The Effect of the MassHealth Hospital Pay-for-Performance Program on Quality

APPENDIX

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Appendix A. Supplemental Results

Table A1. Marginal effects for all variables in main specifications (Table 2) for pneumonia

	Model 1	Model 2	Model 3	Model 4	Model 5
MassHealth	0.70 (0.42)	-.031 (0.43)	3.42*** (0.05)	-0.67 (0.51)	0.44 (0.54)
Time	2.07*** (0.02)	0.11* (0.06)	.	.	-0.01 (0.07)
Difficulty Index	.	1.11*** (0.03)	.	1.05*** (0.02)	1.12*** (0.03)
For profit	.	.	.	.	-0.09 (0.25)
Not for profit	.	.	.	.	0.85 (0.21)
100-399 beds	.	.	.	.	0.83*** (0.20)
Over 400 beds	.	.	.	.	0.42 (0.34)
Urban	.	.	.	.	-0.02 (0.19)
Teaching affiliation	.	.	.	.	-0.61*** (0.20)
Major Teaching (member of COTH)	.	.	.	.	-0.62** (0.30)
% Medicaid discharges	.	.	.	.	-0.0001 (0.001)
% Medicare discharges	.	.	.	.	-0.07*** (0.01)

Note: Standard errors are displayed in parentheses (). Models 1-4 show cluster robust (at the hospital level) standard errors while Model 5 shows standard errors that are robust to arbitrary heteroskedasticity.
Note: The marginal effect on Time is the average marginal effect
Note: Marginal effects on time don't appear in trend models because models are detrended, and time effects are not estimated

Table A2. Marginal effects for all variables in main specifications (Table 2) for surgical infection prevention

	Model 1	Model 2	Model 3	Model 4	Model 5
MassHealth	-3.45***	-2.92***	-1.89**	-0.12***	0.05
	(0.87)	(0.86)	(0.75)	(0.77)	(1.04)
Time	6.18***	1.23***		.	3.03***
	(0.08)	(0.28)			(0.21)
Difficulty Index		0.89***	.	1.07***	0.53***
		(0.05)		(0.04)	(0.04)
For profit	.	.	.	.	-0.98
					(0.60)
Not for profit	.	.	.	.	1.40***
					(0.49)
100-399 beds	.	.	.	.	1.16***
					(0.47)
Over 400 beds	.	.	.	.	1.84**
					(0.75)
Urban	.	.	.	.	0.65
					(0.45)
Teaching affiliation	.	.	.	.	1.26***
					(0.40)
Major Teaching (member of COTH)	.	.	.	.	2.85***
					(0.58)
% Medicaid discharges	.	.	.	.	0.03***
					(0.002)
% Medicare discharges	.	.	.	.	-0.17***
					(0.02)

Note: Standard errors are displayed in parentheses (). Models 1-4 show cluster robust (at the hospital level) standard errors while Model 5 shows standard errors that are robust to arbitrary heteroskedasticity.
Note: The marginal effect on Time is the average marginal effect
Note: Marginal effects on time don't appear in trend models because each hospital is given its own quadratic trend

Table A3. Sensitivity Estimates of the Effect of the MassHealth P4P program on Process Quality

	PHQID exclusion	Assume anticipation effect	Matched Sample	Pneumonia			Surgical Infection Prevention		
				MassHealth effect	n	N hospitals	MassHealth effect	n	N hospitals
Model 6	X			-0.83 (0.53)	18,181	3,123	-0.04 (0.81)	12,652	2,919
Model 7		X		-0.35 (0.35)	19,437	3,356	0.53 (0.76)	13,619	3,147
Model 8			X	-0.82 (0.58)	698	118	-0.96 (1.76)	441	94
Model 9	X	X	X	-1.52* (0.82)	660	112	-0.70 (1.89)	413	88

*$p < .10$
Note: All Models are estimated with the difficulty control, hospital fixed effects, and hospital-specific quadratic trends.
Note: Cluster-robust standard errors are displayed in parentheses ()

Table A4. Effects of MassHealth P4P Program on Quality Across Hospital Characteristics (Model 10)

VARIABLES	Pneumonia	Surgical Infection Prevention
MassHealth	-4.87***	4.31
	(1.51)	(2.91)
MassHealth · not for profit	1.32	-2.05
	(1.59)	(2.38)
MassHealth · 100-399 beds	2.67	-1.31
	(1.56)	(2.09)
MassHealth · Over 400 beds	0.56	1.34
	(2.86)	(3.3)
MassHealth · Urban	0.58	-1.34
	(1.07)	(1.96)
MassHealth · Teaching affiliation	0.71	0.04
	(.97)	(1.77)
MassHealth · Teaching (member of COTH)	0.83	-0.08
	(2.04)	(2.2)
MassHealth · % Medicaid discharges	3.71	4.51
	(6.08)	(12.03)
MassHealth · % Medicare discharges	3.81	-7.47
	(5.44)	(7.84)
Difficulty Index	1.04***	1.07***
	(0.02)	(0.04)
Observations	19,219	13,423
Number of hospitals	3,278	3,080

*** $p < 0.01$

Note: Heteroskedasticity-consistent standard errors, clustered on hospitals, are displayed in parentheses ()

Note: Models include hospital fixed effects and quadratic time trends

Note: Reference category is hospital with graduate or no medical school affiliation,under 100 beds, government of for-profit owned. Model is also estimated at the mean proportion of Medicaid and Medicare discharges

Table A5. Estimates of the Effect of the MassHealth P4P program on Process Quality: Lowest quartile of Medicaid share discharges

	Fixed Effects	Difficulty Index	Trends	Pneumonia			Surgical Infection Prevention		
				MassHealth effect	N	N hospitals	MassHealth effect	N	N hospitals
Model 11	X			1.05 (0.71)	4,324	748	-2.33 (1.50)	3,211	735
Model 12	X	X		-0.09 (0.72)	4,324	748	-1.76 (1.49)	3,211	735
Model 13	X		X	3.83*** (0.77)	4,318	745	-2.18* (1.28)	3,199	729
Model 14	X	X	X	0.03 (0.78)	4,318	745	-0.16 (1.30)	3,199	729

*** $p < .01$, * $p < .10$

Note: Heteroskedasticity-consistent standard errors, clustered on hospitals, are displayed in parentheses ()

Table A6. Estimates of the Effect of the MassHealth P4P program on Process Quality: Highest quartile of Medicaid share discharges

	Fixed Effects	Difficulty Index	Trends	Pneumonia			Surgical Infection Prevention		
				MassHealth effect	N	N hospitals	MassHealth effect	N	N hospitals
Model 15	X			0.33 (0.85)	4,928	836	-6.26*** (2.03)	3,343	787
Model 16	X	X		-0.86 (0.84)	4,928	836	-5.54*** (2.01)	3,343	787
Model 17	X		X	5.33*** (1.15)	4,928	836	1.03 (1.71)	3,327	779
Model 18	X	X	X	0.98 (1.16)	4,928	836	2.01 (1.83)	3,327	779

*** $p < .01$

Note: Heteroskedasticity-consistent standard errors, clustered on hospitals, are displayed in parentheses ()

Table A7. Effect of MassHealth on quality trend for pneumonia

VARIABLES	Model 19
Time	-0.10
	(0.18)
$Time^2$	-0.03
	(0.03)
$Time \cdot MA$	-1.21
	(0.81)
$Time \cdot Post$	-1.03***
	(0.26)
$Time^2 \cdot Post$	0.20***
	(0.05)
$Time^2 \cdot MA$	0.19
	(0.14)
$Time \cdot MA \cdot Post$	0.02
	(0.55)
$Time^2 \cdot MA \cdot Post$	-0.04
	(0.12)
Difficulty Index	1.25***
	(0.07)
Observations	19,627
R-squared	0.580
Number of id	3,385

*** $p < .01$, **$p < .05$, * $p < .10$

Note: Heteroskedasticity-consistent standard errors, clustered on hospitals, are displayed in parentheses ()
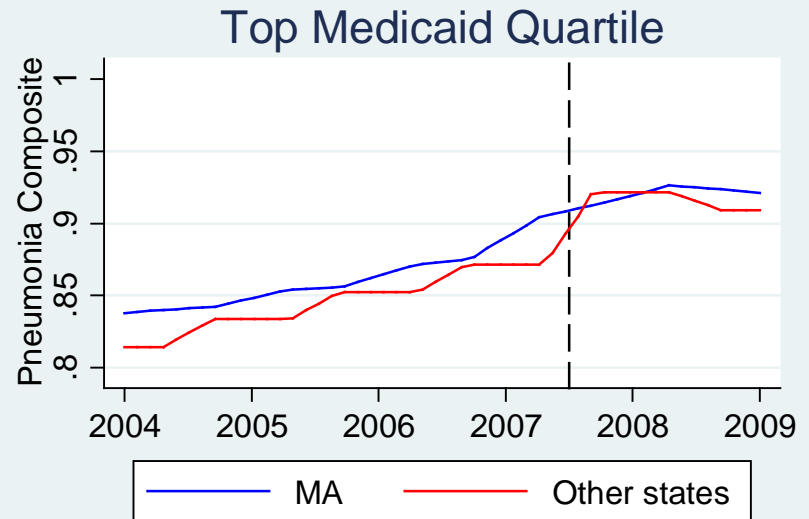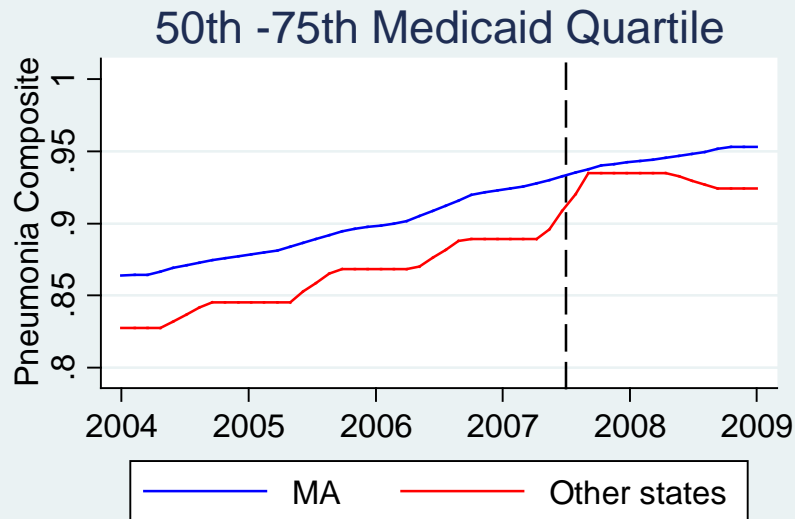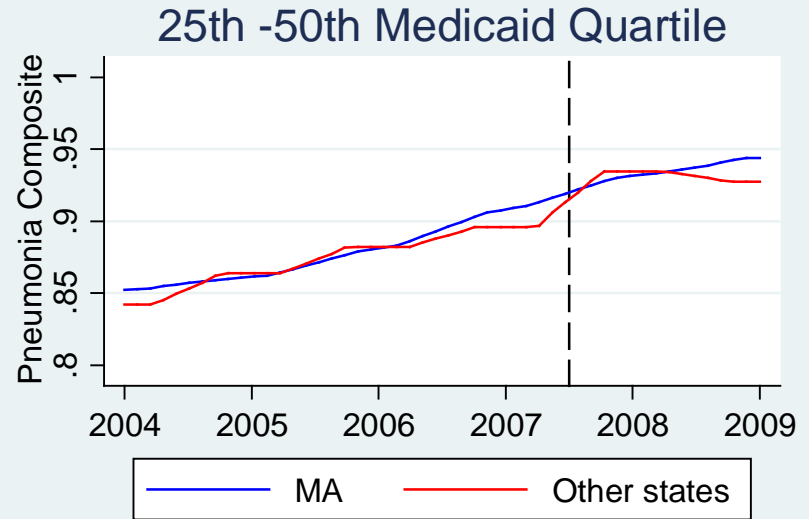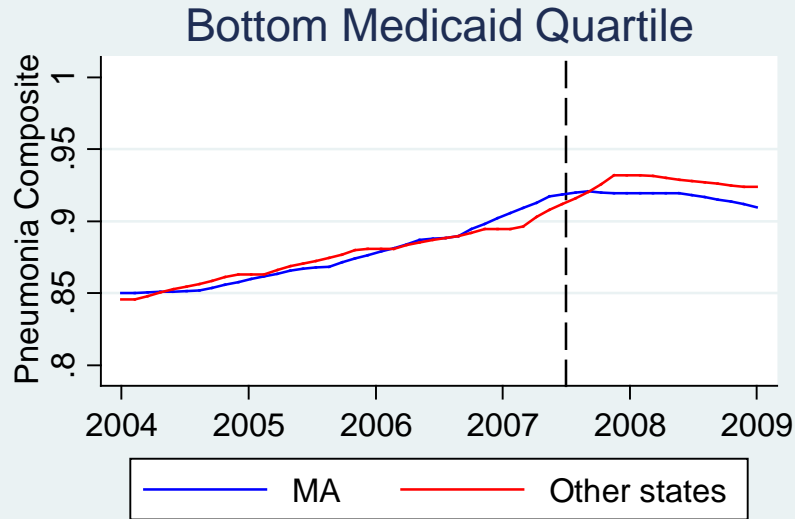
Figure A1. Pneumonia composite quality by Medicaid status

Figure A2. SIP composite quality by Medicaid status