An evaluation of performance thresholds in nursing home pay-for-performance

Rachel M. Werner, Meghan Skira, R. Tamara Konetzka

Appendix Tables

Appendix Table 1. Results of tests for differences in trends of nursing home performance prior to implementation of P4P. To test for differences in trends we regressed nursing home performance on linear time trends, a dummy variable indicating whether the state implemented P4P, and the interaction between the two. The coefficients on the interactions between the time trend and the P4P indicator are shown below. Regressions were limited to the four quarters prior to P4P implementation in each state.

	Pain	Pressure sores	Physically restrained	Falls	Catheter inserted	Weight loss
Colorado	-.010	.013	.020	-.010		
(vs. Arizona)	(.042)	(.050)	(.043)	(.055)		
Georgia	-.036	-.010	-.047*			
(vs. Tennessee)	(.031)	(.033)	(.027)			
Oklahoma		-.034	-.034	.022	.001	.001
(vs. Arkansas)		(.036)	(.035)	(.035)	(.038)	(.035)
All states	-.027	-.016	-.030			
(vs. 3 comparison states)	(.019)	(.022)	(.020)			

Robust standard errors in parentheses

* $p<0.05$

Appendix Table 2. Regression results showing the main effect of P4P on nursing home performance for each state individually (compared to its comparator state) and for the three states combined.

	Pain	Pressure sores	Physically restrained	Falls	Catheter inserted	Weight loss
Colorado	0.0184	-0.1205	0.0929**	-0.0710		
(vs. Arizona)	(0.0691)	(0.0680)	(0.0468)	(.0951)		
Georgia	-0.0021	-0.1286	-0.1282***			
(vs. Tennessee)	(0.0467)	(0.0541)	(0.0465)			
Oklahoma		-0.0181	0.1389***	0.0955*	0.0339	0.0453
(vs. Arkansas)		(0.0605)	(0.0518)	(0.0561)	(0.0461)	(0.0575)
All states	-0.003	-0.071**	0.005			
(vs. 3 comparison states)	(0.038)	(0.034)	(0.030)			

Robust standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Note: Each coefficient represents the main effect of P4P from a separate regression. In each state we test only those performance measures included in that state's P4P program. In the combined (all states) specification, we test the three performance measures we focus on in this paper.

Appendix Table 3. Regression results comparing Colorado (using the higher pre-determined thresholds in their P4P program) to Arizona

	Pain	Pressure Sores	Restraints	Falls
p4p	0.128	-0.136	0.147***	-0.112
	(0.117)	(0.125)	(0.0342)	(0.168)
Quantile 2	0.207*	0.166**	0.0220	0.319***
	(0.124)	(0.0798)	(0.0310)	(0.0863)
Quantile 3	0.232*	0.303***	0.0897***	0.737***
	(0.125)	(0.0737)	(0.0279)	(0.0892)
Quantile 4	0.390***	0.478***	0.171***	0.970***
	(0.128)	(0.0697)	(0.0232)	(0.123)
Quantile 5	0.756***	0.788***	0.523***	1.229***
	(0.132)	(0.0729)	(0.0300)	(0.121)
Quantile 6	1.471***	1.466***	1.129***	2.067***
	(0.145)	(0.114)	(0.0757)	(0.221)
p4p*Quantile 2	-0.0977	0.166	-0.0228	0.125
	(0.113)	(0.161)	(0.0387)	(0.162)
p4p*Quantile 3	-0.0782	0.0659	-0.0406	0.0289
	(0.125)	(0.113)	(0.0468)	(0.156)
p4p*Quantile 4	-0.0334	0.0622	-0.0380	0.222
	(0.113)	(0.114)	(0.0316)	(0.170)
p4p*Quantile 5	-0.162	0.0835	-0.149***	0.135
	(0.114)	(0.117)	(0.0329)	(0.172)
p4p*Quantile 6	-0.127	0.0187	-0.115	0.113
	(0.136)	(0.162)	(0.120)	(0.214)
Constant	0.686	-1.731	-1.822***	-1.313
	(1.163)	(2.484)	(0.665)	(3.659)
Covariates	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
Nursing Home FE	Yes	Yes	Yes	Yes
N	2606	2599	2606	2591
adj. R-squared	0.220	0.160	0.253	0.147

Robust standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01
Note: Nursing homes in quantile 1 (the omitted category) are farthest above the threshold and thus, the highest performers. The threshold is between quantiles 3 and 4. Nursing homes in quantile 6 are farthest below the threshold and thus, the lowest performers.

Appendix Table 4. Regression results comparing Georgia (using average performance in the state as the threshold in their P4P program) to Tennessee

	Pain	Pressure Sores	Restraints
p4p	0.278***	0.251***	0.0861
	(0.0720)	(0.0905)	(0.0576)
Quantile 2	-0.0836*	-0.107*	0.00696
	(0.0460)	(0.0644)	(0.0769)
Quantile 3	-0.118*	-0.185**	0.00261
	(0.0620)	(0.0765)	(0.0881)
Quantile 4	-0.0399	-0.230***	0.0515
	(0.0644)	(0.0810)	(0.0964)
Quantile 5	-0.116*	-0.398***	0.0613
	(0.0676)	(0.0837)	(0.103)
Quantile 6	-0.314***	-0.512***	0.0981
	(0.114)	(0.126)	(0.149)
p4p*Quantile 2	-0.122	-0.277***	-0.0471
	(0.0744)	(0.0977)	(0.0585)
p4p*Quantile 3	-0.267***	-0.251**	-0.0559
	(0.0871)	(0.115)	(0.0704)
p4p*Quantile 4	-0.292***	-0.469***	-0.130*
	(0.112)	(0.126)	(0.0717)
p4p*Quantile 5	-0.447***	-0.362***	-0.320***
	(0.0932)	(0.110)	(0.0619)
p4p*Quantile 6	-0.608***	-0.889***	-0.760***
	(0.184)	(0.151)	(0.108)
Constant	3.817	-5.505*	1.191
	(3.056)	(3.068)	(1.341)
Covariates	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes
Nursing Home FE	Yes	Yes	Yes
N	5140	5115	5140
adj. R-squared	0.114	0.092	0.086

Robust standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Note: Nursing homes in quantile 1 (the omitted category) are farthest above the threshold and thus, the highest performers. The threshold is between quantiles 3 and 4. Nursing homes in quantile 6 are farthest below the threshold and thus, the lowest performers.

Appendix Table 5. Regression results comparing Oklahoma (using thresholds based on median performance in their P4P program) to Arkansas

	Composite	Pressure Sores	Restraints	Falls	Catheter	Weight loss
p4p	0.590***	0.352***	0.462***	0.326**	0.122	0.265**
	(0.176)	(0.134)	(0.114)	(0.154)	(0.0963)	(0.108)
Quantile 2	-0.307**	-0.0303	0.00725	-0.132	-0.170**	0.0480
	(0.130)	(0.0828)	(0.0726)	(0.0813)	(0.0754)	(0.0901)
Quantile 3	-0.275*	-0.0173	0.110	-0.200**	-0.0348	-0.0110
	(0.147)	(0.0983)	(0.0877)	(0.0990)	(0.0862)	(0.106)
Quantile 4	-0.337**	-0.0666	0.0794	-0.252**	-0.133	0.0950
	(0.162)	(0.110)	(0.0913)	(0.0984)	(0.0878)	(0.120)
Quantile 5	-0.564***	-0.0798	-0.0378	-0.306***	-0.104	-0.0662
	(0.151)	(0.111)	(0.0926)	(0.0997)	(0.0920)	(0.138)
Quantile 6	-0.633***	-0.196	-0.0224	-0.358***	-0.0654	-0.121
	(0.170)	(0.138)	(0.112)	(0.114)	(0.101)	(0.138)
p4p*Quantile 2	-0.226	-0.301**	-0.233*	-0.140	0.0926	-0.0762
	(0.195)	(0.150)	(0.125)	(0.175)	(0.111)	(0.137)
p4p*Quantile 3	-0.427*	-0.169	-0.605***	-0.200	-0.142	0.0132
	(0.222)	(0.197)	(0.170)	(0.178)	(0.132)	(0.154)
p4p*Quantile 4	-0.929***	-0.477**	-0.390**	-0.245	-0.0159	-0.476***
	(0.221)	(0.197)	(0.155)	(0.218)	(0.129)	(0.159)
p4p*Quantile 5	-0.706***	-0.509***	-0.228*	-0.154	-0.229	-0.303*
	(0.188)	(0.159)	(0.132)	(0.177)	(0.144)	(0.155)
p4p*Quantile 6	-0.983***	-0.512***	-0.477***	-0.434**	-0.185	-0.356**
	(0.197)	(0.172)	(0.168)	(0.174)	(0.126)	(0.172)
Constant	1.160	0.775	-0.200	-0.529	1.797	-2.359
	(1.005)	(1.737)	(1.204)	(1.218)	(2.156)	(1.731)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Nursing Home FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4071	4064	4071	4045	4050	4067
adj. R-squared	0.178	0.022	0.206	0.022	0.119	0.035

Robust standard errors in parentheses

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Note: Nursing homes in quantile 1 (the omitted category) are farthest above the threshold and thus, the highest performers. The threshold is between quantiles 3 and 4. Nursing homes in quantile 6 are farthest below the threshold and thus, the lowest performers.

Appendix Table 6. Regression results using a false P4P implementation date (one year prior to the actual P4P implementation in each state).

	Pain	Pressure Sores	Restraints
False P4P indicator	-0.00899	0.191***	-0.0601**
	(0.0528)	(0.0536)	(0.0274)
Quantile 2	0.0400	-0.0182	0.101**
	(0.0668)	(0.0593)	(0.0450)
Quantile 3	0.117	0.0323	0.184***
	(0.0806)	(0.0706)	(0.0575)
Quantile 4	-0.00222	-0.0362	0.115**
	(0.0850)	(0.0698)	(0.0528)
Quantile 5	0.230**	-0.0338	0.177***
	(0.0931)	(0.0703)	(0.0574)
Quantile 6	0.730***	0.277***	0.401***
	(0.145)	(0.0914)	(0.0735)
False p4p*Quantile 2	-0.0107	-0.0497	-0.0113
	(0.0676)	(0.0679)	(0.0380)
False p4p*Quantile 3	-0.103	-0.115	-0.059
	(0.0743)	(0.0727)	(0.0511)
False p4p*Quantile 4	-0.163**	-0.227***	-0.156***
	(0.0674)	(0.0678)	(0.0456)
False p4p*Quantile 5	-0.124	-0.152	-0.020*
	(0.0621)	(0.0692)	(0.0103)
False p4p*Quantile 6	-0.198	-0.156	-0.114
	(0.0922)	(0.0826)	(0.0551)
Constant	3.396*	-0.455	-2.402**
	(1.929)	(1.257)	(1.069)
Covariates	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes
Nursing Home FE	Yes	Yes	Yes
N	7753	11808	11859
adj. R-squared	0.095	0.047	0.079

Robust standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01
Note: Nursing homes in quantile 1 (the omitted category) are farthest above the threshold and thus, the highest performers. The threshold is between quantiles 3 and 4. Nursing homes in quantile 6 are farthest below the threshold and thus, the lowest performers.