

Appendix 1

Health care utilization regression analyses

Milliman staff found that participation in the Denver Regional Accountable Health Community program was associated with significantly fewer emergency department visits than would have been expected without the intervention, and significantly more physician office visits than would have been expected without the intervention. Within the regression results illustrated in figures 1 and 2, the control trend variable represents the expected change in average utilization rates per 1,000 patients between the baseline period and the implementation period in the absence of the intervention, and the Westside variable represents the baseline difference in utilization rates

between cases and controls. However, there was no significant association between the intervention and changes in inpatient admissions over time, likely driven by the relatively low frequency with which inpatient care is sought on behalf of a pediatric population. These outcomes align with the theory that a screening and navigation program may decrease preventable use of emergency services and increase the use of lower-intensity preventive services and physician office visits.

Figure 1: Difference-in-differences regression results

Program year (January to December 2019)				
Response variable				
Emergency department visits				
Adjusted model (linear regression)				
Predictor variable	Estimate	p-value	Lower confidence limit	Upper confidence limit
Intercept	228.67	<0.0001	172.47	284.87
Ages 1-5 (base level)	0.00 (ref)			
Ages 6-10	-135.61	<0.0001	-188.06	-83.17
Ages 11-15	-129.79	<0.0001	-182.52	-77.06
Ages 16-plus	47.94	0.1695	-20.46	116.35
Female	0.00 (ref)			
Male	14.33	0.4706	-24.60	53.26
Baseline emergency department visits 0	0.00 (ref)			
Baseline emergency department visits (1-10)	2478.93	<0.0001	2415.73	2542.12
Baseline emergency department visits (11-plus)	10044.85	<0.0001	9750.59	10339.11
Westside patient (baseline difference between Westside and Peña)	-4.35	0.8768	-59.39	50.68
Time period of interest (control trend)				
Westside patient: time period of interest (intervention effect)	-160.30	0.0001	-238.13	-82.47

Figure 1: Difference-in-differences regression results (continued)

Program year (January to December 2019)				
Response variable				
Inpatient visits				
Adjusted model (linear regression)				
Predictor variable	Estimate	p-value	Lower confidence limit	Upper confidence limit
Intercept	55.05	<0.0001	46.25	63.85
Ages 1-5	0.00 (ref)			
Ages 6-10	41.58	<0.0001	-49.79	-33.37
Ages 11-15	-38.68	<0.0001	-46.94	-30.42
Ages 16-plus	-36.48	<0.0001	-47.19	-25.77
Female (base level)	0.00 (ref)			
Male	4.67	0.1331	-1.42	10.77
Baseline emergency department visits (zero)	0.00 (ref)			
Baseline emergency department visits (1-10)	28.43	<0.0001	18.54	38.33
Baseline emergency department visits (11-plus)	32.56	0.1661	-13.52	78.64
Westside patient (baseline difference between Westside and Peña)	-10.74	0.0146	-19.35	-2.12
Time period of interest (control trend)	-20.82	<0.0001	-29.43	-12.20
Westside patient: time period of interest (intervention effect)	6.81	0.2736	-5.38	19.00

Figure 1: Difference-in-differences regression results (continued)

Program year (January to December 2019)				
Response variable				
Planned physician office visits				
Adjusted model (linear regression)				
Predictor variable	Estimate	p-value	Lower confidence limit	Upper confidence limit
Intercept	1,641.45	<0.0001	1,581.67	1,701.24
Ages 1-5	0.00 (ref)			
Ages 6-10	-802.25	<0.0001	-858.04	-746.46
Ages 11-15	-785.62	<0.0001	-841.71	-729.53
Ages 16-plus	-844.20	<0.0001	-916.98	-771.43
Female (base level)	0.00 (ref)			
Male	16.06	0.4471	-25.35	57.48
Baseline emergency department visits (zero)	0.00 (ref)			
Baseline emergency department visits (1-10)	320.34	<0.0001	253.11	387.56
Baseline emergency department visits (11-plus)	686.84	<0.0001	373.80	999.87
Westside patient (baseline difference between Westside and Peña)	-395.19	<0.0001	-453.74	-336.65
Time period of interest (control trend)	-503.37	<0.0001	-561.92	-444.83
Westside patient: time period of interest (intervention effect)	232.87	<0.0001	150.07	315.66

Figure 1: Difference-in-differences regression results (continued)

Program year (January to December 2019)				
Response variable				
Unplanned physician office visits				
Adjusted model (linear regression)				
Predictor variable	Estimate	p-value	Lower confidence limit	Upper confidence limit
Intercept	3,372.81	<0.0001	3,172.47	3,573.15
Ages 1-5	0.00 (ref)			
Ages 6-10	-1063.76	<0.0001	-1250.71	-876.80
Ages 11-15	-1013.37	<0.0001	-1201.34	-825.40
Ages 16-plus	-460.89	0.0002	-704.75	-217.03
Female	0.00 (ref)			
Male	71.07	0.3155	-67.70	209.85
Baseline emergency department visits (zero)	0.00 (ref)			
Baseline emergency department visits (1-10)	2240.15	<0.0001	2,014.88	2,465.42
Baseline emergency department visits (11-plus)	4773.39	<0.0001	3,724.39	5,822.39
Westside patient (baseline difference between Westside and Peña)	-1,488.90	<0.0001	-1,685.09	-1,292.71
Time period of interest (control trend)	-1,145.25	<0.0001	-1,341.44	-949.06
Westside patient: time period of interest (intervention effect)	562.66	0.0001	285.20	840.11

Figure 1: Difference-in-differences regression results (continued)

Program year (January to December 2019)				
Response variable				
Emergency department visits				
Adjusted model (linear regression)				
Predictor variable	Estimate	p-value	Lower confidence limit	Upper confidence limit
Intercept	236.99	<0.0001	184.33	289.66
Ages 1-5	0.00 (ref)			
Ages 6-10	-135.05	<0.0001	-184.20	-85.90
Ages 11-15	-127.87	<0.0001	-177.29	-78.45
Ages 16-plus	92.05	0.0049	27.94	156.16
Female	0.00 (ref)			
Male	6.00	0.7473	-30.49	42.48
Baseline emergency department visits (zero)	0.00 (ref)			
Baseline emergency department visits (1-10)	2,327.24	<0.0001	2,268.02	2,386.47
Baseline emergency department visits (11-plus)	9,629.83	<0.0001	9,354.05	9,905.60
Westside patient (baseline difference between Westside and Peña)	3.37	0.8980	-48.21	54.95
Time period of interest (control trend)	216.17	<0.0001	164.59	267.74
Westside patient: time period of interest (intervention effect)	-210.00	<0.0001	-282.94	-137.06

Figure 1: Difference-in-differences regression results (continued)

Program year (January to December 2019)				
Response variable				
Inpatient visits				
Adjusted model (linear regression)				
Predictor variable	Estimate	p-value	Lower confidence limit	Upper confidence limit
Intercept	50.77	<0.0001	42.83	58.71
Ages 1-5	0.00 (ref)			
Ages 6-10	-39.71	<0.0001	-47.12	-32.30
Ages 11-15	-37.58	<0.0001	-45.03	-30.13
Ages 16-plus	-32.57	<0.0001	-42.23	-22.90
Female	0.00 (ref)			
Male	-1.14	0.6847	-6.64	4.36
Baseline emergency department visits (zero)	0.00 (ref)			
Baseline emergency department visits (1-10)	33.83	<0.0001	24.90	42.75
Baseline emergency department visits (11-plus)	40.32	0.0573	-1.25	81.90
Westside patient (baseline difference between Westside and Peña)	-5.60	0.1580	-13.38	2.17
Time period of interest (control trend)	-9.54	0.0161	-17.32	-1.77
Westside patient: time period of interest (intervention effect)	-2.20	0.6950	-13.20	8.80

Figure 1: Difference-in-differences regression results (continued)

Program year (January to December 2019)				
Response variable				
Preventive evaluation and management visits				
Adjusted model (linear regression)				
Predictor variable	Estimate	p-value	Lower confidence limit	Upper confidence limit
Intercept	1,485.32	<0.0001	1,430.60	1,540.05
Ages 1-5	0.00 (ref)			
Ages 6-10	-730.82	<0.0001	-781.89	-679.75
Ages 11-15	-707.68	<0.0001	-759.03	-656.33
Ages 16-plus	-806.23	<0.0001	-872.84	-739.62
Female	0.00 (ref)			
Male	48.03	0.0130	10.12	85.94
Baseline emergency department visits (zero)	0.00 (ref)			
Baseline emergency department visits (1-10)	300.83	<0.0001	239.29	362.36
Baseline emergency department visits (11-plus)	717.97	<0.0001	431.41	1004.52
Westside patient (baseline difference between Westside and Peña)	-304.93	<0.0001	-358.53	-251.34
Time period of interest (control trend)	-516.92	<0.0001	-570.51	-463.33
Westside patient: time period of interest (intervention effect)	218.12	<0.0001	142.33	293.91

Figure 1: Difference-in-differences regression results (continued)

Program year (January to December 2019)				
Response variable				
Non-preventive evaluation and management visits				
Adjusted model (linear regression)				
Predictor variable	Estimate	p-value	Lower confidence limit	Upper confidence limit
Intercept				
Ages 1-5	0.00 (ref)			
Ages 6-10	-880.54	<0.0001	-1027.31	-733.78
Ages 11-15	-744.05	<0.0001	-891.61	-596.50
Ages 16-plus	-236.52	0.0155	-427.95	-45.09
Female	0.00 (ref)			
Male	24.57	0.6585	-84.37	133.51
Baseline emergency department visits (zero)	0.00 (ref)			
Baseline emergency department visits (1-10)	2181.19	<0.0001	2,004.35	2,358.03
Baseline emergency department visits (11-plus)	5030.34	<0.0001	4,206.88	5,853.81
Westside patient (baseline difference between Westside and Peña)	-1,318.70	<0.0001	-1,472.71	-1,164.69
Time period of interest (control trend)	-984.60	<0.0001	-1,138.61	-830.59
Westside patient: time period of interest (intervention effect)	526.89	<0.0001	309.09	744.69



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