Assessing the Impact of Massachusetts Health Reform on the Utilization, Cost and Outcomes for Seniors in Fee-for-Service Medicare: Positive or Negative Externality?

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Introduction

The passage the 2010 Patient Protection and Affordable Care Act (ACA) will yield the largest expansion of insurance coverage since the introduction of the Medicare and Medicaid program. What is unclear is the impact of the expansion on the population already insured. Fortunately, the Massachusetts health reform implemented in 2006 provides a national experiment to gauge the impact. This analysis seeks to examine the changes in cost, service use, and risk-adjusted mortality within the Medicare fee-for-service senior population in Massachusetts compared with the states adjacent to Massachusetts, as well as the remaining states in the United States.

In 2006 Governor Mitt Romney signed a healthcare reform law that would ensure coverage for all people in Massachusetts. This was great news for the newly insured. However, those who already had insurance were afraid that this population would flood the system, making it much more difficult to access their clinicians. Because the reform in Massachusetts was the model for the national healthcare reform that President Obama signed in 2010, many are concerned with the effects of this influx of patients. This study analyzes a 5% sample of Medicare claims to determine if there were differences in volumes and costs of care and risk-adjusted mortality before and after the Massachusetts reform. The claims are not only from Massachusetts, but neighboring states – Rhode Island, Connecticut, New York, Vermont, and New Hampshire – and the rest of the United States.

Background

The MA health reform that began in 2006 is credited with expanding health insurance coverage from 86.6% of non-elderly adults in 2006 to 94.2% in 2010 (Long, Stockley, and Nordahl, 2012/2013). Some of the expansion occurred through expanded Medicaid eligibility, but most consisted of newly-insured people with subsidized private coverage or employer-sponsored insurance. Consistent with the expansion in coverage, health care access and use improved among the population of non-elderly adults.

Along with the expansion of coverage came concerns that MA residents might have trouble finding providers to serve them. Long and Stockley (2011) reported an increase in delays in obtaining needed care because of difficulty in getting an appointment. The Massachusetts Medical Society (2011) reported that the average waiting time to see an internist increased by more than 50 percent from 2006 to 2007.

However, this work did not address the question of whether the insurance expansion caused access problems among the population that *already* had insurance. Focusing on the Medicare population, Joynt et al. (2013) found that the insurance expansion did not increase rates of ambulatory care-sensitive admissions that can be prevented or reduced by appropriate use of ambulatory care. Their interpretation of this finding is that the MA reform did not have a "clinically meaningful and negative impact on Medicare patients (Joynt, et al., 2013, p. 572).

Bond and White (2013) approached the issue of access more directly by examining two measures of primary care utilization: the change in primary care visits per Medicare beneficiary per year; and the change in the share of Medicare beneficiaries with one or more primary care visits. They found that visits per beneficiary fell by 6.9% in areas of MA where the insurance expansion had the largest impact, relative to areas with the smallest uninsurance rates. However, the expansion of coverage for the non-elderly did not affect the share of Medicare beneficiaries with at least one primary care visit.

Conceptual Model

Our conceptual model of the MA health insurance expansion is based on the following general assumptions:

1. Health care providers serve two types of patients: those covered by government plans (Medicare and Medicaid) and those covered by private health plans.
2. The provider is a "price taker" for government patients but has market power to set private prices.

3. Government patients do not have any cost-sharing (Medicaid) or they have private insurance that pays their cost-sharing (FFS Medicare). Thus, the quantity of services demanded by government patients is price-insensitive.
4. In contrast, private demand is sensitive to prices.
5. A provider with private market power can 'price discriminate' between privately-insured patients and beneficiaries of government programs because medical care cannot be resold.
6. The provider maximizes profits.

We also make the following special assumption: the prices for Medicare patients are higher than those for Medicaid patients. This is true in MA as in most states.[1]

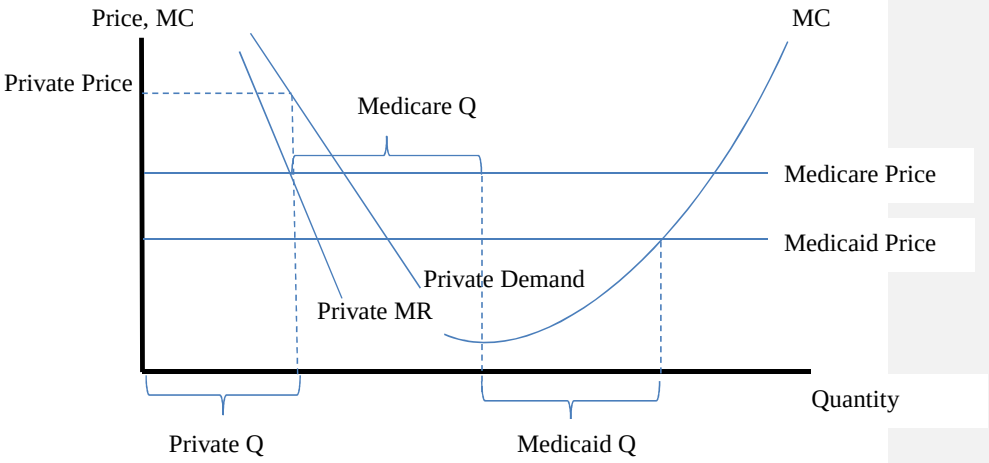
Figure 1 provides a diagrammatic exposition of the model, which appears in many references, such as Morrisey (1994) and Dowd, et al. (2006-2007). The vertical axis of Figure 1 measures the provider's prices and marginal cost, and the horizontal axis measures quantity supplied and demanded. As discussed by Dowd, et al. (2006-2007), the provider will supply services to the private market at the intersection of marginal revenue from privately-insured patients and the Medicare price. The provider then will supply services to FFS Medicare beneficiaries up to the point where either (a) the Medicare price is equal to the provider's marginal cost or (b) all Medicare demand has been met. In case (a) the provider will not serve Medicaid patients. In case (b) the provider will serve Medicaid patients up to the point where the Medicaid price is equal to the provider's marginal cost.[2]

Figure 1 shows the pre-expansion market equilibrium in MA under case (b):

[1] The ratio of Medicaid to Medicare fees across all services in MA is .77 (data from Kaiser Family foundation, available at http://kff.org/medicaid/state-indicator/medicaid-to-medicare-fee-index/).

[2] Although we use a common cost function for government and private patients, the model also applies to the case where government patients are more or less costly than private patients. This is easily accomplished by 'case-mix adjusting' the government quantities.

Figure 1



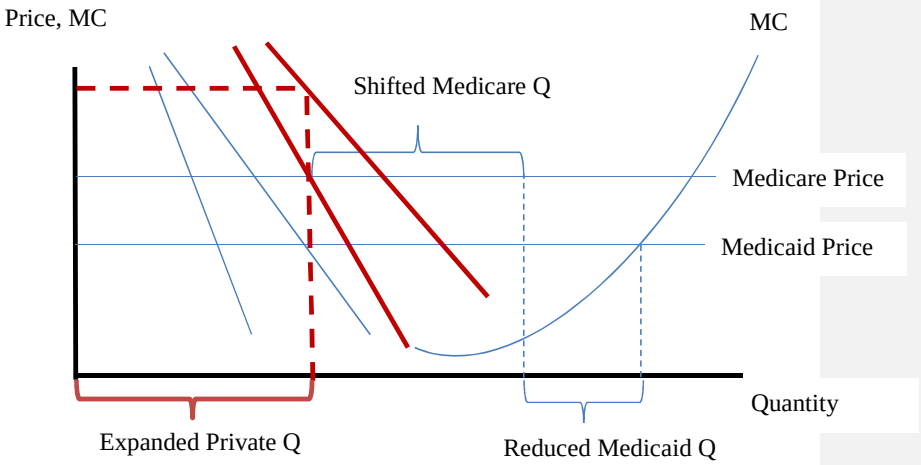
This is a diagram for one type of service (hospital admissions, office visits, home health visits, etc.). There is a separate diagram for each type of service.

Under this scenario, Medicare quantity (Q) is fixed. It is not a function of the Medicare price, as long as the Medicare price lies above the Medicaid price and the intersection of marginal cost.

Now the MA reform happens. The expansion of private coverage shifts private demand and marginal revenue to the right.[3] Even with these shifts, nothing happens to Medicare supply. It remains at the level shown in Figure 1. However, because Medicaid is the lowest payer, the supply of services to Medicaid beneficiaries is reduced. The effect of increased private demand is shown in Figure 2:

[3] Private demand also may become less price elastic as more of the uninsured gain insurance or because the essential benefit package makes coverage more generous.

Figure 2

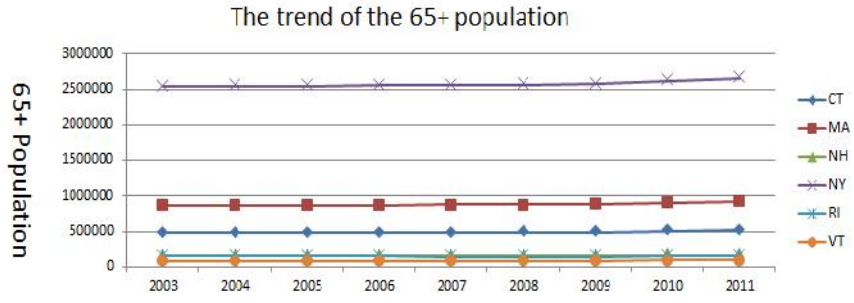


We re-emphasize that if Medicare demand isn't limited or marginal cost (MC) intersects the Medicare price before MC cuts the Medicaid price, then Medicaid beneficiaries get no services at all.

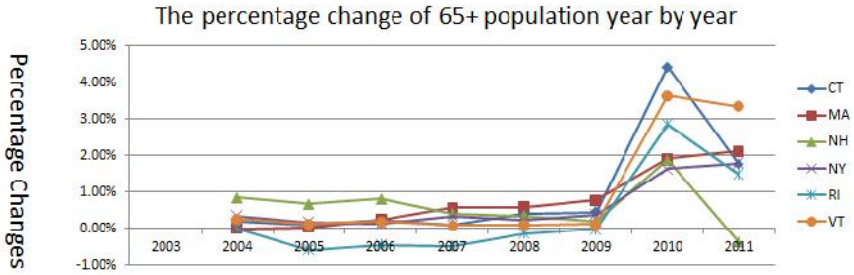
Study Design

We use Medicare claims from years 2005 through 2011 to gauge the impact of Massachusetts insurance expansion on seniors. We examine health care use, cost and mortality as dependent variables for a difference-in-differences empirical analysis. We compare changes in outcomes in MA versus surrounding states (CT, RI, NH, NY and VT), as well as the rest of the country, using 2005 as the pre-reform year and 2006 through 2011 as post-reform years.

Descriptive Analysis



The trend of the population who are older than 65 years old from MA and its adjacent states is shown is the figure above. From 2003 to 2009, the 65+ population in these states were quite stable with +/- 1% year-by-year changes. In 2010, the 65+ population increased dramatically with more than 4% in CT and 2% in MA. Such change can be easily illustrated in the following year by year percentage change figure. However, the change in Medicare population in 2010 was much later than the 2006 MA health care reform and could not be the consequence of the reform.

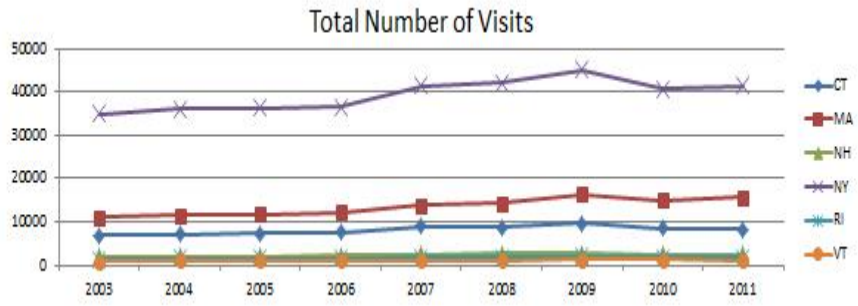


Volume Analysis

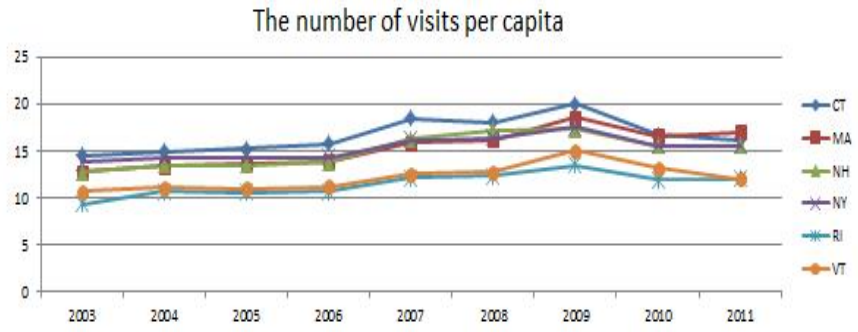
The volumes of Medicare were examined from three aspects: the healthcare visits, the major procedures performed, and the diagnostic tests conducted.

Healthcare Visits

The health care visits are defined as any office visit, hospital visit, emergency room visit, home visit, nursing home visit, specialist visit, and consultation visit. The diagram below shows the total number of health care visits over the course of nine years. In Massachusetts, the total number of visits increased steadily from 2006 to 2009 and dropped at 2010. The adjacent states followed the same trend. Of the states in this study, New York has the highest total number of visits, followed by Massachusetts and Connecticut. Rhode Island and New Hampshire had relatively equivalent expenditures, and Vermont spent the least.



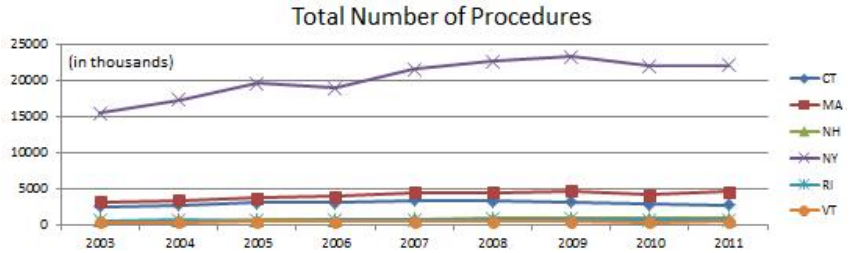
The number of healthcare visit per capita was also examined. The following diagram shows the number of healthcare visit per capita in Massachusetts and adjacent states from 2003 to 2011. Connecticut had the highest number of visit per capita in these six states followed by New York, Massachusetts and New Hampshire which have roughly the same number of visits per capita. Rhode Island and Vermont have the lowest number of visit per capita. The trends of the number of visits in all six states were similar. After 2006 MA health care reform, the number of visits per capita in MA and its adjacent states all went up until 2009. In 2010, the number of visits per capita all went down.



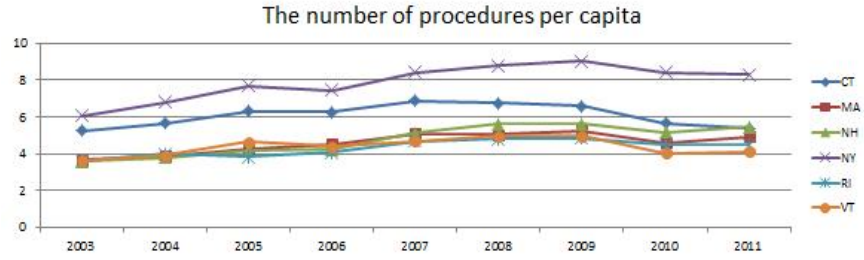
Major Procedures

The major procedures Includes all major procedure (breast, colectomy, cardiovascular, orthopedic and more). The diagram below shows the total number of the major procedures performed over the course of nine years. Of the states in the study, New York has the highest total number of major procedures, followed by

Massachusetts and Connecticut. Rhode Island and New Hampshire had relatively equivalent expenditures, and Vermont spent the least. After the 2006 MA health care reform, the total number of procedures performed under Medicare coverage in MA increased in 2007 and then kept a relative stable status until 2010. In 2010, the total number of procedure actually decreased.

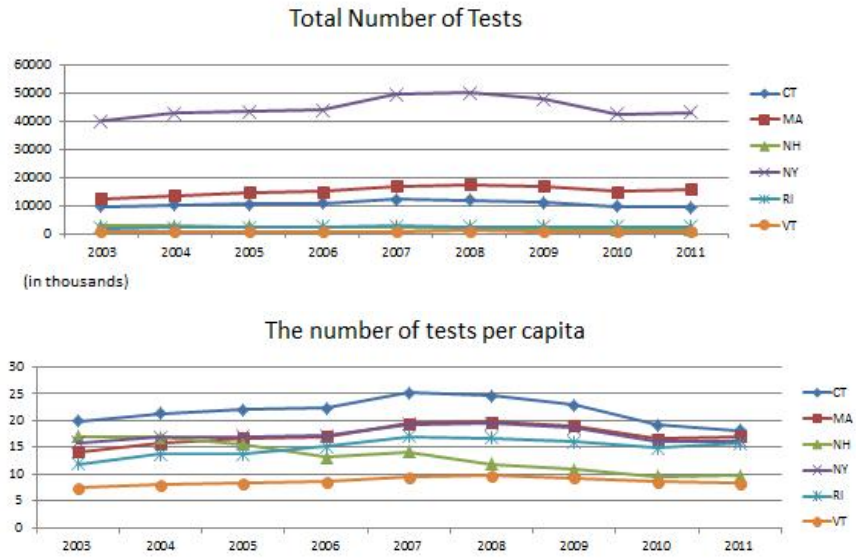


The number of major procedures performed per capita was also examined. The following diagram shows the number of major procedures per capita in Massachusetts and adjacent states from 2003 to 2011. NY had the highest number of major procedure per capita in these six states followed by CT, MA, NH, RI, and VT have the similar and the lowest number of major procedure per capita. After 2006 MA health care reform, the number of major procedures per capita in MA kept steady from 2007 to 2009, while during the same period, the number of major procedures per capita in NY went up.



Diagnostic tests

The diagnostic tests here include all endoscopy, standard imaging, echography/ultrasonography, advanced imaging, and lab tests. The diagram below shows the total number of the diagnostic tests and the number of the diagnostic test per capita performed over the course of nine years. In summary, after 2006 MA health care reform, the total number of diagnostic tests in MA went up in 2007, kept relative stable from 2007 to 2009, and then dropped in 2010.



Cost Analysis

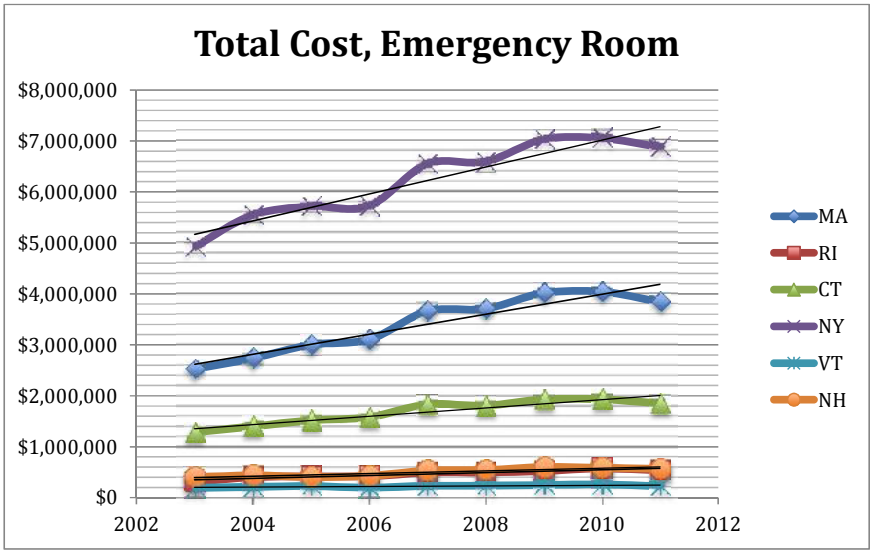
Emergency Room

In a nation that spends billions and possibly trillions of dollars on healthcare annually, it is also important to study the effects of cost from the Massachusetts health reform. First, how does the reform affect emergency room, primary care, and

inpatient claim total costs and per capita costs? Secondly, how do the numbers in Massachusetts compare to neighboring states?

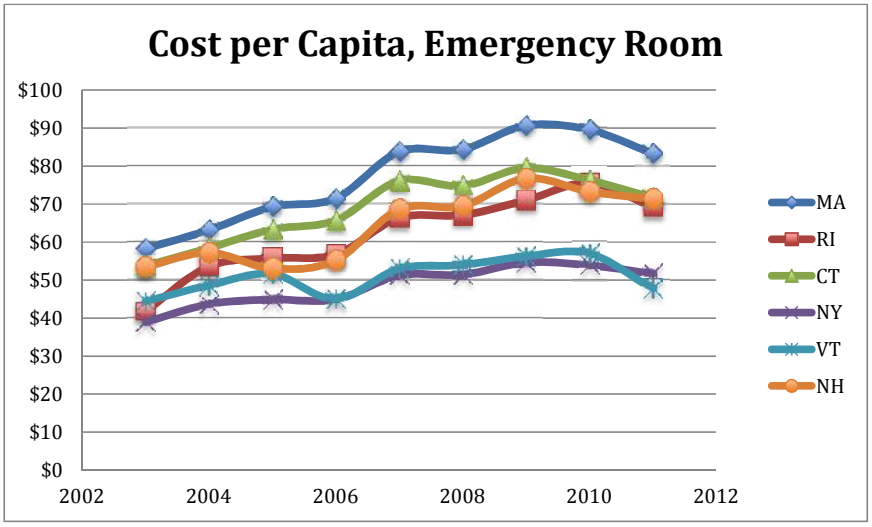
The diagram below shows the total cost for emergency room claims over the course of nine years. In Massachusetts, as in all the other states, the total cost of emergency room visits increases from 2003 to 2011, and from 2006 to 2009, the overall costs increase steadily. They then level out and start to decrease. Notably, there was also no change in 2006 or 2007 that could have been caused by the implementation of the reform.

These trends are similar in adjacent states. Of the states in the study, New York has the highest total costs, followed by Massachusetts and Connecticut. Rhode Island and New Hampshire had relatively equivalent expenditures, and Vermont spent the least.



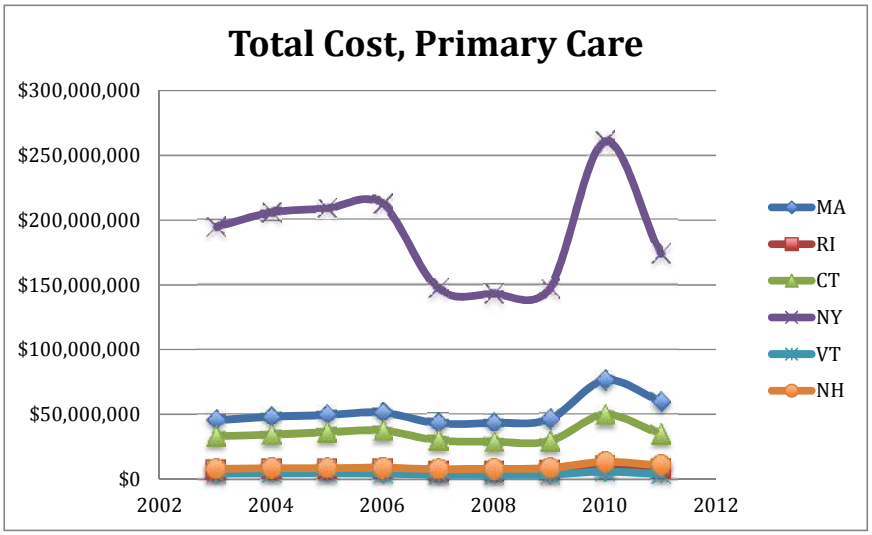
Since population can affect total costs, it is important to also look at the costs per capita. The following diagram shows the costs per capita for emergency room visits in Massachusetts and adjacent states from 2003 to 2011. Massachusetts stands out as having the highest per capita costs of these six states. New York has, on average, the lowest per capita costs, meaning that the high total costs seen in the previous chart must be due to population.

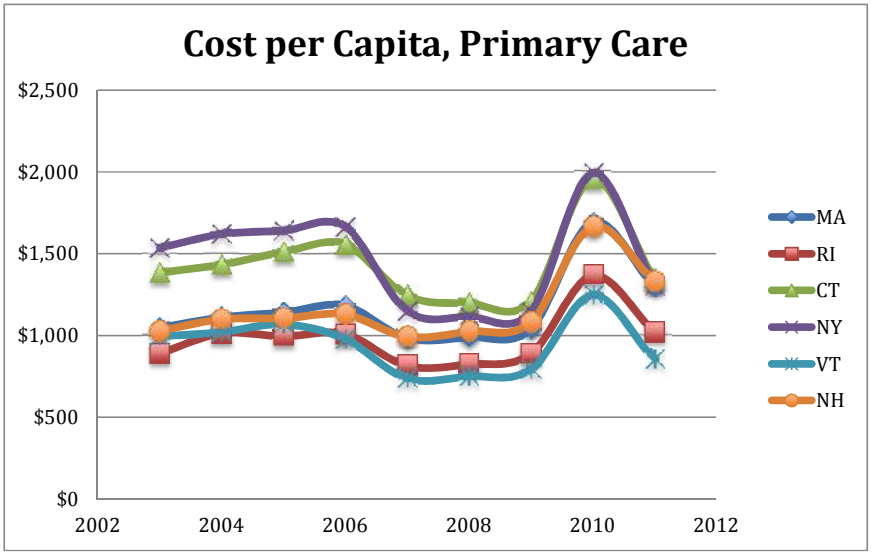
The per capita costs in Massachusetts grew steadily from 2003 to 2006, but there is a huge jump in 2007, right after the reform. However, the growth slows and eventually the costs decrease in 2011. Therefore, the reform has not significantly increased costs in the long run. A further study to investigate the longer term affects to determine if that line keeps trending downward. It is important to note that since the surrounding states also experienced a decrease in per capita costs, the decrease in Massachusetts was not solely from its healthcare reform.



Primary Care

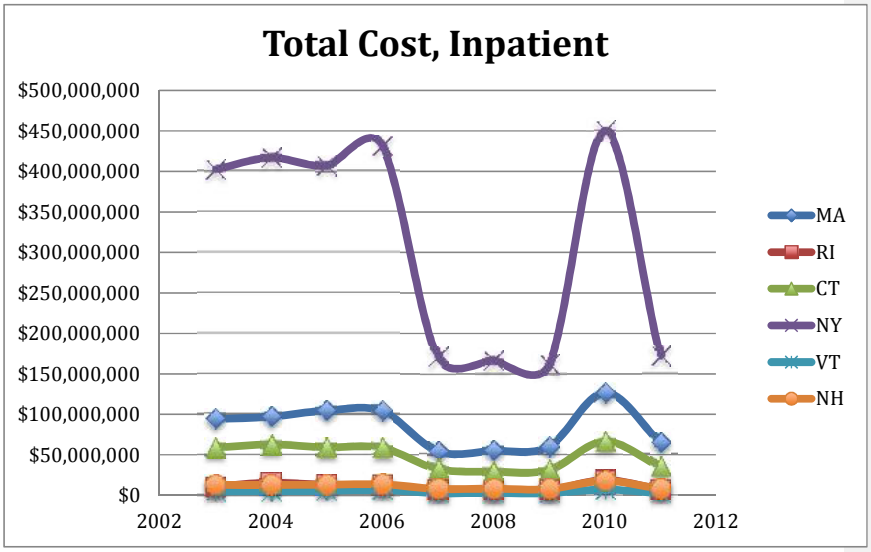
The data do not show that the healthcare reform had any significant influence on the costs of primary care in Massachusetts compared to adjacent states. Both the total costs and the per capita costs decrease from 2007 to 2011, peaking in 2010.

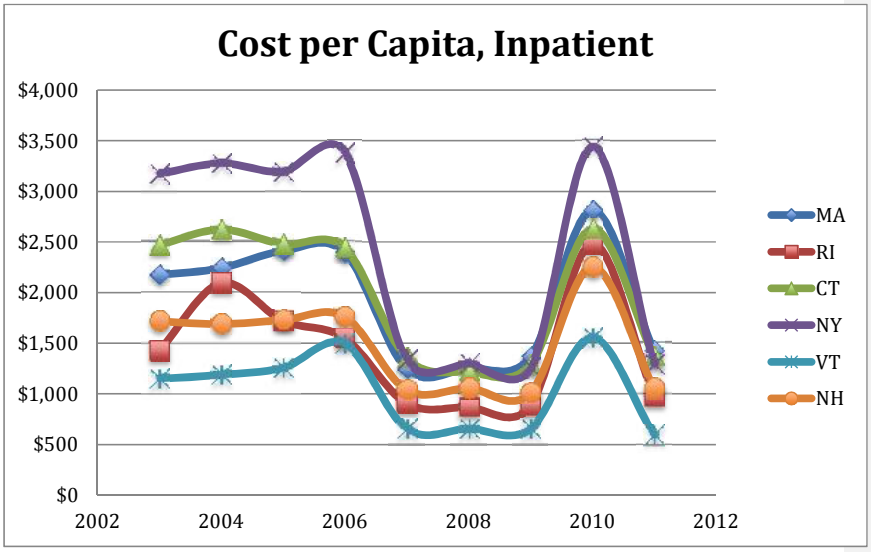




Hospital Inpatient

The hospital inpatient claims also show that there is no significant impact on the total costs and per capita costs for inpatient visits in Massachusetts compared to surrounding states. However, the overall cost level decrease dramatically. For all states in the study, costs decreased by more than 50% after 2006.

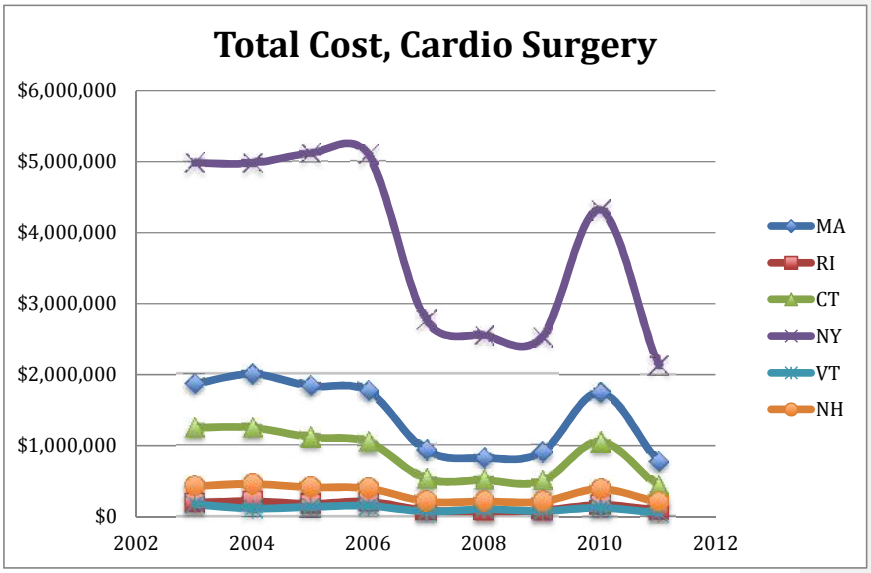




Cardiac Surgery

Cardiac surgery requires expensive medical technology. It is included in this report to determine if costs of devices changed before and after the reform, albeit secondarily. The diagram shows the total costs and per capita costs for cardiac surgeries in Massachusetts and the surrounding states, and the results are similar to

the hospital inpatient services shown above. The costs decreased by 50% between 2003 and 2011, and there is still a peak in 2010.



The descriptive results suggest that there substantial changes to expenditures in the period from 2007 to 2009. The changes are significany enough to worry about a data inconsitency problem across time. However, even if we assume inter-period inconsistency, there appears to be intra-period consistency among the states. From which we see little evidence of Medicare seniors in Massachusetts experiencing a unique change in service use and cost different than other states across the time periods examined. In the following section we examine multivariate results using a differences empirical model to test whether Massachusetts health reform has a unqiue effect on specific specialty services as well as inpatient mortality as a crude patient outcome metric.

Regression Results

Our regression results are presented in three tables. The first table describes primary care visit difference results for the 5% Medicare population. The second table focus on beneficiaru access to specialist services, some of whom see a majority

of seniors in their practices such as cardiologists and other specialities such as internal medicine and pscychiatry that see a mix of senior and non-senior patients. The third table focuses on changes inpatient mortality in Massachusetts compared to other states during the reform period. All regressions models control for patient age, gender, illness burden, race. The reference year is 2006, the start of the reforms in Massachusetts and the reference US region in the rest of the 48 lower states except for Massachusetts and the New England States. Unlike the descriptibe analysis, New York State is included in the regression as part of the other lower 48 state reference cateory.

In Table 1, we present the difference regression results for primary care office visit utilization. The dependpent variable is log linear. We have catorical variables for year and year plus state interactions. We focus our interpretation on the Massachusetts post reform year interaction variables. For the regressions in Table 1 through Table 3, we assume the use of the same 5% Medicare benefiary sample and leave out person attributes that would be repeated over time.

For new patients, Massachusetts had a general trend of providing less primary care visits compared to the rest of non-New England US. This trend was particularly pronounced immediately after the reform with coefficients reported in 2007 to 2009 ranging from -0.0611 to 0.0953. The reductions were not as great during this period as were in the New Endgland states, with the exception of 2007 where Massachusettes had the least margin of new patients seen in the period immedicately after reform.

For established patients the results are more mixed. Massachusetts had lower visits compared to the rest non-New England. This trend is significant until 2007 at which point in becomes significant only once again in 2008 and 2011 (and then only at $p<.05$). In cointrast to primary care visit for established patients, primary care consult visits go from being insignificantly negative for Masschusetts prior to reform to postibe and significant compared to the non-New Endand US from 2007 through

2009, After 2009 primary care consult use in Massachusetts is no different than the non-New England region and New England area.

Table 1 - Difference Results - OLS Models

Primary Care Office Visit Utilization - Log Linear

	New Visits		Established Visits		Consults	
Adjusted r-square	0.4157		0.2161		0.3024	
Variable	Parameter Estimate	Pr > |t|	Parameter Estimate	Pr > |t|	Parameter Estimate	Pr > |t|
Intercept	0.01096	<.0001	0.80268	<.0001	0.01539	<.0001
YR2003	0.00014	0.3965	0.00976	<.0001	0.00563	<.0001
YR2004	0.00040	0.0121	0.01734	<.0001	0.00630	<.0001
YR2005	0.00078	<.0001	0.01528	<.0001	0.00582	<.0001
YR2007	0.91371	<.0001	3.12014	<.0001	0.79681	<.0001
YR2008	0.85075	<.0001	3.14045	<.0001	0.72508	<.0001
YR2009	0.78690	<.0001	3.12147	<.0001	0.69306	<.0001
YR2010	0.00057	0.0004	-0.02078	<.0001	-0.01529	<.0001
YR2011	0.00080	<.0001	-0.04958	<.0001	-0.01534	<.0001
MA_2003	**-0.00291**	**0.0002**	**-0.04262**	**<.0001**	-0.00091	0.2977
NE_2003	-0.00164	0.0224	0.01278	0.0029	-0.00104	0.2012
MA_2004	**-0.00335**	**<.0001**	**-0.02668**	**<.0001**	-0.00122	0.1607
NE_2004	-0.00330	<.0001	0.00587	0.1725	-0.00159	0.0519
MA_2005	**-0.00341**	**<.0001**	**-0.03405**	**<.0001**	**-0.00303**	**0.0004**
NE_2005	-0.00411	<.0001	-0.01328	0.002	-0.00166	0.0426
MA_2007	**-0.09593**	**<.0001**	-0.03421	0.1093	**0.04495**	**<.0001**
NE_2007	-0.07030	<.0001	-0.03655	0.0852	0.09252	<.0001
MA_2008	**-0.08570**	**<.0001**	**-0.05029**	**0.0161**	**0.07151**	**<.0001**
NE_2008	-0.10916	<.0001	-0.03073	0.1436	0.06676	<.0001
MA_2009	**-0.06611**	**<.0001**	-0.03098	0.1412	**0.07462**	**<.0001**
NE_2009	-0.08509	<.0001	-0.04593	0.0243	0.06968	<.0001
MA_2010	**-0.00378**	**<.0001**	0.00823	0.0625	-0.00010	0.9023
NE_2010	-0.00333	<.0001	-0.05394	<.0001	-0.00010	0.9019
MA_2011	**-0.00243**	**0.0008**	**0.01082**	**0.0124**	-0.00004	0.9642
NE_2011	-0.00327	<.0001	-0.07677	<.0001	-0.00004	0.9644

In Table 2, we repeat the same emprical model used for Table 1, but focus on utilization of specific specialty's services. Each of these specialties has a different profile of Seniors seen. In the case of internal medicine, geriatrics and cardiology, Medicare seniors are their dominent, but not only patient practice mix. For radiology, orthoopedic surgey and psychiatry, we would expect a more mixed set of

patients where physicians would consider choosing to work more with seniors because of better reimbursment rates than what they would receive from Medicaid.

Unlike Table 1, we see some very clear differences among the categories of services examined. In the case of internal medicine, Massachusetts seniors receive far more services than New England or non-End land seniors. The trend is larger and significant for Massachusetts prior to reform and three year subsequent to it in 2010. Similar to Internal Medicine, Geriatrics (a subspecialty of Internal Medicine) in Massachusetts has greater utilization than New Endland states or non-New England States. The trend is even large after reform than before. For Cardiology, there is little statistically significant difference in utilization post reform. Radiology become less utilized immediately after reform in Massacusetts and picks up again in 2010.

Table 2 - Difference Results - OLS Models

Specialist Service Utilization - Log Linear

	Internal Medicine		Geriatrics		Cardiology		Radiology		Orthopedic Surgery		Psychiatry	
Adjusted r-sq	0.1493		0.0654		0.1801		0.2058		0.2293		0.1548	
Variable	Parameter Estimate	Pr > |t|	Parameter Estimate	Pr > |t|	Parameter Estimate	Pr > |t|	Parameter Estimate	Pr > |t|	Parameter Estimate	Pr > |t|	Parameter Estimate	Pr > |t|
Intercept	1.01645	<.0001	0.01573	<.0001	0.59738	<.0001	0.73493	<.0001	0.22828	<.0001	0.09405	<.0001
YR2003	-0.00765	<.0001	-0.00143	<.0001	-0.04250	<.0001	-0.04846	<.0001	-0.01389	<.0001	-0.00243	<.0001
YR2004	-0.01223	<.0001	-0.00127	<.0001	-0.01721	<.0001	-0.02422	<.0001	-0.00625	<.0001	-0.00110	0.0388
YR2005	-0.00144	0.288	-0.00051	0.0405	-0.00610	<.0001	-0.00219	0.0337	-0.00036	0.6239	-0.00095	0.0742
YR2007	3.54816	<.0001	0.41132	<.0001	3.32388	<.0001	3.27834	<.0001	2.50460	<.0001	1.45425	<.0001
YR2008	3.57484	<.0001	0.40745	<.0001	3.35484	<.0001	3.31894	<.0001	2.48145	<.0001	1.40830	<.0001
YR2009	3.58330	<.0001	0.41801	<.0001	3.27406	<.0001	3.32257	<.0001	2.49903	<.0001	1.39916	<.0001
YR2010	-0.02333	<.0001	0.00433	<.0001	-0.02786	<.0001	0.03678	<.0001	0.01490	<.0001	-0.00089	0.0937
YR2011	-0.02990	<.0001	0.00504	<.0001	-0.04880	<.0001	0.04105	<.0001	0.01484	<.0001	-0.00061	0.2466
MA_2003	**0.25768**	**<.0001**	**0.00792**	**<.0001**	-0.00615	0.2632	**0.03762**	**<.0001**	**-0.03961**	**<.0001**	**0.07022**	**<.0001**
NE_2003	0.19112	<.0001	-0.00481	<.0001	-0.03714	<.0001	-0.00545	0.2432	0.00020	0.9524	0.01629	<.0001
MA_2004	**0.26606**	**<.0001**	**0.00930**	**<.0001**	-0.00858	0.1159	**0.05084**	**<.0001**	**-0.04247**	**<.0001**	**0.07098**	**<.0001**
NE_2004	0.16542	<.0001	-0.00422	0.0002	-0.04224	<.0001	0.00113	0.809	-0.00672	0.0411	0.01888	<.0001
MA_2005	**0.25916**	**<.0001**	**0.00832**	**<.0001**	**-0.01790**	**0.0008**	**0.04365**	**<.0001**	**-0.04416**	**<.0001**	**0.06974**	**<.0001**
NE_2005	0.13892	<.0001	-0.00454	<.0001	-0.05005	<.0001	0.00037	0.9364	-0.00382	0.2461	0.02152	<.0001
MA_2007	**0.12243**	**<.0001**	**0.06712**	**<.0001**	0.00180	0.9439	0.03288	0.1578	**-0.11034**	**<.0001**	**0.37176**	**<.0001**
NE_2007	0.05790	0.0575	0.02033	0.0003	-0.02003	0.4297	0.01200	0.6042	0.00040	0.9802	0.16605	<.0001
MA_2008	**0.09856**	**0.001**	**0.08492**	**<.0001**	-0.04018	0.1075	0.02684	0.2388	**-0.10757**	**<.0001**	**0.31873**	**<.0001**
NE_2008	0.04540	0.1322	0.02480	<.0001	-0.00926	0.7123	0.00321	0.8885	0.00498	0.7568	0.19789	<.0001
MA_2009	**0.13091**	**<.0001**	**0.10733**	**<.0001**	-0.04081	0.1046	0.03119	0.174	**-0.10860**	**<.0001**	**0.30970**	**<.0001**
NE_2009	0.03630	0.2148	0.04350	<.0001	-0.02035	0.4033	-0.01394	0.5306	-0.00072	0.963	0.19666	<.0001
MA_2010	**0.33509**	**<.0001**	**0.01141**	**<.0001**	**-0.02315**	**<.0001**	**0.05508**	**<.0001**	**-0.04014**	**<.0001**	**0.07631**	**<.0001**
NE_2010	0.08955	<.0001	-0.00289	0.0123	-0.04414	<.0001	-0.01363	0.0045	-0.01576	<.0001	0.02153	<.0001
MA_2011	**0.37987**	**<.0001**	**0.01274**	**<.0001**	**-0.02084**	**<.0001**	**0.07066**	**<.0001**	**-0.03388**	**<.0001**	**0.07178**	**<.0001**
NE_2011	0.09069	<.0001	-0.00348	0.0023	-0.04475	<.0001	-0.01393	0.0032	-0.02043	<.0001	0.02559	<.0001

Orthopedic surgery service use in Massachusetts is far less used than in New England ior the rest of the after reform than before – though the overall trends for Massachusetts was negative pre-health reform. Finally, psychiatry services see a marked pick-up in Massachusetts following reform compare to other states.

In Table 3, we present the marginal effect of Massachuseets heath reform in associated with inpatient mortality. The result is particularly striking given that inpatient mortality association wuith Massachusetts is not statistically significant until after health reform. Specifically, Massachusetts Medicare seniors hositalized have a much greater risk of dying in the hospital than in the New England States and as well as the rest of non-New England area. The result is consistent for five years and does not diminish by the the last study year. In fact the magnitude of the marginal effect on probability of dying in a hospital in Massashusetts is greatest greatest in 2011 compared to other years.

Table 3 - Difference Results - Logistic Regression

Inpatient Mortality

	Coefficicients		Odds Ratio		
Variable	Parameter Estimate	Pr > ChiSq	Point Estimate	95% Wald Lower	Upper
Intercept	3.30020	<.0001			
YR2005	-0.04310	<.0001	0.95800	0.940	0.976
YR2007	0.00956	0.3037	1.01000	0.991	1.028
YR2008	0.00328	0.7245	1.00300	0.985	1.022
YR2009	0.05230	<.0001	1.05400	1.034	1.074
YR2010	0.10130	<.0001	1.10700	1.085	1.128
YR2011	0.11450	<.0001	1.12100	1.100	1.143
MA_2005	0.02410	0.5735	1.02400	0.942	1.114
NE_2005	-0.09160	0.0271	0.91300	0.841	0.990
MA_2007	0.11360	0.0072	**1.12000**	1.031	1.217
NE_2007	-0.01880	0.645	0.98100	0.906	1.063
MA_2008	0.14150	0.001	**1.15200**	1.059	1.253
NE_2008	0.06530	0.1299	1.06800	0.981	1.162
MA_2009	0.15770	0.0003	**1.17100**	1.075	1.275
NE_2009	-0.05590	0.1894	0.94600	0.870	1.028
MA_2010	0.10860	0.0197	**1.11500**	1.017	1.221
NE_2010	-0.11370	0.0114	0.89300	0.817	0.975
MA_2011	0.16870	0.0004	**1.18400**	1.078	1.299
NE_2011	-0.01860	0.6965	0.98200	0.894	1.078

Policy Implications

One question that comes to mind with the results of this analysis is whether the issue can be solved by increasing the supply of primary care physicians in Massachusetts. Local clinics can incentivize physicians to move to the area, but this primary care shortage isn't unique to Massachusetts. Even before the passage of the Affordable Care Act, this issue was of great concern and analysis. The problem stems from a limit number of residency programs, which are funded through Medicare. Congress needs to reduce Medicare spending, not increase it, and while they are waiting for alternative funding, they have capped the residency slots to 110,000 (Kirkpatrick). Even then, primary care specialties have lower salaries, so fewer medical students choose those specialties. An alternative solution to this issue would be to increase the capabilities of nurse practitioners and physician assistants to relieve the stress from this legislation.

This analysis has several significant limitations. The work is at a preliminary stage and needs refinement. The first three notable limitations is the data inconsistency in trends for some of the key utilization metrics for years 2007 to 2009. We have sought to address this limitation in the regression models with year specific categorical variables to account for what could be a regression effect or a database concern. Less concerning are that the trends regarding data services use are not all the same for each services category between in the 2007-2009 panel versus the 2010-2011 or 2003 to 2006 panel. The second limitation is that we have a very crude outcome measure, inpatient mortality. However, inpatient mortality rarely provides such statistically significant results when used with claims data. Further examinations of 30 data post discharge mortality as well as readmission for preventable illnesses would be helpful extensions. The third limitation is that we do have comparison Medicare claims from Medicare Advantage plans to see if this a Medicare FFS story or unique medical specialty story in Massachusetts. We are planning to use new Medicare Advantage data from the Health Care Cost Institute to address this concern.

This investigations early state can makes any interpretation of the results of the paper with respect to externality a risk. The case of positive externality would be possible if we saw clear increases in critical care with better outcomes. Unfortunately, that is not what we found. While some utilization certainly increase such as primary care consults and psychiatry services, other specialties were used less. To truly assess whether this was good or bad for the patient requires us to have comprehensive health outcomes data. Instead we have crude inpatient mortality data. To have a positive externality, Massachusetts would have to been associated at the very least with insignificant effect on mortality. With a positive association with inpatient mortality, it is more likely Medicare fee for service patients experienced a negative externality from reform, beyond the diminished access to primary care new patient visits and services from orthopedic surgeons.

Conclusion

Although preliminary, our analysis suggests that Massachusetts health reform did have a spillover effect on Medicare seniors. In some instances it was a positive with greater use of specialist services from psychiatrists and greater primary care consultation. In other instances, it is concerning with higher inpatient mortality and reduced access to other specialist services and new patient primary care visits. More data and analysis is required for a more thorough assessment of whether there Massachusetts health reform generated a positive or negative externality. Nevertheless, the reform impacted the Medicare market and provision of care by certain specialists for seniors. Given that is was not its intent, we conclude there is a likely case an externality was generated but are uncertain if it was welfare improving without more data and deeper assessment.

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