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Supplementary Material

Article Title: Machine Learning Prediction of Suicide Risk Does Not Identify Patients Without Traditional Risk Factor

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List of Supplementary Material for the article

1. [Table 1](#) Characteristics of patients among visits by individuals without health system's insurance plans or complete suicide event data in the 90-days following the visit
2. [Table 2](#) Count and percentage of mental health specialty visits with history of traditional risk factors in lower strata
3. [Table 3](#) Count and percentage of general medical visits with history of traditional risk factors in lower percentile strata
4. [Table 4](#) Count and percentage of mental health specialty with a prior history of traditional risk factors in all risk strata for patients with sex listed as female
5. [Table 5](#) Count and percentage of general medical visits with a prior history of traditional risk factors in all risk strata for patients with sex listed as female
6. [Table 6](#) Count and percentage of general medical visits with a prior history of traditional risk factors in all risk strata for patients with sex listed as female
7. [Table 7](#) Count and percentage of general medical visits with a prior history of traditional risk factors in all risk strata for patients with sex listed as male
8. [Table 8](#) Count and percentage of mental health specialty visits with a prior history of traditional risk factors in all strata. Restricted to visits with a PHQ-9 item 9 response in the prior 12 months
9. [Table 9](#) Count and percentage of general medical visits with a prior history of traditional risk factors in all strata. Restricted to visits with a PHQ-9 item 9 response in the prior 12 months



THE JOURNAL OF CLINICAL PSYCHIATRY

THE OFFICIAL JOURNAL OF THE AMERICAN SOCIETY OF CLINICAL PSYCHOPHARMACOLOGY

months

10. [Table 10](#) Count and percentage of mental health specialty visits with a recorded PHQ9 total score at that visit that had a total score greater than or equal to 20
11. [Table 11](#) Count and percentage of general medical visits with a recorded PHQ9 total score at that visit that had a total score greater than or equal to 20
12. [Table 12](#) Distribution of absolute predicted risk by sample
13. [Figure 1](#) Percentage of mental health specialty visits with each risk factor across the full range of predicted risk scores using strata of size 5 percentiles for visits with a prior PHQ9 item 9 response in the last year
14. [Figure 2](#) Percentage of general medical visits with each risk factor across the full range of predicted risk scores using strata of size 5 percentiles for visits with a prior PHQ9 item 9 response in the last year

Disclaimer

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Supplementary Table 1. Characteristics of patients among visits by individuals without health system's insurance plans or complete suicide event data in the 90-days following the visit.				
	Mental Health Sample		General Medical Sample	
Characteristic	N	%	N	%
Sex				
Female	68782	61	42648	57
Male	43638	39	32134	43
Other	1	0.001	5	0.007
Unknown	0	0	103	0.138
Race				
Asian	5272	5	2735	4
Black	11256	10	5760	8
Hawaiian / Pacific Islander	668	0.594	464	0.620
Native American	500	0.445	508	0.678
White	60343	54	47308	63
More than one or Other	3493	3	2625	4
Unknown	30889	27	15490	21
Ethnicity				
Hispanic	28077	25	12343	16
Insurance Type				
Commercial	56228	50	25878	35
Medicaid	4293	4	3667	5
Medicare	4539	4	9890	13
Other	47361	42	35455	47
Age				
11-17	8811	8	3066	4
18-29	32702	29	15662	21
30-44	35020	31	17996	24
45-64	29744	26	22511	30
65 or older	6144	5	15655	21
Prior Enrollment				
3 Months or More	78570	70	42584	57
1 Year or More	60053	53	32943	44
5 Years or More	10951	10	7742	10
PHQ-9 item 9 at				
Index Visit	76339	68	63666	85
Any Visit in Prior 3 Months	55159	49	8988	12
Any Visit in Prior Year	43577	39	15998	21
Visits Followed by a				
Suicide Attempt w/in 90 Days	103	0.092	77	0.103
Suicide Death w/in 90 Days	0	0	0	0
Similar percentages of patient characteristics to Table 1 with slight differences for unknown race, commercial and Medicare insurance, age 18-44, emergency department visits, and PHQ-9 item 9's.				

Supplementary Table 2. Count and percentage of mental health specialty visits with history of traditional risk factors in lower strata.												
	Attempt						Death					
	Last 3 months		Last 12 months		Last 5 years		Last 3 months		Last 12 months		Last 5 years	
	N	%	N	%	N	%	N	%	N	%	N	%
Risk Score Less than the 25th Percentile												
Diagnosis of probable self-harm	0	0	0	0	8	0	4826	0	11872	0	59061	2
ED ^a visit with MH ^b diagnosis	38257	1	148571	4	529761	14	94698	3	284538	8	755245	22
Hospitalization with MH ^b diagnosis	12245	0	51633	1	314180	8	41563	1	125228	4	336346	10
Any of the above diagnoses	48301	1	183699	5	682546	18	126818	4	355947	10	874960	25
Risk Score between the 25th and 50th Percentile												
Diagnosis of probable self-harm	2	0	40	0	1298	0	8802	0	20276	1	67455	2
ED ^a visit with MH ^b diagnosis	147692	4	398002	10	934838	25	150179	4	375253	11	868861	25
Hospitalization with MH ^b diagnosis	50733	1	167316	4	530314	14	70301	2	193203	6	527541	15
Any of the above diagnoses	181406	5	489804	13	1136072	30	190075	5	469287	13	1052040	30
Risk Score between the 50th and 75th Percentile												
Diagnosis of probable self-harm	224	0	1910	0	19069	1	16132	0	35723	1	102262	3
ED ^a visit with MH ^b diagnosis	358138	9	759654	20	1361381	36	264781	8	617751	18	1144295	33
Hospitalization with MH ^b diagnosis	160337	4	393060	10	826680	22	151679	4	379721	11	806952	23
Any of the above diagnoses	442413	12	932316	24	1604704	42	348543	10	780458	22	1380641	40
Risk Score between the 75th and 90th Percentile												
Diagnosis of probable self-harm	3258	0	14518	1	87173	4	24970	1	51633	2	106129	5
ED ^a visit with MH ^b diagnosis	434230	19	790574	35	1184448	52	366540	17	680290	32	973538	46
Hospitalization with MH ^b diagnosis	261978	11	509180	22	832028	36	225796	11	458191	22	765747	37
Any of the above diagnoses	539381	24	955914	42	1355270	59	462127	22	828774	40	1150454	55
^a Emergency Department												
^b Mental Health												

Supplementary Table 3. Count and percentage of general medical visits with history of traditional risk factors in lower percentile strata.												
	Attempt						Death					
	Last 3 months		Last 12 months		Last 5 years		Last 3 months		Last 12 months		Last 5 years	
	N	%	N	%	N	%	N	%	N	%	N	%
Risk Score Less than the 25th Percentile												
Diagnosis of probable self-harm	0	0	0	0	0	0	393	0	1629	0	6013	0
ED ^a visit with MH ^b diagnosis	20523	1	79651	3	355637	13	60474	3	201485	9	502494	21
Hospitalization with MH ^b diagnosis	6963	0	25367	1	170281	6	23746	1	81585	3	276413	12
Any of the above diagnoses	27014	1	99214	4	440485	17	76992	3	239370	10	600648	25
Risk Score between the 25th and 50th Percentile												
Diagnosis of probable self-harm	0	0	0	0	1	0	945	0	2725	0	8751	0
ED ^a visit with MH ^b diagnosis	83352	3	221954	8	560340	21	87918	4	251919	10	581320	23
Hospitalization with MH ^b diagnosis	36421	1	107152	4	351688	13	43682	2	124552	5	382448	15
Any of the above diagnoses	111333	4	289242	11	716655	27	113583	5	312442	12	726381	29
Risk Score between the 50th and 75th Percentile												
Diagnosis of probable self-harm	0	0	0	0	642	0	2406	0	7471	0	21784	1
ED ^a visit with MH ^b diagnosis	214635	8	451150	17	832577	32	169846	7	389255	16	725287	30
Hospitalization with MH ^b diagnosis	109960	4	257427	10	567681	22	98552	4	248158	10	517134	21
Any of the above diagnoses	277345	11	575416	22	1033136	39	235407	10	510797	21	902408	37
Risk Score between the 75th and 90th Percentile												
Diagnosis of probable self-harm	3	0	294	0	15409	1	4527	0	12006	1	33888	2
ED ^a visit with MH ^b diagnosis	258833	16	475405	30	734687	46	212068	15	356386	24	552423	38
Hospitalization with MH ^b diagnosis	146318	9	294909	19	523971	33	122384	8	241689	17	414334	28
Any of the above diagnoses	324427	20	581892	37	868330	55	267589	18	445079	31	667995	46

^a Emergency Department												
^b Mental Health												
Supplementary Table 4. Count and percentage of mental health specialty with a prior history of traditional risk factors in all risk strata for patients with sex listed as female.												
	Attempt						Death					
	Last 3 months		Last 12 months		Last 5 years		Last 3 months		Last 12 months		Last 5 years	
	N	%	N	%	N	%	N	%	N	%	N	%
Risk Score Less than the 25th Percentile												
Diagnosis of probable self-harm	0	0	0	0	7	0	3336	0	8208	0	42305	2
ED ^a visit with MH ^b diagnosis	25327	1	100654	4	362931	15	60691	3	191261	9	506983	23
Hospitalization with MH ^b diagnosis	6888	0	32101	1	209335	9	26626	1	83737	4	235733	11
Any of the above diagnoses	30945	1	122782	5	465897	19	80842	4	241008	11	593055	27
Risk Score between the 25th and 50th Percentile												
Diagnosis of probable self-harm	0	0	37	0	802	0	5487	0	12372	1	39380	2
ED ^a visit with MH ^b diagnosis	95492	4	263690	11	631987	26	89657	4	219004	10	527392	24
Hospitalization with MH ^b diagnosis	29182	1	105521	4	357594	15	39581	2	107447	5	280346	13
Any of the above diagnoses	115369	5	323541	13	772712	32	115473	5	271727	12	623315	28
Risk Score between the 50th and 75th Percentile												
Diagnosis of probable self-harm	144	0	1004	0	12131	0	10291	0	22861	1	66227	3
ED ^a visit with MH ^b diagnosis	222774	9	486707	20	888640	37	143815	6	357044	16	718113	32
Hospitalization with MH ^b diagnosis	94331	4	248255	10	546820	22	79740	4	215217	10	522520	24
Any of the above diagnoses	274730	11	601661	25	1054632	43	186600	8	457549	21	890081	40
Risk Score between the 75th and 90th Percentile												
Diagnosis of probable self-harm	2020	0	9337	1	60790	4	16651	1	34387	3	77543	6
ED ^a visit with MH ^b diagnosis	259003	18	482034	33	732833	50	229987	17	458058	34	670328	50
Hospitalization with MH ^b diagnosis	152049	10	308477	21	516696	35	133798	10	300924	23	533795	40
Any of the above diagnoses	322104	22	585566	40	838639	57	294584	22	566031	42	799311	60
Risk Score between the 90th and 95th Percentile												
Diagnosis of probable self-harm	7949	2	27702	6	84983	17	14391	3	29337	7	47041	11
ED ^a visit with MH ^b diagnosis	142182	29	250346	51	334939	69	155055	35	241943	54	282941	64
Hospitalization with MH ^b diagnosis	103617	21	192401	40	273952	56	102451	23	176710	40	234644	53
Any of the above diagnoses	180025	37	305861	63	380819	78	187620	42	280622	63	319479	72
Risk Score between the 95th and 98th Percentile												
Diagnosis of probable self-harm	31894	11	76186	26	131014	45	19040	7	41716	16	50518	19
ED ^a visit with MH ^b diagnosis	126472	43	213265	73	250323	86	126127	47	174396	65	191226	72
Hospitalization with MH ^b diagnosis	108630	37	191692	66	231058	79	97175	36	143770	54	166406	62
Any of the above diagnoses	161991	56	255620	88	279802	96	146919	55	195676	73	210867	79
Risk Score greater than or equal to the 98th Percentile												
Diagnosis of probable self-harm	89128	46	137976	71	163201	84	52149	29	81667	46	84471	48
ED ^a visit with MH ^b diagnosis	131364	68	176975	91	185323	95	112241	63	142367	80	148886	84
Hospitalization with MH ^b diagnosis	123125	63	171826	88	180387	93	101129	57	131488	74	141424	80
Any of the above diagnoses	153431	79	191879	99	194155	100	127243	72	154889	87	160065	90
^a Emergency Department												
^b Mental Health												

Supplementary Table 5. Count and percentage of mental health specialty with a prior history of traditional risk factors in all risk strata for patients with sex listed as male.												
	Attempt						Death					
	Last 3 months		Last 12 months		Last 5 years		Last 3 months		Last 12 months		Last 5 years	
	N	%	N	%	N	%	N	%	N	%	N	%
Risk Score Less than the 25th Percentile												
Diagnosis of probable self-harm	0	0	0	0	1	0	749	0	1828	0	14112	1
ED ^a visit with MH ^b diagnosis	12801	1	47841	3	167333	12	28667	2	86797	7	229617	18
Hospitalization with MH ^b diagnosis	5206	0	19518	1	105025	8	12130	1	36066	3	103253	8
Any of the above diagnoses	17128	1	60869	4	217367	16	37054	3	106759	8	265130	21
Risk Score between the 25th and 50th Percentile												
Diagnosis of probable self-harm	2	0	10	0	503	0	1722	0	4252	0	16547	1
ED ^a visit with MH ^b diagnosis	52437	4	135011	10	303848	22	46890	4	117715	9	279753	22
Hospitalization with MH ^b diagnosis	21434	2	61878	4	174088	13	25396	2	62871	5	143665	11
Any of the above diagnoses	66301	5	167276	12	365360	26	63596	5	145684	11	325261	26
Risk Score between the 50th and 75th Percentile												
Diagnosis of probable self-harm	76	0	836	0	7132	1	3072	0	6890	1	26166	2
ED ^a visit with MH ^b diagnosis	134330	10	272615	20	473287	34	86056	7	199488	16	385807	30
Hospitalization with MH ^b diagnosis	65279	5	144688	10	280818	20	50582	4	119018	9	275101	22
Any of the above diagnoses	166624	12	330495	24	550439	40	110711	9	250493	20	467566	37
Risk Score between the 75th and 90th Percentile												
Diagnosis of probable self-harm	1155	0	4982	1	26935	3	5904	1	12908	2	30987	4
ED ^a visit with MH ^b diagnosis	169673	20	299464	36	441550	53	154130	20	287795	38	392457	51
Hospitalization with MH ^b diagnosis	105821	13	193144	23	305354	37	93840	12	196367	26	310215	41
Any of the above diagnoses	210746	25	359173	43	503782	61	199549	26	356438	47	467952	61
Risk Score between the 90th and 95th Percentile												
Diagnosis of probable self-harm	3371	1	11465	4	33973	12	5614	2	12561	5	19528	8
ED ^a visit with MH ^b diagnosis	105433	38	169634	61	213699	77	108059	42	157384	62	177175	70
Hospitalization with MH ^b diagnosis	78998	29	134356	49	176817	64	75642	30	118963	47	147198	58
Any of the above diagnoses	129923	47	202147	73	240858	87	130389	51	181817	71	199738	78
Risk Score between the 95th and 98th Percentile												
Diagnosis of probable self-harm	10602	6	26572	16	47134	28	8527	6	18699	12	22487	15
ED ^a visit with MH ^b diagnosis	85195	51	130227	79	148112	89	92638	61	119095	78	125453	82
Hospitalization with MH ^b diagnosis	74249	45	119017	72	136709	83	76037	50	103648	68	114733	75
Any of the above diagnoses	103879	63	150102	91	160953	97	106112	69	132077	86	137195	90
Risk Score greater than or equal to the 98th Percentile												
Diagnosis of probable self-harm	40968	37	63567	58	76316	69	28096	28	43449	43	44545	44
ED ^a visit with MH ^b diagnosis	79856	72	102311	93	105943	96	76693	75	91354	90	93033	91
Hospitalization with MH ^b diagnosis	75321	68	99721	90	104144	94	71930	71	87666	86	91055	89
Any of the above diagnoses	90690	82	109094	99	110083	100	85620	84	97865	96	98880	97
a Emergency Department b Mental Health												

Supplementary Table 6. Count and percentage of general medical visits with a prior history of traditional risk factors in all risk strata for patients with sex listed as female.

	Attempt						Death					
	Last 3 months		Last 12 months		Last 5 years		Last 3 months		Last 12 months		Last 5 years	
	N	%	N	%	N	%	N	%	N	%	N	%
Risk Score Less than the 25th Percentile												
Diagnosis of probable self-harm	0	0	0	0	0	0	240	0	1056	0	4036	0
ED ^a visit with MH ^b diagnosis	12933	1	51279	3	235258	14	41329	3	143439	9	356073	23
Hospitalization with MH ^b diagnosis	4211	0	15650	1	108330	7	14793	1	54942	4	190668	13
Any of the above diagnoses	16879	1	63440	4	289203	17	51927	3	168748	11	421334	28
Risk Score between the 25th and 50th Percentile												
Diagnosis of probable self-harm	0	0	0	0	1	0	449	0	1486	0	5072	0
ED ^a visit with MH ^b diagnosis	53810	3	145348	9	374478	23	51954	3	132503	9	310625	20
Hospitalization with MH ^b diagnosis	22220	1	67166	4	230273	14	25112	2	64122	4	206941	14
Any of the above diagnoses	70897	4	187668	11	477324	29	67692	4	164514	11	393349	26
Risk Score between the 50th and 75th Percentile												
Diagnosis of probable self-harm	0	0	0	0	428	0	752	0	2205	0	6986	0
ED ^a visit with MH ^b diagnosis	133723	8	288721	17	545054	33	56171	4	175791	12	394337	26
Hospitalization with MH ^b diagnosis	65670	4	160250	10	367377	22	32469	2	101976	7	269238	18
Any of the above diagnoses	171603	10	367083	22	675801	41	75031	5	226828	15	496231	33
Risk Score between the 75th and 90th Percentile												
Diagnosis of probable self-harm	2	0	197	0	9893	1	1706	0	5487	1	14826	2
ED ^a visit with MH ^b diagnosis	150553	15	284603	29	449698	45	108910	12	230612	25	398991	44
Hospitalization with MH ^b diagnosis	83051	8	173944	17	320647	32	63410	7	153177	17	291812	32
Any of the above diagnoses	189274	19	350382	35	535274	54	153093	17	306249	34	493170	54
Risk Score between the 90th and 95th Percentile												
Diagnosis of probable self-harm	100	0	1677	1	20180	6	2249	1	5834	2	17504	6
ED ^a visit with MH ^b diagnosis	78932	24	139827	42	201892	61	105537	35	151884	50	199855	66
Hospitalization with MH ^b diagnosis	45185	14	89928	27	154281	46	57802	19	106431	35	154666	51
Any of the above diagnoses	96660	29	167294	50	231306	70	131180	43	188018	62	233075	77
Risk Score between the 95th and 98th Percentile												
Diagnosis of probable self-harm	1010	1	6735	3	29988	15	3252	2	8533	5	21877	12
ED ^a visit with MH ^b diagnosis	60194	30	102730	52	136753	69	86671	47	108806	60	129951	71
Hospitalization with MH ^b diagnosis	37017	19	71772	36	112829	57	53360	29	80619	44	105369	58
Any of the above diagnoses	73395	37	121361	61	151816	76	100252	55	124159	68	143019	78
Risk Score greater than or equal to the 98th Percentile												
Diagnosis of probable self-harm	22271	17	44663	34	65407	49	13701	11	25422	21	45430	37
ED ^a visit with MH ^b diagnosis	68360	51	102495	77	114319	86	71455	59	85850	71	97691	80
Hospitalization with MH ^b diagnosis	50943	38	85231	64	103532	78	53969	44	74196	61	88425	73
Any of the above diagnoses	82130	62	116071	87	123864	93	79936	66	94928	78	104494	86
a Emergency Department												
b Mental Health												

Supplementary Table 7. Count and percentage of general medical visits with a prior history of traditional risk factors in all risk strata for patients with sex listed as male.												
	Attempt						Death					
	Last 3 months		Last 12 months		Last 5 years		Last 3 months		Last 12 months		Last 5 years	
	N	%	N	%	N	%	N	%	N	%	N	%
Risk Score Less than the 25th Percentile												
Diagnosis of probable self-harm	0	0	0	0	0	0	210	0	574	0	1971	0
Emerg. dept. visit with MH diagnosis	6811	1	25682	3	113155	12	24838	3	79258	9	186283	21
Hospitalization with MH diagnosis	2493	0	8540	1	57878	6	11169	1	34440	4	106152	12
Any of the above diagnoses	9143	1	32223	3	141871	15	32029	4	94405	10	221490	24
Risk Score between the 25th and 50th Percentile												
Diagnosis of probable self-harm	0	0	0	0	0	0	235	0	646	0	2206	0
Emerg. dept. visit with MH diagnosis	28256	3	73791	8	180661	18	29002	3	70840	8	150361	17
Hospitalization with MH diagnosis	13716	1	38924	4	118265	12	15179	2	37434	4	101426	11
Any of the above diagnoses	38761	4	98234	10	233685	24	38303	4	88726	10	190418	21
Risk Score between the 50th and 75th Percentile												
Diagnosis of probable self-harm	0	0	0	0	112	0	625	0	1701	0	4591	0
Emerg. dept. visit with MH diagnosis	84908	9	169973	17	302346	31	47940	5	120626	13	237053	26
Hospitalization with MH diagnosis	46315	5	101104	10	208823	21	29232	3	74538	8	168327	18
Any of the above diagnoses	110871	11	217670	22	374671	38	64717	7	155563	17	298833	32
Risk Score between the 75th and 90th Percentile												
Diagnosis of probable self-harm	0	0	69	0	5023	1	1259	0	3521	1	10045	2
Emerg. dept. visit with MH diagnosis	106689	18	188421	32	280924	48	82095	15	152477	28	243752	45
Hospitalization with MH diagnosis	62912	11	120072	20	200864	34	51983	10	107917	20	186514	34
Any of the above diagnoses	133445	23	228800	39	328815	56	112778	21	200355	37	301078	55
Risk Score between the 90th and 95th Percentile												
Diagnosis of probable self-harm	26	0	1070	1	11820	6	1508	1	4159	2	10338	6
Emerg. dept. visit with MH diagnosis	53986	28	89558	46	123811	63	68851	38	97424	54	122650	68
Hospitalization with MH diagnosis	34671	18	61912	32	96399	49	44810	25	73163	40	98214	54
Any of the above diagnoses	66215	34	106604	55	143113	73	87381	48	119100	66	142001	78
Risk Score between the 95th and 98th Percentile												
Diagnosis of probable self-harm	742	1	4337	4	17074	15	2627	2	6452	6	13239	12
Emerg. dept. visit with MH diagnosis	46141	39	72863	62	91676	78	57965	53	70520	65	80332	74
Hospitalization with MH diagnosis	33027	28	54884	47	77174	66	40505	37	56092	52	67854	62
Any of the above diagnoses	56784	48	85563	73	102481	87	67529	62	79788	73	88193	81
Risk Score greater than or equal to the 98th Percentile												
Diagnosis of probable self-harm	13876	18	26857	34	37425	48	8193	11	14540	20	24043	33
Emerg. dept. visit with MH diagnosis	48219	62	66452	85	71325	91	48476	67	55069	76	60502	83
Hospitalization with MH diagnosis	38094	49	57658	74	65976	84	38683	53	49059	68	55319	76
Any of the above diagnoses	56917	73	73582	94	76168	97	52967	73	59313	82	63659	88
a Emergency Department b Mental Health												

Supplementary Table 8. Count and percentage of mental health specialty visits with a prior history of traditional risk factors in all strata. Restricted to visits with a PHQ-9 item 9 response in the prior 12 months.												
Mental Health Sample												
	Attempt						Death					
	Last 3 months		Last 12 months		Last 5 years		Last 3 months		Last 12 months		Last 5 years	
	N	%	N	%	N	%	N	%	N	%	N	%
Risk Score Less than the 25th Percentile												
Diagnosis of probable self-harm	0	0	0	0	8	0	1490	0	3869	1	18196	2
ED ^a visit with MH ^b diagnosis	14239	1	55084	5	171933	17	25841	3	77449	10	196271	26
Hospitalization with MH ^b diagnosis	3686	0	17748	2	101951	10	8679	1	29992	4	84728	11
Any of the above diagnoses	17550	2	69007	7	228335	22	32674	4	95950	12	229467	30
PHQ9 ^c item 9 response 2 or 3	15903	2	34085	3			72614	9	120040	16		
Any of the above	33256	3	101075	10	228335	22	98940	13	192221	25	229467	30
Risk Score between the 25th and 50th Percentile												
Diagnosis of probable self-harm	0	0	27	0	790	0	2106	0	5351	1	19565	3
ED ^a visit with MH ^b diagnosis	50912	5	135877	13	288744	28	34918	5	97175	13	212099	28
Hospitalization with MH ^b diagnosis	15394	1	54061	5	162217	16	14683	2	49467	6	136891	18
Any of the above diagnoses	62467	6	169265	16	356322	35	44436	6	124631	16	266965	35
PHQ9 ^c item 9 response 2 or 3	60404	6	109487	11			70141	9	117589	15		
Any of the above	120442	12	264671	26	356322	35	105888	14	212255	28	266965	35
Risk Score between the 50th and 75th Percentile												
Diagnosis of probable self-harm	149	0	882	0	9522	1	4159	1	9153	1	27897	4
ED ^a visit with MH ^b diagnosis	114050	11	247520	24	422696	41	68309	9	160178	21	274670	36
Hospitalization with MH ^b diagnosis	49152	5	124398	12	254810	25	35446	5	94527	12	198685	26
Any of the above diagnoses	140498	14	303777	29	499948	48	89174	12	203382	26	338113	44
PHQ9 ^c item 9 response 2 or 3	144081	14	234699	23			93745	12	150220	20		
Any of the above	269147	26	482583	47	499948	48	165404	21	300714	39	338113	44
Risk Score between the 75th and 90th Percentile												
Diagnosis of probable self-harm	1604	0	7674	1	37182	6	7421	2	17124	4	31536	7
ED ^a visit with MH ^b diagnosis	136847	22	252692	41	364162	59	95213	21	173819	38	232108	50
Hospitalization with MH ^b diagnosis	78722	13	158351	26	253988	41	55978	12	117698	25	183596	40
Any of the above diagnoses	167298	27	302090	49	413784	67	119456	26	212640	46	277000	60
PHQ9 ^c item 9 response 2 or 3	165384	27	247667	40			87651	19	132615	29		
Any of the above	293942	47	447455	72	413784	67	179786	39	279174	60	277000	60
Risk Score between the 90th and 95th Percentile												
Diagnosis of probable self-harm	5232	3	17824	9	42897	21	6661	4	14709	10	19525	13
ED ^a visit with MH ^b diagnosis	73398	36	124534	60	157582	76	53994	35	83972	55	98745	64
Hospitalization with MH ^b diagnosis	52254	25	96048	47	129257	63	37555	24	64210	42	83827	54
Any of the above diagnoses	89472	43	147379	71	174926	85	65645	43	99155	64	114413	74
PHQ9 ^c item 9 response 2 or 3	74047	36	108076	52			40338	26	57560	37		
Any of the above	133645	65	187036	91	174926	85	88849	58	120326	78	114413	74
Risk Score between the 95th and 98th Percentile												
Diagnosis of probable self-harm	16412	13	37201	30	59740	48	9853	11	18109	20	20193	22
ED ^a visit with MH ^b diagnosis	57984	47	94255	76	108967	88	45806	50	63377	69	70161	76
Hospitalization with MH ^b diagnosis	46765	38	82014	66	98508	80	36108	39	53597	58	63047	68
Any of the above diagnoses	71871	58	109828	89	119085	96	53892	58	72467	78	78642	85
PHQ9 ^c item 9 response 2 or 3	49193	40	72676	59			29839	32	40789	44		
Any of the above	92735	75	121278	98	119085	96	67019	73	82493	89	78642	85
Risk Score greater than or equal to the 98th Percentile												
Diagnosis of probable self-harm	38110	46	58625	71	69708	84	17078	28	26608	43	27343	44
ED ^a visit with MH ^b diagnosis	55388	67	74606	90	78776	95	41041	67	51354	83	53508	87
Hospitalization with MH ^b diagnosis	49803	60	71103	86	75766	92	36510	59	47914	78	51930	84
Any of the above diagnoses	64965	79	81319	98	82413	100	46922	76	56625	92	58237	95
PHQ9 ^c item 9 response 2 or 3	42757	52	58173	70			24719	40	31673	51		
Any of the above	74506	90	82509	100	82413	100	53258	86	59859	97	58237	95
^a Emergency Department ^b Mental Health ^c Patient Health Questionnaire												

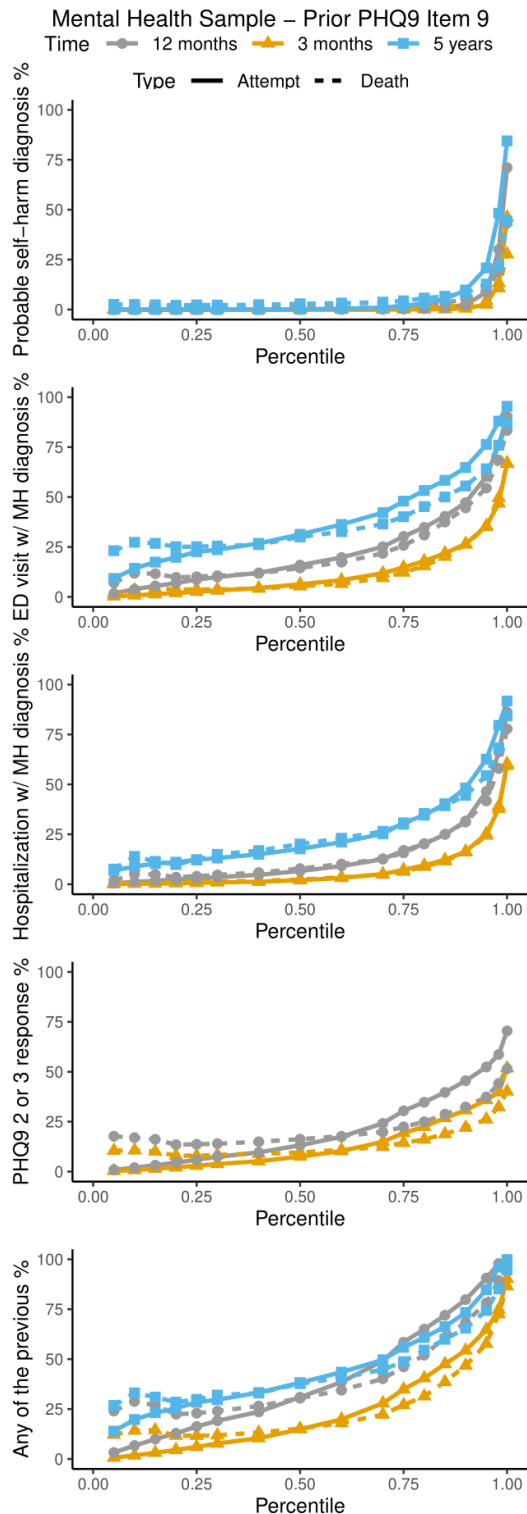
Supplementary Table 9. Count and percentage of general medical visits with a prior history of traditional risk factors in all strata. Restricted to visits with a PHQ-9 item 9 response in the prior 12 months.												
General Medical Sample												
	Attempt						Death					
	Last 3 months		Last 12 months		Last 5 years		Last 3 months		Last 12 months		Last 5 years	
	N	%	N	%	N	%	N	%	N	%	N	%
Risk Score Less than the 25th Percentile												
Diagnosis of probable self-harm	0	0	0	0	0	0	99	0	416	0	1158	0
ED ^a visit with MH ^b diagnosis	4140	1	16317	5	55458	17	7110	3	29255	11	65134	24
Hospitalization with MH ^b diagnosis	2446	1	7969	2	34075	10	3165	1	11321	4	41568	15
Any of the above diagnoses	6443	2	22933	7	76251	23	9462	3	35580	13	83172	30
PHQ9 ^c item 9 response 2 or 3	3253	1	9681	3			9490	3	25001	9		
Any of the above	9660	3	32213	10	76251	23	18296	7	55987	20	83172	30
Risk Score between the 25th and 50th Percentile												
Diagnosis of probable self-harm	0	0	0	0	16	0	215	0	848	0	2272	1
ED ^a visit with MH ^b diagnosis	15885	5	42517	13	92604	28	8672	3	36914	13	79066	29
Hospitalization with MH ^b diagnosis	9027	3	24577	7	64199	19	7448	3	24100	9	57984	21
Any of the above diagnoses	23337	7	59946	18	123789	37	15191	6	52317	19	104235	38
PHQ9 ^c item 9 response 2 or 3	9975	3	24967	7			13696	5	30475	11		
Any of the above	32886	10	81611	25	123789	37	27902	10	75225	28	104235	38
Risk Score between the 50th and 75th Percentile												
Diagnosis of probable self-harm	0	0	24	0	1284	0	916	0	2748	1	7107	3
ED ^a visit with MH ^b diagnosis	37969	11	80921	24	136336	41	34316	13	68127	25	109798	40
Hospitalization with MH ^b diagnosis	20438	6	47017	14	94752	28	18319	7	43646	16	82240	30
Any of the above diagnoses	51249	15	104813	31	168374	51	47172	17	89658	33	137456	50
PHQ9 ^c item 9 response 2 or 3	21291	6	47619	14			18329	7	38676	14		
Any of the above	70051	21	139808	42	168374	51	61232	22	112625	41	137456	50
Risk Score between the 75th and 90th Percentile												
Diagnosis of probable self-harm	44	0	874	0	8665	4	1415	1	3867	2	8331	5
ED ^a visit with MH ^b diagnosis	44533	22	83286	42	119142	60	28743	18	49892	30	74370	45
Hospitalization with MH ^b diagnosis	24135	12	51129	26	87002	44	17902	11	35343	22	56923	35
Any of the above diagnoses	55933	28	101041	51	137720	69	37355	23	63285	39	89729	55
PHQ9 ^c item 9 response 2 or 3	23297	12	46144	23			14346	9	27897	17		
Any of the above	73633	37	126780	63	137720	69	47299	29	78009	48	89729	55
Risk Score between the 90th and 95th Percentile												
Diagnosis of probable self-harm	302	0	2203	3	9079	14	1359	2	3397	6	6426	12
ED ^a visit with MH ^b diagnosis	21693	33	37205	56	48405	73	17408	32	26846	49	34729	63
Hospitalization with MH ^b diagnosis	12951	19	25061	38	38343	58	11084	20	20390	37	28398	52
Any of the above diagnoses	26675	40	43734	66	53836	81	22248	41	33407	61	40715	74
PHQ9 ^c item 9 response 2 or 3	11103	17	20622	31			6212	11	11765	22		
Any of the above	33756	51	52641	79	53836	81	25853	47	37865	69	40715	74
Risk Score between the 95th and 98th Percentile												
Diagnosis of probable self-harm	1396	3	5881	15	12453	31	1851	6	3915	12	6670	20
ED ^a visit with MH ^b diagnosis	16780	42	28075	70	32945	82	15876	48	20648	63	24056	73
Hospitalization with MH ^b diagnosis	11167	28	21621	54	28721	72	9778	30	15650	48	19980	61
Any of the above diagnoses	20609	52	32609	82	36131	90	19005	58	24081	73	26961	82
PHQ9 ^c item 9 response 2 or 3	8762	22	16059	40			5055	15	8406	26		
Any of the above	25198	63	36783	92	36131	90	21185	65	26478	81	26961	82
Risk Score greater than or equal to the 98th Percentile												
Diagnosis of probable self-harm	8732	33	15476	58	18550	70	2967	14	5359	24	8370	38
ED ^a visit with MH ^b diagnosis	17165	64	23106	87	24420	92	13913	64	16327	75	18049	83
Hospitalization with MH ^b diagnosis	13113	49	20189	76	22348	84	10367	47	14175	65	16324	75
Any of the above diagnoses	20223	76	25568	96	26048	98	15570	71	18025	82	19410	89
PHQ9 ^c item 9 response 2 or 3	8584	32	14310	54			4650	21	7159	33		
Any of the above	22194	83	26371	99	26048	98	17018	78	19354	88	19410	89
^a Emergency Department ^b Mental Health ^c Patient Health Questionnaire												

Supplementary Table 10. Count and percentage of mental health specialty visits with a recorded PHQ9 total score at that visit that had a total score greater than or equal to 20.				
Total PHQ9 Score of 20 or more	Attempt		Death	
Risk Score	N	%	N	%
Less than the 25th Percentile	309151	56	210101	51
Between the 25th and 50th Percentile	301173	55	229206	56
Between the 50th and 75th Percentile	323387	59	247057	60
Between the 75th and 90th Percentile	221380	67	158514	64
Between the 90th and 95th Percentile	82197	74	56105	68
Between the 95th and 98th Percentile	52158	79	34883	70
Greater than or equal to the 98th Percentile	37525	85	24395	74

Supplementary Table 11. Count and percentage of general medical visits with a recorded PHQ9 total score at that visit that had a total score greater than or equal to 20.				
Total PHQ9 Score of 20 or more	Attempt		Death	
Risk Score	N	%	N	%
Less than the 25th Percentile	21895	10	12978	7
Between the 25th and 50th Percentile	32932	15	39831	21
Between the 50th and 75th Percentile	47486	21	40510	21
Between the 75th and 90th Percentile	37483	28	29176	26
Between the 90th and 95th Percentile	15433	34	10953	29
Between the 95th and 98th Percentile	10713	39	7021	31
Greater than or equal to the 98th Percentile	9356	52	5364	36

Supplementary Table 12. Distribution of absolute predicted risk by sample.				
Predicted Risk Score distribution				
	Mental Health Sample		General Medical Sample	
Percentile	Attempt	Death	Attempt	Death
0	0.0001	0	0.00007	0
25 th	0.00127	0.00003	0.00065	0.00003
50 th	0.00244	0.00008	0.00115	0.00007
75 th	0.00548	0.0002	0.0024	0.00015
90 th	0.01349	0.00049	0.00584	0.00035
95 th	0.0256	0.00088	0.01097	0.0006
98 th	0.05644	0.00178	0.02345	0.00121
100 th	0.70428	0.10513	0.74041	0.13301

Supplementary Figure 1. Percentage of mental health specialty visits with each risk factor across the full range of predicted risk scores using strata of size 5 percentiles for visits with a prior PHQ9 item 9 response in the last year.



Supplementary Figure 2. Percentage of general medical visits with each risk factor across the full range of predicted risk scores using strata of size 5 percentiles for visits with a prior PHQ9 item 9 response in the last year

