

Supplementary Material

Reduced healthcare resource utilization in patients with opioid use disorder in the 12 months after initiation of a prescription digital therapeutic

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Supplemental table 1. Clinician services in comparative cohort analyses in the 12 months after reSET-O initiation.

Procedure	Control cohort (N=978)		reSET-O cohort (N=901)		IRR	95% CI	p-value	Difference in visits (reSET-O – Control)
	Incidence	95% CI	Incidence N=901	95% CI				
E&M: Case management	0.900	(0.737, 1.098)	1.853	(1.511, 2.272)	2.06	(1.57, 2.71)	<0.001	789
Pathology and laboratory: Drug assay	5.085	(4.672, 5.534)	4.141	(3.784, 4.532)	0.81	(0.72, 0.92)	0.001	-1242
Medicine: Psychiatry	3.425	(3.012, 3.894)	4.214	(3.691, 4.812)	1.23	(1.02, 1.48)	0.029	447
E&M: Outpatient visits	15.660	(14.738, 16.640)	16.369	(15.367, 17.437)	1.05	(0.96, 1.14)	0.327	-567
Alcohol & drug abuse: Self-help/peer services	1.01	(0.775, 1.318)	1.405	(1.068, 1.848)	1.39	(0.94, 2.05)	0.095	278
E&M: Hospital inpatient services	0.854	(0.605, 1.204)	0.520	(0.361, 0.748)	0.61	(0.36, 1.03)	0.064	-367
Alcohol & drug abuse: Assessment	1.617	(1.155, 2.264)	1.949	(1.373, 2.765)	1.20	(0.74, 1.97)	0.459	175
Alcohol & drug abuse: Crisis intervention	0.014	(0.007, 0.028)	0.016	(0.007, 0.033)	1.13	(0.41, 3.12)	0.814	1
Alcohol & drug abuse: Treatment program	0.367	(0.196, 0.688)	0.637	(0.332, 1.222)	1.73	(0.68, 4.39)	0.245	215
E&M: Care plan oversight	0.925	(0.798, 1.071)	0.683	(0.582, 0.803)	0.74	(0.59, 0.92)	0.006	-289
Alcohol & drug abuse: Detox, inpatient	0.290	(0.114, 0.742)	0.085	(0.031, 0.235)	0.29	(0.07, 1.23)	0.093	-207
Alcohol & drug abuse: Behavioral health, residential treatment program	0.310	(0.277, 0.348)	0.113	(0.092, 0.137)	NA	NA	NA	-201
Surgery	1.013	(0.910, 1.127)	1.184	(1.062, 1.320)	1.17	(1.00, 1.36)	0.045	76
E&M: Partial hospitalization services	0.174	(0.149, 0.203)	0.003	(0.001, 0.011)	NA	NA	NA	-167
Pathology and laboratory: Drug assay, before opioid Rx	7.170	(6.662, 7.716)	7.331	(6.789, 7.915)	1.02	(0.92, 1.14)	0.684	-407
Pathology and laboratory: Other	3.239	(2.967, 3.534)	3.088	(2.817, 3.385)	0.95	(0.84, 1.08)	0.462	-385
Alcohol & drug abuse: Psychosocial services	0.416	(0.220, 0.787)	0.281	(0.144, 0.547)	0.67	(0.26, 1.74)	0.414	-154
Alcohol & drug abuse: Other	0.096	(0.078, 0.118)	0.200	(0.172, 0.232)	NA	NA	NA	86
Alcohol & drug abuse: Behavioral health	0.187	(0.148, 0.236)	0.287	(0.230, 0.359)	1.53	(1.12, 2.09)	0.007	76
Alcohol & drug abuse: Mental health, partial hospitalization	0.168	(0.144, 0.196)	0.072	(0.056, 0.092)	NA	NA	NA	-99
Medicine: Physical medicine and rehabilitation	0.288	(0.192, 0.432)	0.228	(0.148, 0.352)	0.79	(0.42, 1.48)	0.468	-76
E&M: Emergency department services	0.724	(0.649, 0.808)	0.665	(0.591, 0.747)	0.92	(0.78, 1.08)	0.295	-109

E&M: Digital, online, telephone management and consultative services	0.085	(0.068, 0.106)	0.142	(0.119, 0.169)	NA	NA	NA	45
E&M: Preventive medicine services	0.153	(0.128, 0.184)	0.210	(0.178, 0.249)	1.37	(1.08, 1.74)	0.009	40
Medicine: Therapeutic, prophylactic, and diagnostic injections and infusions	0.425	(0.365, 0.494)	0.370	(0.314, 0.436)	0.87	(0.70, 1.09)	0.231	-82
Alcohol & drug abuse: Community support services	0.030	(0.008, 0.106)	0.084	(0.024, 0.290)	2.81	(0.42, 18.65)	0.286	46
E&M: Critical care services	0.117	(0.072, 0.189)	0.065	(0.038, 0.111)	0.55	(0.26, 1.16)	0.118	-56
Medicine: Cardiovascular procedures	0.415	(0.356, 0.485)	0.367	(0.311, 0.433)	0.88	(0.71, 1.11)	0.284	-75
E&M: Counseling service	0.387	(0.307, 0.487)	0.342	(0.268, 0.436)	0.88	(0.64, 1.22)	0.453	-70
Medicine: Chiropractic manipulation	0.079	(0.038, 0.162)	0.121	(0.058, 0.249)	1.53	(0.49, 4.74)	0.461	32
Radiology	1.145	(1.021, 1.284)	1.103	(0.979, 1.244)	0.96	(0.82, 1.14)	0.660	-126
Medicine: Ophthalmology	0.083	(0.065, 0.106)	0.124	(0.100, 0.154)	1.50	(1.09, 2.05)	0.013	31
Ambulance	0.172	(0.141, 0.209)	0.134	(0.107, 0.167)	0.78	(0.58, 1.04)	0.089	-47
Medicine: Home health services	0.022	(0.008, 0.062)	0.051	(0.021, 0.126)	2.36	(0.51, 10.82)	0.271	24
Alcohol & drug abuse: Mental health	0.047	(0.031, 0.070)	0.072	(0.050, 0.104)	1.55	(0.91, 2.63)	0.106	19
E&M: Hospital observation services	0.116	(0.096, 0.140, 0.110)	0.094	(0.076, 0.117)	NA	NA	NA	-29
Medicine: Vascular diagnostic studies	0.072	(0.052, 0.100)	0.093	(0.068, 0.127)	1.29	(0.83, 2.00)	0.261	13
E&M: Consultations	0.134	(0.102, 0.174)	0.114	(0.085, 0.152)	0.85	(0.57, 1.26)	0.420	-28
Medicine: Pulmonary services	0.089	(0.067, 0.117)	0.069	(0.051, 0.095)	0.78	(0.52, 1.18)	0.242	-25
Anesthesia	0.113	(0.089, 0.143)	0.132	(0.104, 0.167)	1.17	(0.84, 1.62)	0.360	8
Drugs administered: Other	0.550	(0.481, 0.629)	0.569	(0.495, 0.653)	1.03	(0.85, 1.25)	0.738	-25
E&M: General behavioral health integration care management	0.021	(0.013, 0.035)	0.002	(0.001, 0.009)	0.11	(0.03, 0.45)	0.002	-19
Medicine: Neurology and neuromuscular procedures	0.020	(0.013, 0.032)	0.039	(0.026, 0.058)	1.91	(1.08, 3.38)	0.025	16
Medicine: Sleep studies	0.005	(0.002, 0.014)	0.018	(0.009, 0.035)	3.52	(1.08, 11.50)	0.037	11
Drugs administered: Buprenorphine	0.042	(0.029, 0.061)	0.054	(0.038, 0.077)	1.27	(0.76, 2.12)	0.361	8
E&M: Telephone services	0.014	(0.007, 0.026)	0.025	(0.015, 0.044)	1.8	(0.81, 4.03)	0.15	9
Drugs administered: Naloxone	0.013	(0.007, 0.022)	0.003	(0.001, 0.011)	NA	NA	NA	-10

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Supplementary Table 2. Incidence of facility services among Medicaid subpopulations over 12 months comparing patients using reSET-O vs. control.

Resource	Control cohort (N=640)			reSET-O cohort (N=666)			IRR	95% CI	p-value
	n (%)	Incidence	95% CI	n (%)	Incidence	95% CI			
Unique hospital encounters	303 (47.3%)	1.024	(0.908, 1.155)	276 (41.4%)	0.879	(0.778, 0.993)	0.86	(0.72, 1.02)	0.080
Inpatient stays	103 (16.1%)	0.203	(0.163, 0.253)	72 (10.8%)	0.138	(0.108, 0.176)	0.68	(0.49, 0.94)	0.018
ICU stays	22 (3.4%)	0.044	(0.027, 0.071)	17 (2.6%)	0.024	(0.014, 0.043)	0.55	(0.26, 1.15)	0.111
Readmissions	18 (2.8%)	0.020	(0.011, 0.035)	9 (1.4%)	0.010	(0.005, 0.021)	0.53	(0.22, 1.27)	0.153
Partial hospitalizations	5 (0.8%)	0.036	(0.023, 0.054)	1 (0.2%)	0.009	(0.004, 0.021)	NA	NA	NA
ED visits - not admitted	275 (43.0%)	0.785	(0.692, 0.891)	247 (37.1%)	0.715	(0.630, 0.812)	0.91	(0.76, 1.09)	0.304
HOPD visits - not admitted	12 (1.9%)	0.011	(0.005, 0.021)	8 (1.2%)	0.007	(0.003, 0.016)	0.64	(0.24, 1.70)	0.371
NA: not applicable									

Supplemental table 3. Clinician services in comparative cohort analyses among Medicaid subpopulations in the 12 months after reSET-O initiation.

	Control cohort (N=640)			reSET-O cohort (N=666)					
Procedure	n (%)	Incidence	95% CI	n (%)	Incidence	95% CI	IRR	95% CI	p-value
Alcohol & drug abuse: Assessment	108 (16.9%)	0.461	(0.321, 0.661)	125 (18.8%)	0.607	(0.438, 0.841)	1.32	(0.84, 2.07)	0.230
Alcohol & drug abuse: Behavioral health	116 (18.1%)	0.202	(0.159, 0.257)	144 (21.6%)	0.373	(0.302, 0.460)	1.84	(1.34, 2.53)	<0.001
Alcohol & drug abuse: Behavioral health, residential treatment program	8 (1.3%)	0.297	(0.257, 0.343)	4 (0.6%)	0.144	(0.118, 0.177)	NA	NA	NA
Alcohol & drug abuse: Community support services	8 (1.3%)	0.044	(0.011, 0.181)	10 (1.5%)	0.101	(0.028, 0.360)	2.30	(0.32, 16.4)	0.406
Alcohol & drug abuse: Crisis intervention	10 (1.6%)	0.011	(0.005, 0.024)	10 (1.5%)	0.014	(0.007, 0.029)	1.32	(0.47, 3.75)	0.601
Alcohol & drug abuse: Intervention	4 (0.6%)	0.037	(0.025, 0.056)	2 (0.3%)	0.020	(0.012, 0.035)	NA	NA	NA
Alcohol & drug abuse: Medication services	13 (2.0%)	0.172	(0.048, 0.618)	15 (2.3%)	0.206	(0.064, 0.665)	1.20	(0.17, 8.52)	0.858
Alcohol & drug abuse: Mental health	36 (5.6%)	0.078	(0.052, 0.117)	45 (6.8%)	0.107	(0.075, 0.154)	1.38	(0.81, 2.36)	0.241
Alcohol & drug abuse: Mental health, partial hospitalization	7 (1.1%)	0.112	(0.088, 0.142)	4 (0.6%)	0.094	(0.073, 0.121)	NA	NA	NA
Alcohol & drug abuse: Other	3 (0.5%)	0.146	(0.119, 0.179)	11 (1.7%)	0.270	(0.232, 0.313)	NA	NA	NA
Alcohol & drug abuse: Psychosocial services	33 (5.2%)	0.720	(0.371, 1.399)	33 (5.0%)	0.442	(0.230, 0.850)	0.61	(0.24, 1.58)	0.312
Alcohol & drug abuse: Self-help/peer services	116 (18.1%)	0.440	(0.333, 0.582)	176 (26.4%)	0.453	(0.342, 0.599)	1.03	(0.72, 1.48)	0.881
Alcohol & drug abuse: Skills training	1 (0.2%)	0.032	(0.021, 0.050)	2 (0.3%)	0.055	(0.039, 0.076)	NA	NA	NA
Alcohol & drug abuse: Treatment program	27 (4.2%)	0.462	(0.217, 0.984)	32 (4.8%)	0.877	(0.420, 1.833)	1.90	(0.63, 5.70)	0.252
Ambulance	93 (14.5%)	0.177	(0.141, 0.223)	80 (12.0%)	0.142	(0.112, 0.182)	0.80	(0.58, 1.12)	0.191
Anesthesia	51 (8.0%)	0.109	(0.082, 0.145)	71 (10.7%)	0.130	(0.100, 0.169)	1.19	(0.81, 1.75)	0.374
Drugs administered: Buprenorphine	18 (2.8%)	0.019	(0.010, 0.033)	29 (4.4%)	0.030	(0.019, 0.050)	1.64	(0.86, 3.11)	0.131
Drugs administered: Buprenorphine/Naloxone	1 (0.2%)	0.037	(0.025, 0.056)	2 (0.3%)	0.003	(0.001, 0.013)	NA	NA	NA
Drugs administered: Naloxone	7 (1.1%)	0.011	(0.005, 0.024)	3 (0.5%)	0.005	(0.002, 0.015)	NA	NA	NA
Drugs administered: Other	198 (30.9%)	0.603	(0.517, 0.703)	222 (33.3%)	0.634	(0.546, 0.736)	1.05	(0.85, 1.30)	0.646
E&M: Care plan oversight	188 (29.4%)	0.938	(0.783, 1.123)	135 (20.3%)	0.656	(0.544, 0.791)	0.70	(0.54, 0.91)	0.007
E&M: Case management	216 (33.8%)	1.919	(1.532, 2.404)	262 (39.3%)	3.796	(3.067, 4.697)	1.98	(1.43, 2.73)	<0.001
E&M: Consultations	61 (9.5%)	0.115	(0.083, 0.157)	54 (8.1%)	0.096	(0.069, 0.133)	0.84	(0.53, 1.33)	0.452
E&M: Coordinated care	9 (1.4%)	0.097	(0.076, 0.125)	4 (0.6%)	0.033	(0.021, 0.051)	NA	NA	NA
E&M: Counseling service	112 (17.5%)	0.649	(0.504, 0.836)	137 (20.6%)	0.651	(0.508, 0.834)	1.00	(0.71, 1.43)	0.985
E&M: COVID	7 (1.1%)	0.007	(0.003, 0.016)	13 (2.0%)	0.019	(0.011, 0.035)	2.84	(1.00, 8.00)	0.049
E&M: Critical care services	26 (4.1%)	0.144	(0.078, 0.266)	20 (3.0%)	0.070	(0.037, 0.134)	0.49	(0.19, 1.23)	0.127
E&M: Digital, online, telephone	31 (4.8%)	0.079d	(0.060, 0.105)d	54 (8.1%)	0.143d	(0.116, 0.175)d	NA	NA	NA

	Control cohort (N=640)			reSET-O cohort (N=666)					
Procedure	n (%)	Incidence	95% CI	n (%)	Incidence	95% CI	IRR	95% CI	p-value
management and consultative services									
E&M: Digital services	14 (2.2%)	0.037d	(0.025, 0.056)d	23 (3.5%)	0.050d	(0.036, 0.071)d	NA	NA	NA
E&M: Electronic medication compliance management	8 (1.3%)	0.015d	(0.008, 0.028)d	178 (26.7%)	0.317d	(0.276, 0.364)d	NA	NA	NA
E&M: Emergency department services	283 (44.2%)	0.876	(0.775, 0.992)	263 (39.5%)	0.795	(0.702, 0.900)	0.91	(0.76, 1.08)	0.275
E&M: General behavioral health integration care management	16 (2.5%)	0.033	(0.019, 0.056)	16 (2.4%)	0.004	(0.001, 0.015)	0.13	(0.03, 0.48)	0.002
E&M: Hospital inpatient services	85 (13.3%)	1.083	(0.712, 1.648)	62 (9.3%)	0.579	(0.382, 0.878)	0.53	(0.29, 1.00)	0.050
E&M: Hospital observation services	35 (5.5%)	0.081	(0.053, 0.124)	35 (5.3%)	0.066	(0.042, 0.102)	0.81	(0.43, 1.51)	0.511
E&M: Nursing facility services	1 (0.2%)	0.031d	(0.020, 0.048)d	1 (0.2%)	0.008d	(0.003, 0.019)d	NA	NA	NA
E&M: Other evaluation and management services	14 (2.2%)	0.028	(0.017, 0.047)	7 (1.1%)	0.010	(0.005, 0.020)	0.34	(0.16, 0.76)	0.008
E&M: Outpatient visits	561 (87.7%)	18.76	(17.54, 20.05)	599 (89.9%)	20.79	(19.47, 22.19)	1.11	(1.01, 1.22)	0.033
E&M: Partial hospitalization services	2 (0.3%)	0.016d	(0.009, 0.030)d	0 (0.0%)	0.000e	(0.000, 0.005)e	NA	NA	NA
E&M: Preventive medicine services	109 (17.0%)	0.184	(0.149, 0.227)	138 (20.7%)	0.258	(0.215, 0.310)	1.40	(1.07, 1.84)	0.015
E&M: Prolonged services	8 (1.3%)	0.034d	(0.022, 0.052)d	10 (1.5%)	0.052d	(0.037, 0.073)d	NA	NA	NA
E&M: Psychiatric services, intensive	10 (1.6%)	0.023	(0.007, 0.073)	3 (0.5%)	0.005	(0.001, 0.023)	0.22	(0.03, 1.52)	0.125
E&M: Telephone services	10 (1.6%)	0.018	(0.009, 0.036)	17 (2.6%)	0.033	(0.019, 0.058)	1.82	(0.74, 4.46)	0.189
Medicine: Cardiovascular procedures	165 (25.8%)	0.504	(0.420, 0.605)	160 (24.0%)	0.470	(0.392, 0.564)	0.93	(0.72, 1.21)	0.595
Medicine: Chemotherapy	3 (0.5%)	0.024d	(0.015, 0.040)d	1 (0.2%)	0.014d	(0.007, 0.027)d	NA	NA	NA
Medicine: Chiropractic manipulation	11 (1.7%)	0.073	(0.024, 0.218)	16 (2.4%)	0.120	(0.042, 0.344)	1.65	(0.29, 9.48)	0.573
Medicine: Home health services	11 (1.7%)	0.024	(0.007, 0.079)	13 (2.0%)	0.104	(0.036, 0.300)	4.31	(0.69, 26.8)	0.118
Medicine: Immunization	77 (12.0%)	0.139	(0.110, 0.176)	90 (13.5%)	0.161	(0.130, 0.200)	1.16	(0.84, 1.58)	0.367
Medicine: Immunology	2 (0.3%)	0.011d	(0.005, 0.024)d	2 (0.3%)	0.008d	(0.003, 0.019)d	NA	NA	NA
Medicine: Medical nutrition therapy	4 (0.6%)	0.012	(0.004, 0.036)	8 (1.2%)	0.016	(0.006, 0.046)	1.37	(0.29, 6.46)	0.688
Medicine: Neurology and neuromuscular procedures	16 (2.5%)	0.024	(0.014, 0.040)	38 (5.7%)	0.048	(0.033, 0.071)	2.02	(1.08, 3.78)	0.027
Medicine: Nonphysician online and telephone services	3 (0.5%)	0.005d	(0.002, 0.015)d	5 (0.8%)	0.035d	(0.023, 0.052)d	NA	NA	NA
Medicine: Ophthalmology	59 (9.2%)	0.074	(0.057, 0.096)	82 (12.3%)	0.090	(0.071, 0.114)	1.22	(0.87, 1.70)	0.252
Medicine: Other	123 (19.2%)	0.302	(0.243, 0.375)	119 (17.9%)	0.348	(0.283, 0.427)	1.15	(0.86, 1.55)	0.352
Medicine: Physical medicine and rehabilitation	35 (5.5%)	0.215	(0.122, 0.378)	40 (6.0%)	0.250	(0.145, 0.432)	1.16	(0.50, 2.73)	0.730
Medicine: Psychiatry	324 (50.6%)	5.370	(4.680, 6.161)	389 (58.4%)	6.398	(5.599, 7.311)	1.19	(0.98, 1.45)	0.076
Medicine: Pulmonary services	52 (8.1%)	0.076	(0.056, 0.104)	46 (6.9%)	0.065	(0.047, 0.089)	0.85	(0.55, 1.32)	0.471
Medicine: Sleep studies	2 (0.3%)	0.006	(0.002, 0.018)	11 (1.7%)	0.018	(0.009, 0.038)	2.98	(0.80, 11.1)	0.103
Medicine: Therapeutic, prophylactic, and diagnostic injections and infusions	162 (25.3%)	0.465	(0.391, 0.552)	171 (25.7%)	0.431	(0.363, 0.512)	0.93	(0.73, 1.18)	0.550
Medicine: Vascular diagnostic studies	42 (6.6%)	0.064	(0.045, 0.091)	40 (6.0%)	0.054	(0.038, 0.078)	0.85	(0.52, 1.41)	0.537

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