

Supplementary Appendix
The Association of Health Reform and Infant Health: Evidence from Massachusetts

The following appendix proceeds in two sections. In section 1 we present the results of several alternative models which generally suggested the same set of substantive conclusions as those described in the main text. In the second section we present complete regression results.

Section 1. Robustness Tests

Appendix Table 1 presents the results of a test of the parallel trends assumption in the low birth weight model. Using the 2001-2005 data, the low birth weight indicator was regressed on the interaction between Massachusetts and continuous year. The test suggested that the pre-existing trends in Massachusetts were similar to those in the comparison group.

Appendix Table 1. Parallel Trends Test

	Coef.	Std. Err.	p value
Birth Year	0.00	0.00	0.011
Mass	-0.73	0.43	0.166
Mass*Birth Year	0.00	0.00	0.165
Intercept	-1.91	0.43	0.012

Source: 2001-2005 birth data. Results come from linear regression of low birth weight.

While the parallel trends test supported the set of chosen comparison states, in Appendix Table 2 (Panel A) we present results when adding Connecticut and New York to the other 4 comparison states. The next set of results describes results when removing Maine and Vermont which both had smaller insurance expansions during the study period. We came to the same conclusion using these alternative comparison groups. Panel B of Appendix Table 2 shows that setting the policy period in reference to the date of conception has no appreciable effects on the results. Panel C shows results for four alternative health outcomes: very low birth weight, pre-term birth, small-for-gestational age, and 5-minute Apgar scores. All three had similar results to birth weight.

Appendix Table 3 presents the results when we restricted the mortality data to be a balanced panel such that each year has the same set of county-by-race cells. The results are nearly identical to those presented in the main paper.

Appendix Table 2. The Association of Massachusetts Health Reform with the Incidence of Low Birthweight (Percentage Point Change)

	Est.	SE	P-Value
<i>Panel A. Alternative Comparison Groups</i>			
Original Comparison States (ME, RI, VT, NH)			
Treat*Implementation	0.25	0.04	0.004
Treat*Post	0.10	0.14	0.527
Add CT and NY			
Treat*Implementation	0.08	0.04	0.08
Treat*Post	0.05	0.05	0.35
Add CT and NY, Remove ME and VT			
Treat*Implementation	0.07	0.03	0.12
Treat*Post	0.05	0.05	0.41
<i>Panel B. Setting Policy Period in Reference to Conception Date</i>			
Original Specification (Birth Year)			
Treat*Implementation	0.25	0.04	0.00
Treat*Post	0.10	0.14	0.53
Year of Conception			
Treat*Implementation	0.14	0.04	0.03
Treat*Post	-0.05	0.07	0.53
<i>Panel C. Alternative Outcomes</i>			
Very Low Birth Weight (<1500g)			
Treat*Implementation	-0.07	0.03	0.078
Treat*Post	0.01	0.02	0.768
Preterm Birth			
Treat*Implementation	0.01	0.09	0.94
Treat*Post	0.24	0.16	0.20
Small-for-Gestational Age			
Treat*Implementation	0.30	0.12	0.07
Treat*Post	0.19	0.30	0.56
5 Minute Apgar Less Than 7			
Treat*Implementation	0.08	0.10	0.46
Treat*Post	0.06	0.06	0.37

Source: 2001-2012 Birth Files and Area Health Resources Files. All estimates are from separate regressions. Coefficients and standard errors have been scaled by 100 to represent percentage point change.

Appendix Table 3. The Association of Massachusetts Health Reform with Infant Mortality Rates

	IRR	SE	P-Value
Original Model (Unbalanced Panel)			
Treat*Implementation	0.981	0.051	0.714
Treat*Post	1.049	0.089	0.572
Balanced Panel			
Treat*Implementation	0.983	0.052	0.739
Treat*Post	1.047	0.090	0.596

Source: 2001-2012 Mortality Files and Area Health Resources Files. All estimates are from separate regressions. IRR represents incident rate ratios and SE are Hubert-White standard errors, clustered on state. Models control for race, county by year, poverty, and unemployment and state and year fixed effects. See appendix for complete regression results.

Appendix Table 4 compares the low birth weight results in full sample as estimated from the linear probability model featured in our main text and the average marginal effects derived from a logistic regression. The results are similar across these two specifications.

Appendix Table 4. Comparison of Linear Probability Model and Average Marginal Effects from Logistic Regression of Low Birth Weight, Full Sample

	Est.	Se	P-Value
Linear Probability Model			
Treat*Implementation	0.25	0.04	0.004
Treat*Post	0.1	0.14	0.527
Average Marginal Effects from Logistic Regression			
Treat*Implementation	0.024	0.04	<0.001
Treat*Post	0.1	0.17	0.500

Source: 2001-2012 Birth Files and Area Health Resources Files. All estimates are from separate regressions. Coefficients and standard errors have been scaled by 100 to represent percentage point change. Models adjust for mother's age, race, and marital status, birth order, and county level poverty and unemployment, and year and state fixed effects.

A valid critique of the inference strategy in our main text, based on Huber-White standard errors that have been clustered on state, is that because the cluster size is small our tests are likely to over-reject the null. Given that in our main results we were unable to reject the null, this issue has little bearing on our ultimate conclusions. Nonetheless, in Appendix Table 6 we compare the confidence intervals implied from the clustered standard error approach to the confidence intervals from a studentized wild-cluster bootstrap approach. Wild-cluster bootstrap estimates have previously been shown to perform better than simply clustering on state. We present results from the low-birth weight regressions, for the overall population and for infants born to African-American infants—the group estimated to have the largest post-period effect. Both approaches result in a similar inferential conclusions.

Appendix Table 5. Comparison of Cluster-Robust and Studentized Wild Cluster Bootstrap Confidence Intervals, Low Birth Weight Regression

	Est.	Cluster-Robust 95% CI	Studentized Wild Cluster Bootstrap 95% CI
Overall Population			
Treat*Implementation	0.25	(0.14, 0.36)	(0.07, 0.42)
Treat*Post	0.1	(-.30, 0.50)	(-0.21, 0.40)
Non-Hispanic African-American Mothers			
Treat*Implementation	0.07	(-0.64, 0.78)	(-0.60, 0.71)
Treat*Post	-0.34	(-0.99, 0.31)	(-0.7, .08)

Source: 2001-2012 Birth Files and Area Health Resources Files. All estimates are from separate regressions. Coefficients and standard errors have been scaled by 100 to represent percentage point change. Models adjust for mother's age, race, and marital status, birth order, and county level poverty and unemployment.

Section 2

The following section includes the full set of regression results featured in the main paper. The table notes included in the main paper apply to these tables.

Appendix Table 6. Complete Regression Results, Low Birth Weight Regression, Overall Population

	b	se	p
MA*Implement	0.25	0.04	0.004
MA*Reform	0.10	0.14	0.527
Age 21-34	-0.40	0.14	0.045
Age 35+	0.56	0.10	0.005
Single Mother	2.53	0.04	0.000
2-3 Birth	-2.08	0.08	0.000
4+ Birth	-0.62	0.14	0.012
Black, NH	3.41	0.14	0.000
Other, NH	1.53	0.24	0.003
Hispanic	1.05	0.13	0.001
Unemployment	0.11	0.08	0.237
Poverty	0.05	0.01	0.017
MA	0.07	0.10	0.506
NH	0.31	0.04	0.002
RI	0.09	0.19	0.670
VT	0.23	0.07	0.027
2002	-0.11	0.14	0.480
2003	-0.06	0.23	0.817
2004	0.05	0.14	0.735
2005	0.16	0.07	0.097
2006	0.04	0.14	0.791
2007	-0.08	0.08	0.340
2008	-0.20	0.17	0.302
2009	-0.60	0.42	0.223
2010	-0.58	0.37	0.193
2011	-0.49	0.36	0.246
2012	-0.46	0.33	0.234
Intercept	4.15	0.10	0.000

Appendix Table 7. Complete Regression Results, Low Birth Weight Regression, White, NH Population

	b	se	p
MA*Implement	0.32	0.09	0.020
MA*Reform	0.22	0.11	0.133
Age 21-34	-0.02	0.10	0.869
Age 35+	0.83	0.13	0.003
Single Mother	2.73	0.09	0.000
2-3 Birth	-2.02	0.07	0.000
4+ Birth	-0.63	0.13	0.008
Black, NH			
Other, NH			
Hispanic			
Unemployment	0.09	0.06	0.191
Poverty	0.03	0.01	0.025
MA	-0.12	0.05	0.069
NH	0.23	0.03	0.002
RI	0.12	0.09	0.253
VT	0.15	0.04	0.029
2002	-0.13	0.17	0.510
2003	-0.06	0.21	0.773
2004	0.09	0.11	0.442
2005	0.18	0.08	0.074
2006	0.00	0.16	0.991
2007	-0.07	0.09	0.484
2008	-0.25	0.15	0.175
2009	-0.49	0.31	0.185
2010	-0.55	0.31	0.157
2011	-0.33	0.31	0.351
2012	-0.38	0.26	0.218
Intercept	4.07	0.09	0.000

Appendix Table 8. Complete Regression Results, Low Birth Weight Regression, African American, NH Population

	b	se	p
MA*Implement	0.07	0.25	0.801
MA*Reform	-0.34	0.23	0.220
Age 21-34	-0.08	0.24	0.755
Age 35+	1.98	0.24	0.001
Single Mother	2.37	0.18	0.000
2-3 Birth	-2.48	0.06	0.000
4+ Birth	-0.69	0.34	0.114
Black, NH			
Other, NH			
Hispanic			
Unemployment	0.13	0.03	0.008
Poverty	0.13	0.00	0.000
MA	1.65	0.17	0.001
NH	1.63	0.07	0.000
RI	1.32	0.13	0.001
VT	0.36	0.06	0.004
2002	0.71	0.44	0.183
2003	0.58	0.15	0.017
2004	0.49	0.16	0.037
2005	0.49	0.29	0.164
2006	0.73	0.42	0.160
2007	0.41	0.40	0.355
2008	0.23	0.34	0.539
2009	-0.77	0.49	0.193
2010	-0.50	0.37	0.243
2011	-0.63	0.45	0.237
2012	-0.31	0.38	0.468
Intercept	4.66	0.53	0.001

Appendix Table 9. Complete Regression Results, Low Birth Weight Regression, Hispanic Population

	b	se	p
MA*Implement	0.32	0.28	0.324
MA*Reform	-0.33	0.22	0.208
Age 21-34	-2.03	0.98	0.108
Age 35+	-1.34	1.03	0.263
Single Mother	2.56	0.32	0.001
2-3 Birth	-2.19	0.09	0.000
4+ Birth	-0.44	0.65	0.534
Black, NH			
Other, NH			
Hispanic			
Unemployment	0.25	0.14	0.155
Poverty	0.02	0.06	0.813
MA	1.97	0.23	0.001
NH	1.14	0.26	0.012
RI	1.43	0.18	0.001
VT	1.88	0.21	0.001
2002	-0.30	0.73	0.698
2003	-0.23	0.63	0.739
2004	-0.55	0.81	0.534
2005	0.08	0.37	0.839
2006	-0.30	0.62	0.650
2007	0.08	0.60	0.898
2008	0.14	0.57	0.825
2009	-1.05	1.10	0.393
2010	-0.58	0.88	0.547
2011	-0.57	0.81	0.521
2012	-0.67	0.57	0.307
Intercept	5.49	1.51	0.022

Appendix Table 10. Complete Regression Results, Low Birth Weight Regression, Single Mother Population

	b	se	p
MA*Implement	0.13	0.08	0.166
MA*Reform	-0.23	0.14	0.168
Age 21-34	-0.83	0.18	0.009
Age 35+	1.08	0.10	0.000
Single Mother			
2-3 Birth	-1.19	0.09	0.000
4+ Birth	1.11	0.27	0.014
Black, NH	2.90	0.15	0.000
Other, NH	1.54	0.42	0.022
Hispanic	0.34	0.15	0.090
Unemployment	0.09	0.11	0.483
Poverty	0.08	0.01	0.000
MA	0.64	0.12	0.007
NH	0.47	0.15	0.036
RI	0.20	0.26	0.480
VT	0.38	0.13	0.045
2002	-0.10	0.18	0.608
2003	-0.19	0.41	0.659
2004	0.11	0.16	0.512
2005	0.15	0.23	0.559
2006	0.20	0.25	0.475
2007	-0.34	0.18	0.131
2008	-0.18	0.36	0.645
2009	-0.47	0.66	0.516
2010	-0.54	0.55	0.381
2011	-0.60	0.56	0.344
2012	-0.40	0.44	0.409
Intercept	6.20	0.24	0.000

Appendix Table 11. Complete Regression Results, Low Birth Weight Regression, High school or Less Population

	b	se	p
MA*Implement	0.10	0.05	0.102
MA*Reform	0.07	0.17	0.703
Age 21-34	0.02	0.19	0.933
Age 35+	1.85	0.19	0.001
Single Mother	2.18	0.10	0.000
2-3 Birth	-2.12	0.13	0.000
4+ Birth	-0.51	0.24	0.099
Black, NH	2.68	0.38	0.002
Other, NH	0.99	0.31	0.034
Hispanic	0.14	0.19	0.521
Unemployment	0.12	0.13	0.409
Poverty	0.06	0.03	0.088
MA	0.56	0.18	0.035
NH	0.49	0.04	0.000
RI	0.39	0.23	0.161
VT	0.69	0.06	0.000
2002	-0.09	0.17	0.620
2003	0.01	0.41	0.984
2004	0.10	0.21	0.662
2005	0.15	0.17	0.423
2006	0.13	0.24	0.619
2007	0.04	0.06	0.546
2008	-0.12	0.31	0.713
2009	-0.55	0.66	0.452
2010			
2011			
2012			
Intercept	4.39	0.13	0.000

**Appendix Table 12. Transformed Negative Binomial
Regression Coefficients, Overall Population**

	IRR	se	p
MA*Implement	0.981	0.051	0.714
MA*Reform	1.049	0.089	0.572
Poverty Rate	1.011	0.008	0.168
Unemployment Rate	1.073	0.047	0.105
Black, NH	2.421	0.140	0.000
Other	1.545	0.064	0.000
2002	0.843	0.032	0.000
2003	0.774	0.052	0.000
2004	0.873	0.051	0.020
2005	0.928	0.074	0.350
2006	0.950	0.092	0.596
2007	0.892	0.057	0.076
2008	0.773	0.081	0.014
2009	0.636	0.136	0.035
2010	0.600	0.117	0.009
2011	0.653	0.162	0.085
2012	0.593	0.116	0.007
MA	0.610	0.038	0.000
NH	0.893	0.017	0.000
RI	0.750	0.061	0.000
VT	0.965	0.034	0.314
Constant	0.004	0.000	0.000

**Appendix Table 13. Transformed Negative Binomial
Regression Coefficients, White, NH Population**

	IRR	se	p
MA*Implement	1.044	0.065	0.494
MA*Reform	1.019	0.052	0.716
Poverty Rate	1.008	0.008	0.324
Unemployment Rate	1.060	0.032	0.051
2002	0.833	0.041	0.000
2003	0.771	0.040	0.000
2004	0.893	0.053	0.055
2005	0.961	0.065	0.559
2006	0.983	0.099	0.865
2007	0.876	0.077	0.130
2008	0.785	0.065	0.003
2009	0.726	0.092	0.012
2010	0.659	0.070	0.000
2011	0.766	0.123	0.097
2012	0.669	0.065	0.000
MA	0.579	0.024	0.000
NH	0.853	0.012	0.000
RI	0.697	0.034	0.000
VT	0.928	0.018	0.000
Constant	0.004	0.000	0.000

Appendix Table 14. Transformed Negative Binomial Regression Coefficients, African American, NH Population

	IRR	se	p
MA*Implement	1.039	0.167	0.811
MA*Reform	0.925	0.268	0.788
Poverty Rate	1.007	0.003	0.015
Unemployment Rate	1.107	0.067	0.092
2002	0.809	0.139	0.217
2003	0.820	0.106	0.125
2004	0.794	0.099	0.063
2005	0.794	0.118	0.121
2006	0.887	0.190	0.574
2007	0.938	0.157	0.705
2008	0.941	0.274	0.834
2009	0.514	0.287	0.234
2010	0.512	0.300	0.253
2011	0.443	0.251	0.150
2012	0.469	0.236	0.133
MA	0.965	0.210	0.869
NH	1.246	0.027	0.000
RI	1.053	0.183	0.766
VT	2.001	0.081	0.000
Constant	0.005	0.000	0.000

**Appendix Table 15. Transformed Negative Binomial
Regression Coefficients, All Other Mothers**

	IRR	se	p
MA*Implement	0.810	0.021	0.000
MA*Reform	1.653	0.488	0.089
Poverty Rate	1.007	0.009	0.418
Unemployment Rate	1.159	0.085	0.044
2002	0.802	0.105	0.091
2003	0.672	0.109	0.014
2004	0.804	0.159	0.271
2005	0.862	0.097	0.189
2006	0.862	0.088	0.143
2007	0.899	0.111	0.390
2008	0.464	0.165	0.031
2009	0.295	0.168	0.032
2010	0.303	0.181	0.045
2011	0.329	0.182	0.045
2012	0.318	0.181	0.044
MA	0.658	0.068	0.000
NH	1.045	0.036	0.197
RI	0.877	0.072	0.113
VT	0.843	0.066	0.030
Constant	0.004	0.001	0.000
