097	42.8	2,338	47.8%	284	5.8	176	3.6	82
2,500-3,999 g	58,757	92.5	25,961	40.9	32,796	51.6%	2,973	4.7	1,810	2.8	533
4,000+ g	7,587	93.9	3,357	41.6	4,230	52.4%	318	3.9	174	2.2	56
Gestational Age											
<28 weeks	421	91.9	223	48.7	198	43.2%	22	4.8	15	3.3	37
<37 weeks	6,520	92.4	3,232	45.8	3,288	46.6%	317	4.5	221	3.1	164
37-42 weeks	65,137	92.5	28,648	40.7	36,489	51.8%	3,301	4.7	1,956	2.8	537

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: 2004

	Adequate Total[2]		Adequate Intensive		Adequate Basic		Intermediate		Inadequate		Unknown
	n	%	n	%	n	%	n	%	n	%	n
State Total	**70,246**	**90.5%**	**34,784**	**44.8%**	**35,462**	**45.7%**	**6,505**	**8.4%**	**871**	**1.1%**	**838**
Age					**Maternal Demographics**						
<18	1,288	87.1	707	47.8	581	39.3	154	10.4	37	2.5	17
18-19	2,638	86.2	1,393	45.5	1,245	40.7	359	11.7	62	2.0	46
20-24	10,135	87.9	5,130	44.5	5,005	43.4	1,180	10.2	216	1.9	139
25-29	15,844	89.6	7,686	43.5	8,158	46.1	1,636	9.2	208	1.2	226
30-34	23,406	91.5	11,105	43.4	12,301	48.1	1,961	7.7	203	0.8	234
35-39	13,713	92.4	6,925	46.7	6,788	45.8	1,005	6.8	118	0.8	141
40+	3,221	93.2	1,838	53.2	1,383	40.0	209	6.0	27	0.8	33
Educational Attainment											
< than High School	6,766	84.9	3,748	47.0	3,018	37.9	989	12.4	216	2.7	132
High School	16,816	89.3	8,527	45.3	8,289	44.0	1,740	9.2	285	1.5	231
Some college	15,475	90.7	8,008	46.9	7,467	43.8	1,410	8.3	177	1.0	236
College	19,614	92.0	8,938	41.9	10,676	50.1	1,576	7.4	126	0.6	101
More than college	11,488	93.1	5,516	44.7	5,972	48.4	782	6.3	64	0.5	75
Race/Hispanic Ethnicity											
Hispanic	8,491	87.6	4,389	45.3	4,102	42.3	1,030	10.6	170	1.8	107
White non-Hispanic	50,062	91.3	24,410	44.5	25,652	46.8	4,319	7.9	480	0.9	461
Black non-Hispanic	5,235	88.7	2,840	48.1	2,395	40.6	544	9.2	126	2.1	148
Asian	4,923	90.7	2,406	44.3	2,517	46.4	454	8.4	53	1.0	24
Other	1,491	88.5	715	42.4	776	46.1	153	9.1	41	2.4	45
Birthplace											
U.S. States/D.C.	50,958	90.8	25,089	44.7	25,869	46.1	4,550	8.1	590	1.1	582
Puerto Rico/U.S. Terr.	1,704	88.6	851	44.2	853	44.3	181	9.4	39	2.0	25
Non-U.S.-Born	17,559	89.7	8,829	45.1	8,730	44.6	1,769	9.0	241	1.2	223
Parity[3]					**Pregnancy-Related Factors**						
1	31,215	90.7	15,244	44.3	15,971	46.4	2,869	8.3	337	1.0	281
2-3	34,323	90.8	17,016	45.0	17,307	45.8	3,095	8.2	399	1.1	375
4+	4,623	87.4	2,478	46.8	2,145	40.5	536	10.1	132	2.5	85
Smoking[4]											
Yes	4,913	85.6	2,760	48.1	2,153	37.5	646	11.3	179	3.1	71
No	65,264	90.9	31,984	44.5	33,280	46.3	5,852	8.2	687	1.0	715
Plurality					**Birth Outcomes**						
Singleton	66,630	90.2	31,624	42.8	35,006	47.4	6,433	8.7	840	1.1	774
Multiple birth	3,616	97.2	3,160	85.0	456	12.3	72	1.9	31	0.8	64
Birthweight											
<500 g	98	92.5	90	84.9	8	7.5	0	0.0	8	7.5	19
500-1,499 g	924	94.2	853	87.0	71	7.2	28	2.9	29	3.0	42
1,499-2,499 g	4,630	94.6	3,799	77.6	831	17.0	177	3.6	88	1.8	82
2,500-3,999 g	57,342	90.2	27,138	42.7	30,204	47.5	5,524	8.7	674	1.1	533
4,000+ g	7,233	89.5	2,886	35.7	4,347	53.8	775	9.6	71	0.9	56
Gestational Age											
<28 weeks	428	93.4	400	87.3	28	6.1	13	2.8	17	3.7	37
<37 weeks	6,730	95.4	5,964	84.5	766	10.9	202	2.9	126	1.8	164
37-42 weeks	63,382	90.0	28,750	40.8	34,632	49.2	6,283	8.9	729	1.0	537

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 2004, among all births to Massachusetts women, 68.5% 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 30.5% of all births to Massachusetts women in 2004 as compared with 28.9% in 2003. Although this year's increase over last is modest (5.5%), the proportion of publicly financed care has increased by 26% since 1996, from 24.2% to 30.5%. Finally, less than 1% of all births were considered "self-pay", which often means that mothers had no sources of payment (0.5%) or had their care paid for by other sources (0.4%).

Contrasting 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 (23.1%) had her prenatal care financed by Medicaid/MassHealth. However, Medicaid/MassHealth financing varied largely by race and Hispanic ethnicity. About half of Hispanic and black non-Hispanic mothers had their PNC financed by Medicaid/MassHealth; whereas, 21.7% of Asian and 15.6% of white non-Hispanic mothers' PNC was Medicaid/MassHealth financed (Table 22).

Among women whose prenatal care was funded by Medicaid/MassHealth, about 1 in 7 (15.2%) were under the age of 20. Medicaid/Mass Health accounted for three quarters (74.7%) of teens who had prenatal care insurance. In contrast, only 1 in 50 women (1.9%) whose prenatal care was privately insured were under age 20 (Table 22). Hispanic women also had the highest proportion of mothers under the age of 20 with privately (7.0%) funded prenatal care.

Overall, women whose prenatal care was publicly funded had a higher proportion of low birthweight (8.7%) 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 women (8.0%) with publicly financed prenatal care were more likely to have low birthweight infants when compared with those with private insurance (6.8%). However, black non-Hispanic women with publicly financed prenatal care were somewhat less likely to have low birthweight infants (11.7%) compared with those with privately financed insurance (12.3%). For Hispanic and Asian women, there was little difference in infants' low birthweight based on prenatal care insurance source.

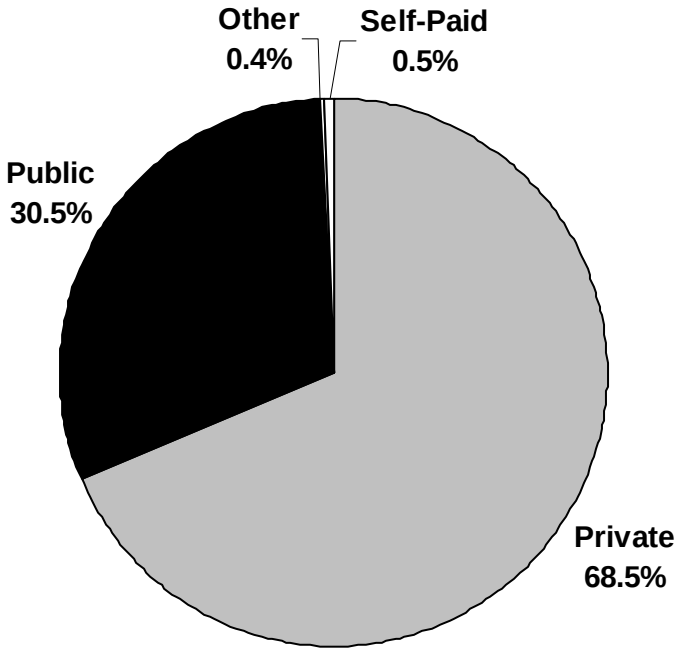
Women whose prenatal care was publicly financed were less likely than those whose prenatal care was privately insured to receive adequate prenatal care (74.6% vs. 89.0%). This was true overall and for each racial and ethnicity group (Table 22). Similar patterns between public versus private insurance source of prenatal care payment were seen for initiation of prenatal care in the first trimester.

Overall, women with publicly funded prenatal care were less likely than those with privately insured prenatal care to deliver by Cesarean section (26.4% vs. 33.2%). This pattern was also seen for each race and ethnicity group. The lowest Cesarean section delivery rate was

found among Asian mothers with publicly funded prenatal care (20.1%) and the highest Cesarean section delivery rate was among Black non-Hispanics mothers with privately insured prenatal care (37.8%).

Women of all race and ethnicity groups whose prenatal care was publicly funded were less likely to report breastfeeding or the intent to breastfeed (70.4%) compared with women who had private insurance (82.8%). The lowest breastfeeding rates were found among white non-Hispanic and Asian women with publicly funded prenatal care (62.9% and 65.3%, respectively). The highest breastfeeding rate was among Asian women with privately insured prenatal care (90.3%) (Table 22).

Figure 17. Distribution of Prenatal Care Payment Source[1], Massachusetts: 2004



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: 2004

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]	**78,460**	**100.0**	**1,496**	**1.9**	**4,601**	**5.9**	**1,148**	**1.5**	**6,125**	**7.8**
Public	23,422	30.5	1,097	4.7	3,438	14.7	350	1.5	2,042	8.7
Medicaid[5]	17,727	23.1	873	4.9	2,694	15.2	249	1.4	1,538	8.7
Other Public[6]	5,695	7.4	224	3.9	744	13.1	101	1.8	504	8.8
Private[7]	52,551	68.5	353	0.7	1,018	1.9	686	1.3	3,747	7.1
White non-Hispanic	**55,322**	**100.0**	**566**	**1.0**	**2,137**	**3.9**	**687**	**1.2**	**4,024**	**7.3**
Public	10,448	19.4	328	3.1	1,403	13.4	108	1.0	841	8.0
Medicaid[5]	8,385	15.6	273	3.3	1,161	13.8	76	0.9	658	7.8
Other Public[6]	2,063	3.8	55	2.7	242	11.7	32	1.6	183	8.9
Private[7]	42,952	79.7	218	0.5	654	1.5	499	1.2	2,928	6.8
Black non-Hispanic	**6,053**	**100.0**	**214**	**3.5**	**595**	**9.8**	**213**	**3.5**	**733**	**12.1**
Public	3,630	60.8	169	4.7	466	12.8	112	3.1	423	11.7
Medicaid[5]	2,750	46.1	140	5.1	382	13.9	84	3.1	336	12.2
Other Public[6]	880	14.7	29	3.3	84	9.5	28	3.2	87	9.9
Private[7]	2,278	38.2	38	1.7	108	4.7	88	3.9	281	12.3
Hispanic	**9,798**	**100.0**	**585**	**6.0**	**1,524**	**15.6**	**153**	**1.6**	**834**	**8.5**
Public	6,920	71.2	498	7.2	1,311	18.9	104	1.5	584	8.4
Medicaid[5]	4,635	47.7	366	7.9	924	19.9	67	1.4	383	8.3
Other Public[6]	2,285	23.5	132	5.8	387	16.9	37	1.6	201	8.8
Private[7]	2,690	27.7	74	2.8	188	7.0	41	1.5	221	8.2
Asian	**5,454**	**100.0**	**67**	**1.2**	**156**	**2.9**	**57**	**1.0**	**378**	**6.9**
Public	1,475	27.2	55	3.7	121	8.2	5	0.3	102	6.9
Medicaid[5]	1,177	21.7	49	4.2	107	9.1	5	0.4	84	7.1
Other Public[6]	298	5.5	6	2.0	14	4.7	0	0.0	18	6.0
Private[7]	3,915	72.1	8	0.2	29	0.7	52	1.3	270	6.9
Other[9]	**1,730**	**100.0**	**63**	**3.6**	**184**	**10.6**	**34**	**2.0**	**148**	**8.6**
Public	941	57.0	47	5.0	136	14.5	21	2.2	91	9.7
Medicaid[5]	773	46.8	45	5.8	119	15.4	17	2.2	76	9.8
Other Public[6]	168	10.2	2	--[8]	17	10.1	4	--[8]	15	8.9
Private[7]	683	41.3	15	2.2	39	5.7	4	--[8]	42	6.1

Table 22. Birth Characteristics by Race/Hispanic Ethnicity and Source of Prenatal Care Payment (Public/Private) -- Massachusetts: 2004

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]	**65,362**	**84.2**	**64,958**	**83.5**	**24,295**	**31.0**	**60,718**	**78.9**
Public	17,272	74.6	16,609	71.5	6,184	26.4	16,481	70.4
Medicaid[5]	13,295	75.7	12,793	72.7	4,739	26.8	12,131	68.5
Other Public[6]	3,977	71.1	3,816	67.7	1,445	25.4	4,350	76.4
Private[7]	46,596	89.0	46,815	89.3	17,418	33.2	43,499	82.8
White non-Hispanic	**47,512**	**86.6**	**47,817**	**87.0**	**17,693**	**32.0**	**42,032**	**77.8**
Public	7,937	76.5	7,683	73.9	2,810	26.9	6,567	62.9
Medicaid[5]	6,440	77.3	6,210	74.5	2,260	27.0	5,034	60.1
Other Public[6]	1,497	73.2	1,473	71.8	550	26.7	1,533	74.3
Private[7]	38,314	89.4	38,820	90.5	14,320	33.4	34,990	81.5
Black non-Hispanic	**4,522**	**76.6**	**4,288**	**72.0**	**1,987**	**33.0**	**4,806**	**80.0**
Public	2,517	71.3	2,390	67.0	1,089	30.1	2,744	75.6
Medicaid[5]	1,974	73.4	1,884	69.4	815	29.8	2,088	76.0
Other Public[6]	543	64.8	506	59.3	274	31.1	656	74.5
Private[7]	1,952	86.8	1,843	81.6	858	37.8	1,994	87.5
Hispanic	**7,429**	**76.7**	**7,194**	**74.0**	**2,625**	**26.8**	**7,915**	**81.0**
Public	5,033	73.5	4,921	71.6	1,740	25.2	5,437	78.6
Medicaid[5]	3,433	74.7	3,385	73.5	1,220	26.4	3,648	78.7
Other Public[6]	1,600	71.1	1,536	67.7	520	22.8	1,789	78.3
Private[7]	2,317	86.6	2,201	82.1	840	31.3	2,355	87.5
Asian	**4,509**	**83.0**	**4,292**	**78.9**	**1,502**	**27.6**	**4,536**	**83.4**
Public	1,071	73.1	925	62.9	296	20.1	963	65.3
Medicaid[5]	845	72.1	727	61.9	242	20.6	736	62.5
Other Public[6]	226	76.9	198	67.1	54	18.1	227	76.4
Private[7]	3,399	87.1	3,337	85.4	1,194	30.5	3,537	90.3
Other[9]	**1,347**	**79.9**	**1,323**	**78.1**	**470**	**27.3**	**1,394**	**84.0**
Public	707	76.4	682	73.3	247	26.3	763	81.3
Medicaid[5]	597	78.3	580	75.7	200	25.9	619	80.3
Other Public[6]	110	67.5	102	61.8	47	28.0	144	85.7
Private[7]	585	86.5	584	86.4	195	28.6	600	88.1

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 organizations (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 breastfeeding or intending to breastfeed at the time the birth certificate was completed.

CHAPTER 7

CESAREAN SECTION DELIVERIES BY HOSPITAL

Introduction

In 2004, 79,438 births occurred in Massachusetts, which is a decrease of 16% since 1990 (94,406 births) and a decrease of 1,872 since 2003 (81,310).

Please note: the percentages and rates provided in Tables 23, 24, 25, and 26 are based on occurrence births (births that occurred in Massachusetts to mothers who are 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 31.1%[21] of the live births occurring in Massachusetts ("occurrence births") in 2004 (Table 23), up 5% from the 2003 rate of 29.5%. Since 1997, there has been a 57% increase in the percentage of Cesarean section deliveries in Massachusetts, from 19.8% in 1997 to 31.1% in 2004, 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 2004, the following facilities had Cesarean section delivery rates at least 15% below or at least 15% above the state rate of 31.1% (Table 23):

Thirteen facilities had cesarean section rates below 26.4% (15% below the state rate):

Nantucket Cottage Hospital	17.5%
Tobey Hospital	20.4%
Holyoke Hospital	21.4%
Heywood Memorial Hospital	21.5%
Berkshire Medical Center	22.3%
Mercy Medical Center	22.7%
Mount Auburn Hospital	23.0%
Franklin Medical Center	23.8%
Cooley Dickinson Hospital	25.2%
Boston Medical Center	25.7%
Anna Jaques Hospital	25.8%
Saint Vincent Hospital	25.8%
Leominster Hospital	26.1%

[21] 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.

Eight facilities had cesarean section rates above 35.8% (15% above the state rate):

Caritas Holy Family Hspt. and Med. Ct	40.3%
Tufts-New England Med. Ctr Hspt.	40.3%
Caritas St. Elizabeth's Med. Ctr.	39.9%
Beth Israel Deaconess Med. Ctr.	38.1%
Newton-Wellesley Hospital	37.6%
Metrowest Med. Ctr.-Framingham	36.7%
Melrose-Wakefield Hospital	36.2%
Morton Hospital	36.0%

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 22.6% statewide in 2004, up 6% from the 2003 rate of 21.4%.

In 2004, the following facilities had primary Cesarean section delivery rates at least 15% below or at least 15% above the state rate of 22.6% (Table 23):

Eighteen facilities had primary Cesarean section rates below 19.2% (15% below the state rate):

Holyoke Hospital	11.9%
Heywood Memorial Hospital	13.1%
Tobey Hospital	15.4%
Mercy Medical Center	15.6%
Nantucket Cottage Hospital	15.8%
Leominster Hospital	15.8%
Berkshire Medical Center	16.6%
St. Luke's Hospital	16.7%
Martha's Vineyard Hospital	16.8%
Mount Auburn Hospital	17.0%
Franklin Medical Center	17.4%
Fairview Hospital	17.6%
Saint Vincent Hospital	18.1%
Cape Cod Hospital	18.1%
Lawrence General Hospital	18.1%
Cooley Dickinson Hospital	18.6%
Boston Medical Center	18.7%
Anna Jaques Hospital	19.1%

Seven facilities had this rate above 26.0% (15% above the state rate):

Metrowest Med. Ctr.-Framingham	26.7%
Morton Hospital	26.8%
Newton-Wellesley Hospital	28.2%
Caritas St. Elizabeth's Med. Ctr.	28.5%
Caritas Holy Family Hspt. and Med. Ctr.	28.6%
Beth Israel Deaconess Med. Ctr.	30.1%
Tufts-New England Med. Ctr. Hspt.	33.0%

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 89.1% in 2004, up 2% from the 2003 rate of 87.5%.

Repeat Cesarean section delivery rates were lowest at Anna Jaques Hospital (71.6%), Mount Auburn Hospital (75.5%), and Saint Vincent Hospital (76.8%). Facilities with the highest rates of repeat Cesarean section deliveries include Metrowest Medical Ctr (100%), Mary Lane Hospital (100%), Fairview Hospital (100%), Martha's Vineyard Hospital (100%), and Nantucket Cottage Hospital (100%) (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 2004, the VBAC rate was 10.9%, down 13% from the 2003 rate of 12.5%. In 1996, the VBAC rate peaked at 34.0% (trend data not shown), and it has declined 68%.

In 2004, only eight facilities had over 40 births delivered through VBAC. The VBAC delivery rate among these facilities ranged from 8.3% for South Shore Hospital to 24.5% for Mount Auburn Hospital. The other six facilities with over 40 births delivered through VBAC were Beth Israel Deaconess Medical Center (11.3%), UMass Memorial Medical Center - West Campus (12.7%), Brigham and Women's Hospital (13.5%), Massachusetts General Hospital (15.4%), Baystate Medical Center (17.3%), and Saint Vincent Hospital (23.2%).

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 2004, as in 2003, 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 31.0% of singleton births to mothers who gave birth to their first child in a Massachusetts licensed maternity facility in 2004 (Table 24), up 6% from the 2003 rate of 28.1% .

In 2004, 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 30.6% (Table 24):

Fourteen facilities had this rate below 26.0% (15% below the state rate):

UMass Memorial Med. Ctr.- West	25.9%
Mount Auburn Hospital	25.2%
Cambridge Hospital	24.7%
Lawrence General Hospital	24.3%
St. Luke's Hospital	24.3%
Berkshire Medical Center	23.7%
Boston Medical Center	23.4%
Martha's Vineyard Hospital	23.1%
Leominster Hospital	22.4%
Franklin Medical Center	22.1%
Heywood Memorial Hospital	21.1%
Tobey Hospital	21.0%
Nantucket Cottage Hospital	17.2%
Holyoke Hospital	15.2%

Eleven facilities had this rate at or above 35.2% (15% above the state rate):

Tufts-New England Medical Ct. Hspt.	40.9%
Morton Hospital	40.8%
Caritas Holy Family Hspt. and Medical Ctr.	40.5%
Sturdy Memorial Hospital	39.7%
Newton Wellesley Hospital	39.3%
Caritas St. Elizabeth's Medical Center	38.6%
Melrose-Wakefield Hospital	37.7%
Mary Lane Hospital	36.5%
Metrowest Medical Ctr.	36.5%
Caritas Good Samaritan	35.7%
Beth Israel Deaconess Med. Center	35.2%

In 2004, cesarean section was the method of delivery for 9.4% of singleton births to mothers having the second or later birth who had no prior cesarean section, compared with 8.8% in 2003. The following facilities had this rate at least 15% below and at least 15% above the state rate of 9.4% (Table 24):

Fourteen facilities had this rate below 8.0% (15% below the state rate):

Mount Auburn Hospital	4.4%
Cooley Dickinson Hospital	4.7%
Heywood Memorial Hospital	4.8%
Cape Cod Hospital	5.6%
Mercy Medical Center	5.8%
Beverly Hospital	6.5%
Tobey Hospital	7.2%
Berkshire Medical Center	7.3%
Holyoke Hospital	7.5%
Anna Jaques Hospital	7.5%
Leominster Hospital	7.6%
Fairview Hospital	7.6%
Mary Lane Hospital	7.8%

Sixteen facilities had this rate above 10.8% (15% above the state rate):

Mount Auburn Hospital	4.4%
Cooley Dickinson Hospital	4.7%
Heywood Memorial Hospital	4.8%
Cape Cod Hospital	5.6%
Mercy Medical Center	5.8%
Beverly Hospital	6.5%
Tobey Hospital	7.2%
Berkshire Medical Center	7.3%
Holyoke Hospital	7.5%
Anna Jaques Hospital	7.5%
Leominster Hospital	7.6%
Fairview Hospital	7.6%
Mary Lane Hospital	7.8%
Caritas Good Samaritan Medical Ctr.	11.7%
Boston Medical Center	11.9%
Falmouth Hospital	12.4%
Brockton Hospital	12.4%
Morton Hospital	12.4%
Metrowest Medical Ctr.	12.7%
Harrington Memorial Hospital	13.8%
Tufts-New England Medical Ct. Hspt.	15.0%

Table 23. Cesarean Section Deliveries and Vaginal Births after Cesarean Section (VBACs) by Licensed Maternity Facility[1], All Births, Massachusetts: 2004

Facility	Occurrence Births[2]	Total C-Sections		Primary C-Section[2]		Repeat C-Sections		VBACs2	
		n	%[3,4]	n	%[3,5]	n	%[3,6]	n	%[7]
State Total	**79,438**	**24,669**	**31.1**	**15,637**	**22.6**	**9,032**	**89.1**	**1,106**	**10.9**
Anna Jaques Hspt.	743	192	25.8	124	19.1	68	71.6	27	28.4
Baystate Med. Ctr.	4,200	1,285	30.6	822	22.6	463	82.7	97	17.3
Berkshire Med. Ctr.	813	181	22.3	122	16.6	59	77.6	17	22.4
Beth Israel Deaconess Med. Ctr.	5,219	1,987	38.1	1,356	30.1	631	88.7	80	11.3
Beverly Hspt.	2,123	626	29.5	368	20.1	258	87.5	37	12.5
Boston Med. Ctr.	2,238	575	25.7	379	18.7	196	91.6	18	8.4
Brigham And Women's Hspt.	8,864	2,884	32.7	1,956	25.2	928	86.5	145	13.5
Brockton Hspt.	1,271	426	33.5	269	24.7	157	86.7	24	13.3
Cambridge Hspt.	1,096	302	27.6	187	19.4	115	87.1	17	12.9
Cape Cod Hspt.	932	254	27.3	146	18.1	108	87.1	16	12.9
Caritas Good Samaritan Med. Ctr.	974	345	35.4	211	25.4	134	93.1	10	6.9
Caritas Norwood Hspt.	604	189	31.3	123	23.3	66	86.8	10	13.2
Caritas St. Elizabeth's Med.	1,398	555	39.9	328	28.5	227	93.4	16	6.6
Charlton Memorial Hspt.	1,630	477	29.3	325	22.1	152	95.0	8	5.0
Cooley Dickinson Hspt.	906	228	25.2	152	18.6	76	84.4	14	15.6
Emerson Hspt.	1,312	447	34.1	254	23.1	193	91.5	18	8.5
Fairview Hspt.	172	46	26.7	27	17.6	19	100.0	0	0.0
Falmouth Hspt.	653	215	33.5	118	21.7	97	98.0	2	--[9]
Franklin Med. Ctr.	449	107	23.8	71	17.4	36	87.8	5	12.2
Harrington Memorial Hspt.	460	145	31.5	94	23.6	51	83.6	10	16.4
Heywood Memorial Hspt.	539	116	21.5	62	13.1	54	80.6	13	19.4
Caritas Holy Family Hspt. And Med. Ctr.	1,342	541	40.3	319	28.6	222	98.2	4	--[9]
Holyoke Hspt.	588	126	21.4	61	11.9	65	87.8	9	12.2
Jordan Hspt.	610	195	32.0	119	22.6	76	91.6	7	8.4
Lawrence General Hspt.	1,739	524	30.1	265	18.1	259	93.5	18	6.5
Leominster Hspt.	1,117	289	26.1	151	15.8	138	93.2	10	6.8

Table 23. (cont'd). Cesarean Section Deliveries and Vaginal Births after Cesarean Section (VBACs) by Licensed Maternity Facility[1], All Births, Massachusetts: 2004

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]
Lowell General Hspt.	1,899	550	29.0	339	20.5	211	86.8	32	13.2
Martha's Vineyard Hspt.	131	36	27.7	19	16.8	17	100.0	0	0.0
Massachusetts General Hspt.	3,537	1,072	30.3	731	23.3	341	84.6	62	15.4
Mary Lane Hspt.	130	38	29.2	24	20.7	14	100.0	0	0.0
Melrose-Wakefield Hspt.	1,460	529	36.2	322	25.9	207	95.0	11	5.0
Mercy Med. Ctr.	1,385	314	22.7	194	15.6	120	87.0	18	13.0
Metrowest Med. Ctr.-	2,022	742	36.7	466	26.7	276	100.0	0	0.0
Milford-Whitinsville Regional Hspt.	860	279	32.4	171	23.0	108	93.1	8	6.9
Morton Hspt.	522	188	36.0	118	26.8	70	85.4	12	14.6
Mount Auburn Hspt.	1,824	420	23.0	278	17.0	142	75.5	46	24.5
Nantucket Cottage Hspt.	103	18	17.5	16	15.8	2	--[9]	0	0.0
Newton Wellesley Hspt.	3,067	1,154	37.6	738	28.2	416	92.9	32	7.1
North Adams Regional Hspt.	292	78	26.7	54	20.2	24	96.0	1	--[9]
North Shore Med. Ctr. - Salem Hspt.	1,806	546	30.2	354	22.3	192	88.9	24	11.1
Saint Vincent Hspt.	1,856	478	25.8	293	18.1	185	76.8	56	23.2
Saints Memorial Med. Ctr.	671	219	32.6	142	24.0	77	96.3	3	--[9]
South Shore Hspt.	4,104	1,319	32.1	797	22.5	522	91.7	47	8.3
St. Luke's Hspt.	1,561	402	26.5	222	16.7	180	95.2	9	4.8
Sturdy Memorial Hspt.	1,065	346	32.5	235	24.9	111	91.7	10	8.3
Tobey Hspt.	517	105	20.4	73	15.4	32	80.0	8	20.0
Tufts-New England Med. Ctr. Hspt.	1,324	533	40.3	383	33.0	150	92.6	12	7.4
Umass Memorial Med. Ctr. - West Campus	4,480	1,282	28.6	816	20.7	466	87.3	68	12.7
Winchester Hospital	2,219	763	34.4	443	23.5	320	97.0	10	3.0

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: 2004

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	**34,006**	**10,410**	**30.6**	**31,713**	**2,972**	**9.4**	**9,508**	**8,422**	**88.6**
Anna Jaques Hspt.	317	86	27.1	308	23	7.5	94	67	71.3
Baystate Medical Ctr.	1,645	482	29.3	1,752	170	9.7	530	433	81.7
Berkshire Medical Ctr.	363	86	23.7	356	26	7.3	74	57	77.0
Beth Israel Deaconess Med. Ctr.	2,349	827	35.2	1,757	189	10.8	649	571	88.0
Beverly Hspt.	881	273	31.0	880	57	6.5	277	240	86.6
Boston Medical Ctr.	998	234	23.4	961	114	11.9	210	192	91.4
Brigham And Women's Hspt.	3,997	1,209	30.2	3,029	254	8.4	888	752	84.7
Brockton Hspt.	548	190	34.7	517	64	12.4	171	149	87.1
Cambridge Hspt.	628	155	24.7	323	26	8.0	126	109	86.5
Cape Cod Hspt.	414	111	26.8	372	21	5.6	122	106	86.9
Caritas Good Samaritan Med.Ctr.	398	142	35.7	401	47	11.7	141	131	92.9
Caritas Norwood Hspt.	280	96	34.3	233	21	9.0	75	66	88.0
Caritas St. Elizabeth's Medical Ctr.	603	233	38.6	470	51	10.9	235	219	93.2
Charlton Memorial Hspt.	737	216	29.3	682	78	11.4	151	143	94.7
Cooley Dickinson Hspt.	414	116	28.0	364	17	4.7	86	72	83.7
Emerson Hspt.	538	172	32.0	523	49	9.4	200	182	91.0
Fairview Hspt.	74	21	28.4	79	6	7.6	19	19	100.0
Falmouth Hspt.	263	79	30.0	266	33	12.4	89	87	97.8
Franklin Medical Ctr.	204	45	22.1	184	16	8.7	41	36	87.8
Harrington Memorial Hspt.	190	62	32.6	203	28	13.8	61	51	83.6
Heywood Memorial Hspt.	232	49	21.1	229	11	4.8	67	54	80.6
Caritas Holy Family Hspt. And Medical Ctr.	555	225	40.5	512	58	11.3	221	217	98.2
Holyoke Hspt.	243	37	15.2	265	20	7.5	70	61	87.1
Jordan Hspt.	246	81	32.9	268	29	10.8	79	72	91.1
Lawrence General Hspt.	680	165	24.3	738	63	8.5	267	249	93.3
Leominster Hspt.	429	96	22.4	501	38	7.6	144	134	93.1
Lowell General Hspt.	786	218	27.7	820	90	11.0	229	197	86.0
Martha's Vineyard Hspt.	65	15	23.1	43	2	--[5]	16	16	100.0
Mary Lane Hspt.	52	19	36.5	64	5	7.8	14	14	100.0

Table 24 (cont'd). Cesarean Section Deliveries for Singleton Births by Licensed Maternity Facility and Number of Previous Births, Massachusetts: 2004

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.	1,588	508	32.0	1,381	137	9.9	371	309	83.3
Melrose-Wakefield Hspt.	615	232	37.7	596	66	11.1	212	201	94.8
Mercy Medical Ctr.	525	146	27.8	702	41	5.8	134	116	86.6
Metrowest Medical Ctr.-	894	326	36.5	793	101	12.7	268	268	100.0
Milford-Whitinsville Regional Hspt.	350	123	35.1	377	39	10.3	116	108	93.1
Morton Hspt.	184	75	40.8	241	30	12.4	82	70	85.4
Mount Auburn Hspt.	885	223	25.2	702	31	4.4	186	140	75.3
Nantucket Cottage Hspt.	64	11	17.2	37	5	13.5	2	2	--[5]
Newton Wellesley Hspt.	1,351	531	39.3	1,107	96	8.7	421	391	92.9
North Adams Regional Hspt.	129	38	29.5	131	11	8.4	25	24	96.0
North Shore Medical Ctr. - Salem Hspt.	789	249	31.6	745	65	8.7	211	188	89.1
Saint Vincent Hspt.	805	212	26.3	780	66	8.5	231	175	75.8
Saints Memorial Medical Ctr.-St.	311	107	34.4	266	25	9.4	76	73	96.1
South Shore Hspt.	1,650	523	31.7	1,702	138	8.1	540	493	91.3
St. Luke's Hspt.	621	151	24.3	679	64	9.4	182	173	95.1
Sturdy Memorial Hspt.	458	182	39.7	465	42	9.0	116	108	93.1
Tobey Hspt.	205	43	21.0	251	18	7.2	36	28	77.8
Tufts-New England Med. Ctr. Hspt.	543	222	40.9	486	73	15.0	138	126	91.3
Umass Memorial Medical Ctr. - West Campus	1,841	477	25.9	1,880	211	11.2	493	426	86.4
Winchester Hspt.	863	291	33.7	950	107	11.3	316	306	96.8

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 2004, at least 10% of the births at six hospitals were low birthweight (Table 25). These hospitals were: Tufts-New England Medical Center Hospital (26.1%), Caritas St. Elizabeth's Medical Center of Boston (13.2%), Baystate Medical Center (13.2%), Baystate Medical Center (13.2%), Beth Israel Deaconess Medical Center (12.3%), and Brigham and Women's Hospital (11.3%).

Publicly Funded Delivery by Facility

In nine hospitals, 50% or more of the deliveries were paid with public funds: Boston Medical Center (83.0%), Cambridge Hospital (72.1%), Holyoke Hospital (64.9%), Lawrence General Hospital (61.3%), Brockton Hospital (60.6%), Mercy Medical Center (58.3%), St. Luke's Hospital (57.0%), Mary Lane Hospital (53.8%), and North Adams Regional Hospital (51.7%). In four facilities, less than 10% of deliveries were paid with public funds: Newton-Wellesley Hospital (2.5%), Emerson Hospital (3.4%), Winchester Hospital (5.2%), and Saint Vincent Hospital (8.5%) (Table 25).

Adequacy of Prenatal Care by Facility

The facilities with the lowest reported rate of adequacy of prenatal care among mothers delivering in 2004 (i.e. less than 65%) were Boston Medical Center (53.9%), Tobey Hospital (62.8%), Lowell General Hospital (64.5%), and Berkshire Medical Center (64.6%). Beverly Hospital (93.3%), Saint Vincent Hospital (94.8%), Beth Israel Deaconess Medical Center (95.1%), and Brigham and Women's Hospital (98.1%) reported the highest rate of mothers with adequate prenatal care (Table 25).

Low Birthweight in the 30 Largest Massachusetts Cities and Towns

In 2004, among the 30 largest cities and towns in the Commonwealth, low birthweight rates were highest in Peabody (11.1%), Brockton (10.9%), Springfield (10.8%), Taunton (9.9%), Lawrence (9.5%), and Haverhill (9.3%). These communities had low birthweight rates 20% higher than the statewide rate of 7.8% (numbers are shown in Table 26A and rates are shown in Table 3A).

Table 25. Birth Characteristics by Licensed Maternity Facility[1], Massachusetts: 2004

Facility	Location	Occurrence Births[2] (n)	Low Birthweight[3] (%)	Public Payment for Delivery[4] (%)	Adequate Prenatal Care[5] (%)
STATE TOTAL[6]		**79,438**	**7.8**	**29.8**	**84.2**
Anna Jaques Hspt.	Newburyport	743	3.9	18.1	88.8
Baystate Medical Ctr.	Springfield	4,200	13.2	44.1	80.9
Berkshire Medical Ctr.	Pittsfield	813	5.9	39.4	64.6
Beth Israel Deaconess Medical Ctr.	Boston	5,219	12.3	17.1	95.1
Beverly Hspt.	Beverly	2,123	4.7	26.0	93.3
Boston Medical Ctr.	Boston	2,238	9.3	83.0	53.9
Brigham And Women's Hspt.	Boston	8,864	11.3	18.8	98.1
Brockton Hspt.	Brockton	1,271	7.9	60.6	80.5
Cambridge Birth Ctr.	Cambridge	108	0.0	28.7	81.5
Cambridge Hspt.	Cambridge	1,096	3.3	72.1	78.0
Cape Cod Hspt.	Barnstable	932	6.3	38.2	88.7
Caritas Good Samaritan Medical Ctr.	Brockton	974	7.0	48.7	66.5
Caritas Norwood Hspt.	Norwood	604	4.6	17.3	78.6
Charlton Memorial Hspt.	Fall River	1,630	5.8	44.0	90.5
Cooley Dickinson Hspt.	Northampton	906	3.3	23.7	91.0
Emerson Hspt.	Concord	1,312	4.6	3.4	84.7
Fairview Hspt.	Great Barrington	172	--[7]	43.0	87.8
Falmouth Hspt.	Falmouth	653	2.7	32.5	85.8
Franklin Medical Ctr.	Greenfield	449	4.9	37.0	82.9
Harrington Memorial Hspt.	Southbridge	460	4.8	48.4	85.2
Heywood Memorial Hspt.	Gardner	539	3.2	36.6	83.9
Caritas Holy Family Hspt. and Medical Ctr.	Methuen	1,342	4.8	18.6	83.3
Holyoke Hspt.	Holyoke	588	4.4	64.9	76.2
Jordan Hspt.	Plymouth	610	4.3	26.7	73.2
Lawrence General Hspt.	Lawrence	1,739	7.8	61.3	82.2
Leominster Hspt.	Leominster	1,117	2.6	39.0	86.1
Lowell General Hspt.	Lowell	1,899	5.3	39.5	64.5
Martha's Vineyard Hspt.	Oak Bluffs	131	3.8	35.7	88.4
Mary Lane Hspt.	Ware	130	3.8	53.8	71.5
Massachusetts General Hspt.	Boston	3,537	8.6	28.8	87.5
Melrose-Wakefield Hspt.	Melrose	1,460	5.3	19.5	89.0

Table 25. (cont'd) Births Characteristics by Licensed Maternity Facility[1], Massachusetts: 2004

Facility	Location	Occurrence Births[2] (n)	Low Birthweight[3] (%)	Public Payment for Delivery[4] (%)	Adequate Prenatal Care[5] (%)
Mercy Medical Ctr.	Springfield	1,385	3.7	58.3	77.0
Metrowest Medical Ctr.	Framingham	2,022	5.3	27.2	92.5
Milford-Whitinsville Regional Hspt.	Milford	860	2.9	19.6	90.2
Morton Hspt.	Taunton	522	5.9	40.8	73.6
Mount Auburn Hspt.	Cambridge	1,824	4.2	14.1	92.0
Nantucket Cottage Hspt.	Nantucket	103	--[7]	32.0	84.5
Newton Wellesley Hspt.	Newton	3,067	5.6	2.5	77.3
North Adams Regional Hspt.	North Adams	292	2.4	51.7	92.8
North Shore Birth Ctr.	Beverly	80	0.0	16.3	91.3
North Shore Medical Ctr. - Salem Hspt.	Salem	1,806	6.8	43.2	69.6
Saint Vincent Hspt.	Worcester	1,856	3.6	8.5	94.8
Saints Memorial Medical Ctr.	Lowell	671	5.1	36.3	83.2
South Shore Hspt.	Weymouth	4,104	5.4	11.3	90.1
Caritas St. Elizabeth's Medical Ctr.	Boston	1,398	13.2	20.5	85.7
St. Luke's Hspt.	New Bedford	1,561	6.7	57.0	80.7
Sturdy Memorial Hspt.	Attleboro	1,065	3.9	16.9	71.2
The Birthplace At Wellesley	Wellesley	111	--[7]	0.0	82.7
Tobey Hspt.	Wareham	517	4.3	27.1	62.8
Tufts-New England Medical Ctr. Hspt.	Boston	1,324	26.1	33.8	85.5
Winchester Hospital	Winchester	2,219	5.2	5.2	86.2
Other Hospitals		11	--[7]	42.9	63.6
Home Births, En route, Other		301	11.9	26.3	60.4

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, Ctr. for Health Information, Statistics, Research and Evaluation, Massachusetts Department of Public Health.

Table 26A. Birth Characteristics[1]: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2004

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]	Fetal Deaths[7]
STATE TOTAL	**79,438**	**78,460**	**6,125**	**4,559**	**372**	**288**	**417**
Abington	0	182	16	7	0	0	2
Acton	0	234	21	--	0	0	3
Acushnet	2	72	--	5	0	0	0
Adams	0	90	10	14	3	3	0
Agawam	0	270	22	14	3	2	1
Alford	0	2	0	0	0	0	0
Amesbury	0	192	12	10	0	0	1
Amherst	6	191	10	8	0	0	1
Andover	0	310	25	--	0	0	2
Aquinnah (Gay Head)	0	3	--	0	0	0	0
Arlington	1	569	38	7	5	5	5
Ashburnham	1	66	0	--	0	0	0
Ashby	2	27	--	--	0	0	0
Ashfield	0	15	--	--	0	0	0
Ashland	0	238	14	--	0	0	0
Athol	1	132	6	15	2	2	0
Attleboro	1,066	616	50	37	4	4	2
Auburn	1	169	17	--	1	1	2
Avon	0	64	--	--	0	0	0
Ayer	1	108	8	--	1	1	0
Barnstable	934	448	41	21	1	1	6
Barre	0	68	--	6	0	0	0
Becket	0	19	--	--	0	0	0
Bedford	2	140	5	5	0	0	2
Belchertown	1	173	15	8	1	1	0
Bellingham	2	202	11	10	1	1	0
Belmont	0	286	18	--	1	0	2
Berkley	2	86	9	--	1	1	0
Berlin	0	26	--	--	0	0	0
Bernardston	0	18	0	--	0	0	0
Beverly	2,207	416	26	11	0	0	2
Billerica	0	455	40	13	1	1	0
Blackstone	0	114	9	8	0	0	0
Blandford	0	7	0	0	0	0	0
Bolton	0	64	6	0	0	0	1
Boston	22,627	7,721	693	578	46	36	57
Bourne	1	226	16	7	1	1	1
Boxborough	0	57	--	0	0	0	0
Boxford	1	80	8	--	0	0	0
Boylston	1	52	0	0	1	1	0
Braintree	0	375	23	6	0	0	0
Brewster	1	58	--	--	0	0	0
Bridgewater	0	241	20	--	0	0	2
Brimfield	0	39	5	--	0	0	1

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2004

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]	Fetal Deaths[7]
Brockton	2,252	1,592	174	161	17	12	8
Brookfield	0	27	--	--	0	0	0
Brookline	2	697	55	--	1	1	1
Buckland	0	17	0	0	0	0	0
Burlington	2	305	27	--	2	2	0
Cambridge	3,034	1,095	74	25	4	3	8
Canton	0	269	21	--	1	1	0
Carlisle	0	49	7	0	0	0	0
Carver	0	104	8	8	0	0	1
Charlemont	0	11	--	0	0	0	0
Charlton	2	132	8	--	0	0	1
Chatham	0	31	--	0	0	0	3
Chelmsford	0	395	30	12	2	1	2
Chelsea	4	678	55	73	7	5	3
Cheshire	0	25	--	--	0	0	0
Chester	0	16	--	0	0	0	0
Chesterfield	2	12	--	0	0	0	0
Chicopee	0	612	52	64	8	4	6
Chilmark	0	9	0	0	0	0	0
Clarksburg	0	12	0	0	0	0	0
Clinton	1	186	14	14	2	1	3
Cohasset	0	102	11	0	0	0	1
Colrain	0	12	--	--	0	0	0
Concord	1,314	156	8	0	0	0	3
Conway	1	23	--	0	2	2	0
Cummington	0	13	0	0	0	0	0
Dalton	0	55	7	--	0	0	0
Danvers	1	233	21	--	0	0	1
Dartmouth	1	275	18	15	1	1	0
Dedham	0	302	31	5	0	0	0
Deerfield	0	44	--	--	1	1	0
Dennis	0	113	6	8	0	0	0
Dighton	0	60	--	--	0	0	0
Douglas	0	116	9	0	2	2	1
Dover	0	50	--	0	1	0	1
Dracut	1	384	20	14	0	0	2
Dudley	1	113	8	--	1	0	0
Dunstable	0	35	--	0	0	0	0
Duxbury	1	131	8	0	0	0	0
East Bridgewater	0	160	6	7	3	2	2
East Brookfield	0	19	--	--	0	0	0
East Longmeadow	0	161	11	--	0	0	0
Eastham	0	27	6	--	0	0	0
Easthampton	0	154	8	16	0	0	0
Easton	0	249	23	--	0	0	0
Edgartown	0	34	--	0	0	0	2
Egremont	0	11	--	0	0	0	0

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2004

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]	Fetal Deaths[7]
Erving	0	19	--	--	0	0	0
Essex	0	30	--	0	0	0	1
Everett	1	512	35	34	1	1	4
Fairhaven	1	146	16	11	1	1	0
Fall River	1,631	1,189	102	171	6	5	9
Falmouth	655	298	26	25	4	2	2
Fitchburg	2	550	53	70	5	4	0
Florida	0	5	0	0	0	0	0
Foxborough	1	166	11	--	1	1	1
Framingham	2,026	943	79	44	8	6	8
Franklin	2	414	24	7	2	1	0
Freetown	0	94	9	--	0	0	0
Gardner	541	235	17	28	0	0	3
Georgetown	0	102	8	0	0	0	1
Gill	0	13	--	--	0	0	0
Gloucester	0	312	28	15	1	1	0
Goshen	1	11	--	0	0	0	0
Gosnold	0	0	0	0	0	0	0
Grafton	1	243	13	5	1	0	0
Granby	0	47	--	--	0	0	0
Granville	0	10	--	0	0	0	1
Great Barrington	175	68	--	--	1	1	0
Greenfield	451	171	20	13	1	1	0
Groton	1	109	6	--	0	0	0
Groveland	0	64	--	--	0	0	0
Hadley	1	46	--	--	0	0	0
Halifax	0	75	5	--	1	0	0
Hamilton	0	86	7	0	3	3	0
Hampden	1	34	--	--	0	0	0
Hancock	0	10	0	--	0	0	0
Hanover	0	157	8	--	0	0	1
Hanson	1	140	13	--	0	0	1
Hardwick	0	37	--	--	0	0	0
Harvard	0	45	8	--	0	0	0
Harwich	0	100	9	6	1	1	0
Hatfield	1	27	--	0	0	0	0
Haverhill	2	872	81	56	3	2	4
Hawley	0	2	0	0	0	0	0
Heath	0	5	0	0	0	0	0
Hingham	1	254	16	--	0	0	0
Hinsdale	0	24	--	--	0	0	0
Holbrook	1	141	7	12	0	0	1
Holden	0	194	15	0	2	2	0
Holland	0	25	--	--	0	0	0
Holliston	0	153	9	--	1	1	0
Holyoke	591	608	66	115	6	4	0
Hopedale	1	92	6	--	0	0	1

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2004

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]	Fetal Deaths[7]
Hopkinton	0	180	6	--	1	1	0
Hubbardston	0	35	--	0	0	0	0
Hudson	0	236	19	--	3	3	1
Hull	0	105	8	--	1	1	1
Huntington	4	19	0	--	0	0	0
Ipswich	0	141	7	--	0	0	1
Kingston	0	151	14	--	0	0	0
Lakeville	0	120	8	6	0	0	1
Lancaster	1	59	0	0	0	0	0
Lanesborough	0	22	--	--	0	0	0
Lawrence	1,741	1,417	134	226	13	9	13
Lee	1	49	--	--	0	0	0
Leicester	0	128	13	8	1	1	0
Lenox	0	39	--	--	0	0	0
Leominster	1,117	511	34	26	2	2	3
Leverett	0	13	0	0	0	0	0
Lexington	0	222	16	--	0	0	0
Leyden	0	0	0	0	0	0	0
Lincoln	0	102	--	--	0	0	0
Littleton	0	111	8	--	1	1	2
Longmeadow	0	136	7	0	0	0	3
Lowell	2,574	1,649	149	194	8	6	14
Ludlow	1	184	18	6	5	5	0
Lunenburg	1	102	--	--	0	0	0
Lynn	6	1,428	108	135	9	8	7
Lynnfield	0	99	9	0	2	1	0
Malden	2	856	70	28	2	2	6
Manchester-by-the-Sea	0	51	7	0	1	0	0
Mansfield	0	316	25	--	0	0	1
Marblehead	0	223	11	--	0	0	0
Marion	0	55	--	--	0	0	0
Marlborough	3	566	28	21	1	1	1
Marshfield	0	332	24	7	1	0	0
Mashpee	1	160	10	10	0	0	0
Mattapoisett	0	47	--	--	0	0	0
Maynard	1	156	14	--	0	0	2
Medfield	1	124	5	0	0	0	1
Medford	2	617	44	16	5	4	5
Medway	0	163	14	6	1	1	0
Melrose	1,460	330	15	--	1	1	1
Mendon	1	67	--	0	1	1	1
Merrimac	0	57	--	--	0	0	0
Methuen	1,343	622	46	38	3	1	0
Middleborough	0	267	20	11	1	1	2
Middlefield	0	4	0	--	0	0	0
Middleton	0	71	--	--	0	0	0
Milford	860	357	15	16	0	0	1

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2004

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]	Fetal Deaths[7]
Millbury	0	148	13	5	0	0	0
Millis	0	100	6	--	1	1	0
Millville	0	56	7	--	0	0	0
Milton	0	331	23	6	3	3	0
Monroe	0	0	0	0	0	0	0
Monson	0	86	7	--	1	0	1
Montague	2	86	10	10	0	0	1
Monterey	0	9	0	0	0	0	0
Montgomery	0	9	0	0	0	0	0
Mount Washington	0	2	0	0	0	0	0
Nahant	0	25	0	--	0	0	0
Nantucket	105	149	14	--	0	0	0
Natick	1	436	43	--	2	2	5
Needham	0	348	23	0	1	1	2
New Ashford	0	1	0	0	0	0	0
New Bedford	1,563	1,378	108	183	3	2	12
New Braintree	0	4	0	0	0	0	0
New Marlborough	0	16	0	0	0	0	0
New Salem	0	7	0	0	0	0	0
Newbury	0	77	5	--	2	2	0
Newburyport	744	197	19	7	0	0	0
Newton	3,070	844	77	9	4	4	5
Norfolk	0	98	8	--	0	0	1
North Adams	292	151	8	20	0	0	2
North Andover	1	329	19	5	0	0	0
North Attleboro	0	374	24	11	0	0	0
North Brookfield	0	46	--	--	0	0	0
North Reading	0	175	13	--	0	0	0
Northampton	910	242	21	16	0	0	0
Northborough	0	164	9	--	0	0	0
Northbridge	2	221	14	10	0	0	0
Northfield	2	36	--	--	0	0	0
Norton	2	243	16	8	0	0	0
Norwell	0	107	9	--	1	1	1
Norwood	605	371	36	--	1	1	3
Oak Bluffs	131	44	--	--	0	0	0
Oakham	0	12	0	--	0	0	0
Orange	0	84	6	13	1	1	1
Orleans	0	38	--	0	0	0	0
Otis	0	13	--	--	0	0	0
Oxford	1	148	13	7	2	2	2
Palmer	0	135	6	9	0	0	0
Paxton	0	45	5	--	0	0	0
Peabody	2	513	57	24	0	0	2
Pelham	0	4	0	0	0	0	0
Pembroke	0	222	11	8	2	1	0

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2004

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]	Fetal Deaths[7]
Pepperell	1	115	13	--	1	1	0
Peru	0	8	--	--	0	0	0
Petersham	0	8	--	--	0	0	0
Phillipston	0	15	--	--	0	0	0
Pittsfield	814	538	49	59	3	1	4
Plainfield	0	5	0	0	0	0	0
Plainville	0	97	6	--	0	0	2
Plymouth	615	688	49	27	2	2	6
Plympton	0	30	--	0	0	0	0
Princeton	1	36	--	--	0	0	0
Provincetown	1	18	--	0	0	0	0
Quincy	4	1,168	83	34	5	4	3
Randolph	0	414	32	18	4	3	1
Raynham	0	168	16	5	0	0	0
Reading	0	273	13	--	0	0	1
Rehoboth	0	108	8	--	0	0	0
Revere	0	689	57	42	3	3	4
Richmond	0	8	0	0	0	0	0
Rochester	0	47	--	--	0	0	1
Rockland	1	228	19	13	1	1	0
Rockport	0	59	--	--	0	0	0
Rowe	0	4	0	--	0	0	0
Rowley	0	74	5	--	0	0	0
Royalston	0	15	--	--	0	0	0
Russell	1	17	--	0	0	0	0
Rutland	1	102	9	0	0	0	0
Salem	1,807	526	53	26	2	2	1
Salisbury	0	78	6	--	1	0	0
Sandisfield	0	8	0	0	0	0	0
Sandwich	0	177	8	8	0	0	1
Saugus	0	281	23	7	3	2	2
Savoy	0	3	0	0	0	0	0
Scituate	0	193	14	--	0	0	0
Seekonk	0	104	5	--	1	1	0
Sharon	0	190	18	--	1	1	0
Sheffield	1	29	--	--	1	0	1
Shelburne	0	13	0	0	0	0	0
Sherborn	2	39	0	--	0	0	0
Shirley	0	60	5	0	0	0	0
Shrewsbury	0	469	45	7	0	0	1
Shutesbury	2	19	--	0	0	0	0
Somerset	1	145	--	7	0	0	0
Somerville	4	849	56	36	5	4	9
South Hadley	0	158	8	5	1	1	0
Southampton	1	41	--	--	0	0	0

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2004

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]	Fetal Deaths[7]
Southborough	0	125	6	0	0	0	2
Southbridge	463	261	24	38	4	4	2
Southwick	0	92	--	--	1	1	0
Spencer	1	125	10	9	1	1	1
Springfield	5,596	2,390	258	428	15	9	20
Sterling	1	83	7	--	0	0	0
Stockbridge	0	13	--	0	0	0	0
Stoneham	0	213	14	--	1	1	2
Stoughton	1	345	42	6	5	5	0
Stow	0	100	6	0	1	1	2
Sturbridge	1	100	--	--	2	1	0
Sudbury	2	200	15	0	1	1	1
Sunderland	1	31	--	--	0	0	0
Sutton	0	111	--	--	0	0	1
Swampscott	2	157	14	--	0	0	0
Swansea	0	133	12	--	2	1	0
Taunton	524	775	77	54	2	1	3
Templeton	0	69	--	--	0	0	1
Tewksbury	0	318	23	8	0	0	2
Tisbury	1	35	--	0	0	0	0
Tolland	0	3	0	0	0	0	0
Topsfield	0	56	7	0	0	0	0
Townsend	1	97	--	7	1	0	1
Truro	1	12	--	--	0	0	0
Tyngsborough	0	140	10	--	1	0	0
Tyringham	0	3	0	0	0	0	0
Upton	1	97	6	0	0	0	1
Uxbridge	0	153	--	5	1	0	1
Wakefield	2	298	25	6	1	1	0
Wales	0	18	--	--	0	0	0
Walpole	0	276	13	--	1	1	2
Waltham	5	676	44	18	1	1	2
Ware	130	110	8	13	0	0	0
Wareham	517	244	21	18	0	0	0
Warren	2	59	--	--	0	0	0
Warwick	0	3	0	0	0	0	0
Washington	0	2	0	--	0	0	0
Watertown	0	335	27	--	0	0	1
Wayland	1	124	8	0	0	0	2
Webster	0	216	23	13	1	1	3
Wellesley	111	274	15	--	0	0	1
Wellfleet	0	24	--	0	0	0	0
Wendell	0	7	--	0	0	0	0
Wenham	1	41	--	0	0	0	0
West Boylston	0	71	--	0	0	0	0
West Bridgewater	0	73	6	5	1	1	1

Table 26A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities: 2004

Community	Occurrence Births[2]	Resident Births[3]	Low Birthweight[4]	Teen Births (15-19 years)	Infant Deaths[5]	Neonatal Deaths[6]	Fetal Deaths[7]
West Brookfield	0	38	0	0	0	0	0
West Newbury	0	34	--	0	0	0	0
West Springfield	1	351	22	30	3	2	3
West Stockbridge	0	12	0	0	0	0	0
West Tisbury	0	23	5	0	0	0	0
Westborough	1	235	19	7	1	1	2
Westfield	4	425	23	32	0	0	2
Westford	1	249	18	--	0	0	2
Westhampton	1	13	--	0	0	0	0
Westminster	0	49	--	--	0	0	1
Weston	1	84	5	--	0	0	0
Westport	0	109	7	5	1	0	0
Westwood	1	156	6	--	0	0	1
Weymouth	4,105	699	41	27	4	4	4
Whately	0	17	0	--	0	0	0
Whitman	0	205	14	6	0	0	1
Wilbraham	0	112	7	--	0	0	0
Williamsburg	0	23	--	0	0	0	0
Williamstown	1	42	--	--	0	0	0
Wilmington	1	298	16	7	1	1	1
Winchendon	0	103	--	8	0	0	1
Winchester	2,219	275	15	--	1	1	1
Windsor	0	8	--	--	0	0	0
Winthrop	0	176	12	7	1	1	0
Woburn	0	481	36	14	0	0	4
Worcester	6,357	2,579	196	250	17	12	18
Worthington	0	14	0	0	0	0	0
Wrentham	1	118	9	--	0	0	0
Yarmouth	1	202	15	14	2	2	1

-- Due to small numbers for births (n=1-4), exact count not provided.

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, Ctr. 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. 7. A stillbirth delivered, extracted or expulsed, at 20 weeks gestation or more and/or weighs 350 grams or more.

Table 26B. Birth Characteristics, Occurrence and Resident Births and Infant Deaths by County Massachusetts: 2004

County Name	Occurrence Births[1]	Resident Births[2]			Deaths		
		Number	Low Birthweight[3]	Teen Births (15-19 years)	Infant[4]	Neonatal[5]	Fetal[6]
STATE TOTAL	**79,438**	**78,460**	**6,125**	**4,559**	**372**	**288**	**417**
Barnstable	1,595	1,932	148	104	9	7	14
Berkshire	1,284	1,297	94	122	8	5	7
Bristol	4,793	6,640	535	535	22	17	27
Dukes	132	148	13	3	0	0	2
Essex	7,858	9,253	764	590	43	31	38
Franklin	459	670	55	49	5	5	2
Hampden	6,195	5,740	515	716	42	27	38
Hampshire	1,058	1,307	87	73	2	2	1
Middlesex	15,738	17,954	1,303	575	69	58	112
Nantucket	105	149	14	4	0	0	0
Norfolk	4,837	8,054	577	167	34	30	26
Plymouth	3,388	6,150	500	311	31	22	31
Suffolk	22,631	9,264	817	700	57	45	64
Worcester	9,365	9,902	703	610	50	39	54

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

Table 26C. Birth Characteristics, Occurrence and Resident Births and Infant Deaths, Massachusetts Community Health Network Areas (CHNAs): 2004

Community Health Network Area (CHNA Number)	Occurrence Births[1]	Resident Births[2]			Deaths		
		Number	LBW[3]	Teen Births (15-19 years)	Infant[4]	Neonatal[5]	Fetal[6]
STATE TOTAL	**79,438**	**78,460**	**6,125**	**4,559**	**372**	**288**	**417**
Community Health Network of Berkshire County (1)	1,284	1,297	94	122	8	5	7
Upper Valley Health Web (Franklin County) (2)	460	840	65	69	7	7	2
Partnership for Health in Hampshire County (Northampton) (3)	1,054	1,288	87	72	2	2	1
The Community Health Connection (Springfield) (4)	5,599	3,813	346	493	23	14	29
Community Health Network of Southern Worcester County (5)	471	1,366	107	92	11	9	10
Community Partners for Health (Milford) (6)	869	2,163	122	70	8	6	7
Community Health Network of Greater Metro West (Framingham) (7)	2,040	4,874	333	102	22	20	33
Community Wellness Coalition (Worcester) (8)	6,360	4,098	318	278	23	17	21
Fitchburg/Gardner Community Health Network (9)	1,673	2,958	207	186	12	9	14
Greater Lowell Community Health Network (10)	2,576	3,625	292	247	12	8	22
Greater Lawrence Community Health Network (11)	3,085	2,749	228	273	16	10	15
Greater Haverhill Community Health Network (12)	747	1,827	153	86	6	4	6
Community Health Network North (Beverly/Gloucester) (13)	2,208	1,192	87	30	5	4	4
North Shore Community Health Network (14)	1,818	3,485	296	201	16	13	13
Greater Woburn/Concord/Littleton Community Health Network (15)	3,538	2,430	164	37	5	5	16
North Suburban Health Alliance (Medford/Malden/Melrose) (16)	1,467	3,274	229	92	11	10	19
Greater Cambridge/Somerville Community Health Network (17)	3,039	3,134	213	74	15	12	25
West Suburban Health Network (Newton/Waltham) (18)	3,188	2,734	203	36	7	6	12
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop) (19)	22,633	9,961	872	703	58	46	65
Blue Hills Community Health Alliance (Greater Quincy) (20)	4,715	4,578	335	109	21	19	14
Four (For) Communities (Holyoke, Chicopee, Ludlow, Westfield) (21)	600	1,864	161	218	19	13	8
Greater Brockton Community Health Network (22)	2,254	3,252	309	214	26	20	17
South Shore Community Partners in Prevention (Plymouth) (23)	618	2,258	163	73	7	4	9
Greater Attleboro-Taunton Health & Education Response (24)	1,594	3,237	260	143	9	8	9
Partners for a Healthier Community (Fall River) (25)	1,632	1,576	125	187	9	6	9
Greater New Bedford Health & Human Services Coalition (26)	2,084	2,358	181	241	5	4	13
Cape and Islands Community Health Network (27)	1,832	2,229	175	111	9	7	16

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

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 2004 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 Worksheet 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/Pacific Islander
- 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
- American
- Other

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: (1) the timing of death in relation to the pregnancy and birth; and (2) 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 deaths of 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 Center 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. Thus, maternal deaths are a subset of pregnancy-associated deaths.

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 1996-2004 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 the 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[22], 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).

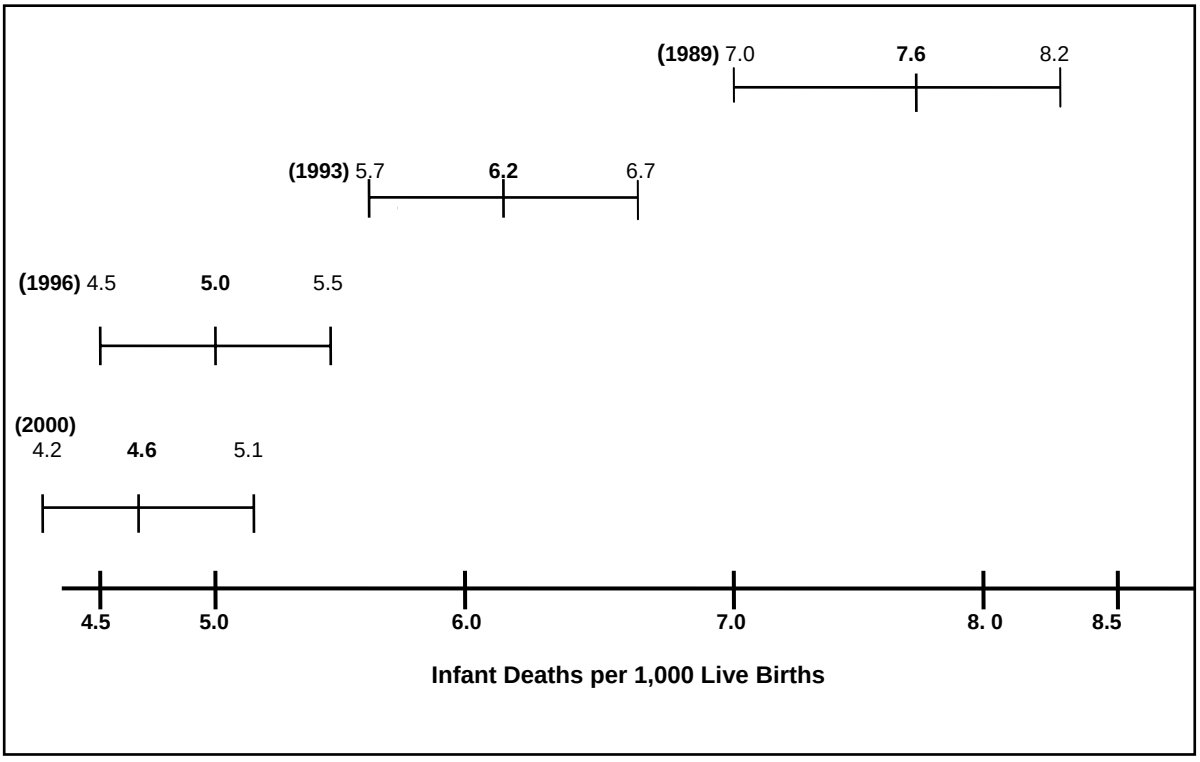
[22] The number of "expected" visits is determined based on standards set by the American College of Obstetricians and Gynecologists (ACOG).

CONFIDENCE INTERVALS AND INFANT MORTALITY RATES

Beginning with 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: 1990-2004

	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)
2004	**372**	**4.7 (4.3, 5.2)**	**209**	**3.8 (3.3, 4.3)**	**69**	**11.4 (8.7, 14.1)**	**73**	**7.4 (5.4, 9.1)**	**15**	**2.7 (1.4, 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 2004, the black non-Hispanic infant mortality rate was 11.4 deaths per 1,000 live births (95% CI: 8.7, 14.1), which was three times greater than the white non-Hispanic infant mortality rate of 3.8 (95% CI: 3.3, 4.3). The difference in these two rates was statistically significant. The rate of infant mortality for black non-Hispanics was also significantly elevated compared with Asians (95% CI: 1.4, 4.1) in 2004.

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

Population Estimates for Massachusetts Communities, 2000, continued

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

Population Estimates for Massachusetts Communities, 2000, continued

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

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:* Prior to the *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.

Death Cohort Linked File or Linked Birth and Infant Death File – Death Cohort

All infant deaths occurring in a specific year, which have been linked to their corresponding birth certificates, whether the birth occurred during the same year or in the previous one. This is in contrast to a birth cohort linked file, in which infant deaths may have occurred in the same year as, or in the year following the year of birth.

Delivery

A delivery may consist of one or more live born or stillborn fetuses. The number of deliveries in a given period will be equal to or less than the number of births because multiple births (twins, triplets or higher–order births) are counted as single deliveries.

EOHHS Regions

The six regions delineated by the commonwealth's Executive Office of Health and Human Services and used by the Department of Public Health for statistical, care coordination and administrative purposes. The regions - Western, Central, Northeast, Metro West, Boston and Southeast - are based on geographical groupings of cities and towns.

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 (28 weeks of gestation to 7 days or more 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."

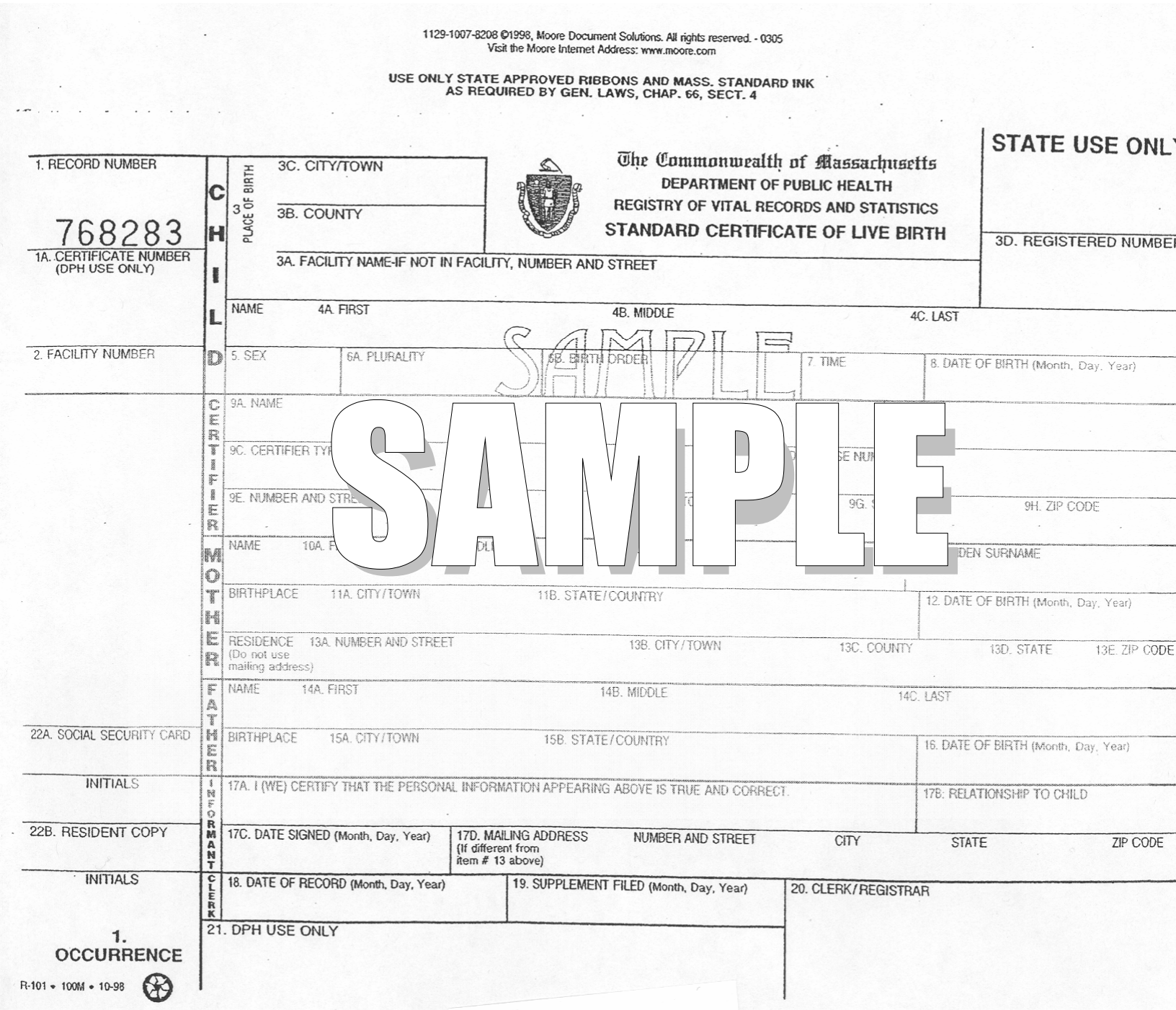
Resident Birth
The birth of an infant whose mother reports that her usual place of residence is in Massachusetts. In Massachusetts, a resident is a person with a permanent address in one of the 351 cities or towns. Vital statistics data may be presented in terms either of residence or occurrence. All data in this publication, except all data in Tables 23, 24, 25, and selected data in Table 26 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 Canadian provinces 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: 2004



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

1. RECORD NUMBER
768283
1A. CERTIFICATE NUMBER (DPH USE ONLY)

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

STATE USE ONLY
3D. REGISTERED NUMBER

CHILD
3 PLACE OF BIRTH
3C. CITY/TOWN
3B. COUNTY
3A. FACILITY NAME-IF NOT IN FACILITY, NUMBER AND STREET
NAME 4A. FIRST 4B. MIDDLE 4C. LAST
2. FACILITY NUMBER
5. SEX 6A. PLURALITY 6B. BIRTH ORDER 7. TIME 8. DATE OF BIRTH (Month, Day, Year)

SAMPLE

CERTIFIER
9A. NAME
9C. CERTIFIER TYPE
9E. NUMBER AND STREET
9G.
9H. ZIP CODE

MOTHER
NAME 10A. FIRST
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
22A. SOCIAL SECURITY CARD
BIRTHPLACE 15A. CITY/TOWN 15B. STATE/COUNTRY
16. DATE OF BIRTH (Month, Day, Year)

INFORMANT
INITIALS
17A. I (WE) CERTIFY THAT THE PERSONAL INFORMATION APPEARING ABOVE IS TRUE AND CORRECT.
17B. RELATIONSHIP TO CHILD
22B. RESIDENT COPY
17C. DATE SIGNED (Month, Day, Year)
17D. MAILING ADDRESS (If different from item # 13 above) NUMBER AND STREET CITY STATE ZIP CODE

CLERK
INITIALS
18. DATE OF RECORD (Month, Day, Year)
19. SUPPLEMENT FILED (Month, Day, Year)
20. CLERK/REGISTRAR
1. OCCURRENCE
21. DPH USE ONLY

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