

SUPPLEMENTARY MATERIALS

Appendix 1. Definition of Suicidal Behavior Using ICD-9 Diagnostic Codes.

For this study, suicidal behavior was defined using ICD-9 diagnostic codes and death certificates from the Commonwealth of Massachusetts. ICD-9 codes of E95* (injuries of intentional intent) are the most explicit diagnostic code for suicide attempts. In order to validate our case definition, we randomly selected 100 patients with an E95* code and reviewed all clinical notes within one week of the ICD-9 diagnosis. Three senior clinicians with expertise in the epidemiology and treatment of suicidal behavior (JWS, RHP, MKN) manually reviewed narrative notes. Each note was designated as one of six categories using consensus agreement by all three clinicians: (1) Self-harm, suicidal, (2) Self-harm, intentional, non-suicidal, (3) Self-harm, accidental, (4) Self-harm, not enough intent information, (5) Self-harm, contradictory intent information and (6) No evidence of self-harm. The positive predictive value (PPV) of each code was calculated as the proportion of notes classified in categories 1 or 2.

To maximize sensitivity of the case definition we identified an additional set of 15 ICD-9 injury code categories as well as E98* (injury of questionable intent) as potential indicators of suicide attempts in the EHR (Table S-1). For each ICD-9 category, the clinicians reviewed a small sample of patients using the chart review method above. If the prevalence of true cases was > 20%, a larger sample of 50 randomly selected patients were subsequently reviewed. Code categories with a PPV > 0.70 were selected for our final case definition. These included E95* (PPV: 0.82), 965.* (Poisoning by analgesics, antipyretics, and anti-rheumatics, PPV: 0.80), 967.* (Poisoning by sedatives and hypnotics, PPV: 0.84), 969.* (Poisoning by psychotropic agents, PPV: 0.80) and 881.* (Open wound of elbow

forearm and wrist, PPV: 0.70). Detailed chart review results, including codes not included in the definition are available in Supplementary Table S-1.

We searched death certificates for a primary or underlying cause of death of suicide as defined by the state (ie ICD-10 X60-X84, Y87.0, ICD-9 E950-E959). In Massachusetts, all deaths by suicide, homicide, deaths under suspicious or unusual circumstances and deaths due to poison or acute or chronic use of drugs or alcohol are referred to the medical examiner to establish the cause of death (MGL Ch. 38, Section 3) and 99.6% were reviewed by the medical examiner. While this may have resulted in our missing true cases, the effect would be expected to reduce the accuracy of our model (as these cases would have been included among controls). Thus our model accuracy metrics may be conservative and we now note this as a limitation of the study. Also, as noted in the main text, of the 852 death certificates with suicide as a cause of death, only 49 didn't have one of the ICD9 codes that comprise the case definition, supporting the assumption that our case definition of suicide attempt captures most individuals who completed suicide.

Appendix 2. Development of the Naïve Bayes Classifier Model

To build the Naïve Bayes classifier we calculated the odds-ratio associated with each feature used in the model. We then calculated the log of the odds-ratio, converting ratios that are larger than one (more common among cases) into positive scores and ratios that are between zero and one (more common among controls) into negative scores. For example, “Opioid abuse, unspecified use” was recorded for 366 cases (out of a total of 627,121 different ICD-9 codes recorded for the cases) and for 2,073 controls (out of a total of 53,596,375 ICD-9 codes recorded for the controls). Thus, the odds-ratio was:

$$(366/627,121) / (2,073/53,596,375) = 15.09$$

To calculate the Naïve Bayes score we took the natural log of the odds-ratio to get a score of:

$$\ln(15.09) = 2.71$$

The same process was repeated for all different variables. Once we had a Naïve Bayes score for each individual variable, we applied these scores for each subject over time and calculated the total cumulative score. Thus, if a subject X had a documentation of “Opioid abuse, unspecified use” at a specific time T, then their score from time T-1 will increase by 2.71 points.

Table S-2 - List of top 100 diagnoses, medications, and lab results associated with suicidal behavior, along with their incidence and associated risk-score. The incidence of each code and shown on a 1:100,000 codes ratio. The risk score for each code is calculated as the relative prevalence of the code among cases divided by the relative prevalence among controls. 95% Confidence Intervals (CI) are shown in brackets.

A. Top 100 diagnostic and procedure codes associated with suicidal behavior.

Diagnoses and Procedures	Cases (1:100k)	TOTAL			Women	Men
		Controls (1:100k)	Risk Score [95% CI]	Risk Score [95% CI]	Risk Score [95% CI]	
Opioid abuse, continuous use	16.26	0.88	18.43	[14.9-22.8]	20.83 [14.7-29.6]	15.8 [12.1-20.7]
Other, mixed, or unspecified drug abuse, continuous use	13.24	0.72	18.28	[14.4-23.2]	17.9 [11.7-27.4]	16.8 [12.6-22.3]
Combinations of opioid type drug with any other drug dependence, continuous use	9.89	0.56	17.72	[13.5-23.3]	16.7 [10.4-26.8]	16.79 [12-23.5]
Combinations of opioid type drug with any other drug dependence, unspecified use	10.84	0.63	17.24	[13.3-22.4]	20.02 [12.9-31.1]	14.58 [10.5-20.1]
Poisoning by unspecified drug or medicinal substance	24.72	1.49	16.54	[13.9-19.6]	16.78 [13.1-21.5]	15.76 [12.4-20]
Cocaine dependence, continuous use	10.21	0.63	16.18	[12.4-21.1]	16.97 [10.9-26.4]	14.5 [10.4-20.3]
Opioid abuse, unspecified use	58.36	3.87	15.09	[13.5-16.9]	13.92 [11.4-17]	14.36 [12.6-16.4]
Barbiturate and similarly acting sedative or hypnotic abuse, unspecified use	11.48	0.89	12.95	[10.1-16.6]	13.18 [8.9-19.4]	11.98 [8.7-16.5]
Cocaine abuse, continuous use	15.95	1.34	11.92	[9.7-14.7]	9.51 [6.3-14.5]	11.77 [9.2-15]
Opioid type dependence, continuous use	33.49	2.90	11.55	[10-13.3]	10.22 [8.1-13]	11.68 [9.7-14]
Drug withdrawal syndrome	33.17	3.07	10.82	[9.4-12.5]	10.7 [8.5-13.5]	10.2 [8.5-12.3]
Other, mixed, or unspecified drug abuse, unspecified use	109.07	10.23	10.66	[9.8-11.5]	11.69 [10.2-13.3]	9.3 [8.4-10.3]
Combinations of drug dependence excluding opioid type drug, unspecified use	32.21	3.07	10.48	[9.1-12.1]	12.03 [9.5-15.2]	8.89 [7.4-10.7]
Acute alcoholic intoxication in alcoholism, unspecified drinking behavior	34.12	3.26	10.48	[9.1-12.1]	13.99 [10.8-18.2]	8.45 [7.1-10]
Borderline personality	26.63	2.59	10.30	[8.8-12.1]	11.55 [9.7-13.8]	8.88 [5.9-13.5]
Unspecified neurotic disorder	59.48	6.03	9.86	[8.9-11]	10.54 [9.1-12.3]	8.95 [7.7-10.4]
Acute alcoholic intoxication in alcoholism, continuous drinking behavior	24.24	2.47	9.83	[8.3-11.6]	16.86 [12.1-23.4]	7.47 [6.1-9.1]
Cocaine abuse, unspecified use	56.77	5.79	9.81	[8.8-10.9]	12.14 [10.1-14.6]	8 [7-9.2]
Barbiturate and similarly acting sedative or hypnotic dependence, unspecified use	13.71	1.41	9.70	[7.8-12.1]	9.83 [7-13.8]	9.08 [6.7-12.2]
Cocaine dependence, unspecified use	24.72	2.58	9.56	[8.1-11.3]	10.27 [7.8-13.5]	8.45 [6.9-10.4]
Drug-induced organic affective	10.52	1.11	9.51	[7.4-12.3]	9.55 [6.3-14.5]	8.78 [6.4-12.1]

syndrome						
Opioid type dependence, unspecified use	71.28	7.89	9.04	[8.2-10]	9.18 [7.9-10.7]	8.33 [7.4-9.4]
Opioid abuse, in remission	7.65	0.85	9.04	[6.7-12.2]	8.46 [5-14.4]	8.55 [6-12.3]
Lack of housing	49.43	5.67	8.72	[7.8-9.8]	8.23 [6.6-10.2]	8.11 [7.1-9.3]
Depressive neuroses	6.86	0.83	8.28	[6.1-11.3]	8.26 [5.4-12.7]	8.31 [5.2-13.2]
Alcohol/drug abuse or dependence w cc	12.12	1.49	8.13	[6.4-10.3]	9.76 [6.4-14.8]	6.79 [5.1-9]
Bipolar affective disorder, depressed, severe degree, specified as with psychotic behavior	7.49	0.96	7.81	[5.8-10.5]	6.68 [4.3-10.3]	9.29 [6.1-14.1]
Unspecified drug dependence, unspecified use	45.13	5.87	7.69	[6.8-8.7]	7.86 [6.4-9.6]	6.99 [6-8.1]
Closed fracture of rib(s)	3.03	0.42	7.28	[4.6-11.6]	8.46 [4.3-16.7]	6.08 [3.2-11.6]
Opioid type dependence, in remission	6.70	0.93	7.19	[5.3-9.9]	7.81 [4.8-12.6]	6.35 [4.2-9.6]
Psychoses	34.12	4.82	7.08	[6.2-8.1]	7.1 [5.8-8.7]	6.85 [5.6-8.3]
Open wound of hand except fingers alone, with tendon involvement	12.28	1.76	6.97	[5.5-8.8]	10.95 [7.5-16.1]	5.12 [3.8-6.9]
Cocaine abuse, episodic use	3.67	0.53	6.95	[4.5-10.6]	10.43 [5.4-20]	5.01 [2.9-8.8]
Other, mixed, or unspecified drug abuse, in remission	11.00	1.60	6.89	[5.4-8.8]	7.32 [4.9-10.8]	6.15 [4.5-8.4]
Other and unspecified alcohol dependence	6.22	0.91	6.86	[4.9-9.5]	7.83 [3.8-16.1]	5.88 [4.1-8.5]
Unspecified personality disorder	20.73	3.07	6.75	[5.6-8.1]	8.28 [6.6-10.4]	5.12 [3.8-6.8]
Assault by cutting and piercing instrument	12.76	1.91	6.69	[5.3-8.4]	5.12 [2.5-10.4]	6.07 [4.8-7.7]
Bipolar affective disorder, mixed	4.15	0.63	6.61	[4.4-9.9]	7.34 [4.4-12.2]	5.79 [3-11]
Nontraumatic rupture of extensor tendons of hand and wrist	4.62	0.70	6.61	[4.5-9.6]	11.05 [6.9-17.8]	3.5 [1.9-6.6]
Unspecified schizophrenia, chronic state	3.83	0.60	6.43	[4.2-9.7]	8.24 [4.5-15.3]	5.01 [2.9-8.8]
Schizo-affective type schizophrenia, chronic state with acute exacerbation	2.55	0.41	6.27	[3.8-10.4]	5.28 [2.3-12]	6.75 [3.5-12.9]
Observation following other inflicted injury	7.81	1.26	6.22	[4.7-8.3]	8.02 [5.3-12.1]	4.72 [3.1-7.1]
Other and unspecified alcohol dependence, continuous drinking behavior	33.65	5.41	6.21	[5.4-7.1]	7.51 [5.7-9.9]	5.22 [4.4-6.1]
Hepatitis C carrier	7.81	1.29	6.07	[4.5-8.1]	6.49 [4.1-10.3]	5.39 [3.7-7.8]
Major depressive disorder, single episode, severe degree, specified as with psychotic behavior	7.49	1.24	6.06	[4.5-8.1]	5.95 [3.9-9]	6.13 [4-9.4]
Unspecified drug-induced mental disorder	3.83	0.63	6.05	[4-9.2]	6.48 [3.4-12.3]	5.39 [3.1-9.3]

Schizo-affective type schizophrenia, chronic state	2.55	0.42	6.05	[3.6-10]	5.79 [2.7-12.4]	6.02 [3.1-11.9]
Alcohol/drug abuse or depend w/o rehabilitation therapy w/o cc	4.78	0.80	6.00	[4.1-8.7]	5.95 [2.9-12.2]	5.43 [3.5-8.4]
Bipolar affective disorder, depressed, moderate degree	5.26	0.88	5.99	[4.2-8.5]	7.45 [4.9-11.3]	4.09 [2.1-8]
Bipolar affective disorder, depressed, unspecified degree	46.40	7.84	5.92	[5.3-6.7]	6.26 [5.3-7.3]	5.51 [4.6-6.6]
Other electroshock therapy	6.22	1.06	5.89	[4.3-8.1]	6.1 [4-9.4]	5.68 [3.5-9.3]
Alcohol withdrawal	36.99	6.28	5.89	[5.2-6.7]	8.15 [6.3-10.6]	4.74 [4.1-5.5]
Alveolitis of jaw	3.03	0.51	5.88	[3.7-9.4]	4.91 [2.5-9.6]	7.36 [3.8-14.1]
Bipolar affective disorder, unspecified	60.43	10.56	5.72	[5.2-6.3]	6.47 [5.6-7.4]	4.87 [4.2-5.7]
Bipolar affective disorder, mixed, severe degree, without mention of psychotic behavior	3.83	0.67	5.71	[3.8-8.6]	7.64 [4.8-12.1]	2.72 [1-7.4]
Debridement of open fracture of radius and ulna	2.39	0.42	5.65	[3.3-9.5]	4.32 [1.8-10.6]	6.34 [3.3-12.1]
Issue of repeat prescriptions	20.89	3.70	5.65	[4.7-6.7]	4.55 [3.4-6.2]	6.01 [4.8-7.5]
Bipolar affective disorder, mixed, severe degree, specified as with psychotic behavior	3.83	0.68	5.60	[3.7-8.5]	4.94 [2.8-8.8]	6.64 [3.7-12]
Paranoid type schizophrenia, chronic state	3.19	0.58	5.46	[3.5-8.6]	6.05 [2.8-13]	4.73 [2.7-8.3]
Alcoholic gastritis, without mention of hemorrhage	4.78	0.89	5.40	[3.7-7.8]	6.43 [3.6-11.5]	4.47 [2.8-7.2]
Acute adjustment reaction and psychosocial dysfunction	6.38	1.20	5.32	[3.9-7.3]	5.08 [3.2-8]	5.57 [3.5-8.8]
Major depressive disorder, recurrent episode	4.46	0.85	5.26	[3.6-7.7]	6.79 [4.5-10.3]	2.54 [0.9-6.9]
Manic disorder, single episode, unspecified degree	11.96	2.28	5.25	[4.2-6.6]	5.96 [4.4-8]	4.44 [3-6.5]
Other and unspecified alcohol dependence, unspecified drinking behavior	93.28	17.85	5.23	[4.8-5.7]	5.7 [4.9-6.6]	4.56 [4.1-5]
Bipolar affective disorder, mixed, unspecified degree	29.34	5.62	5.22	[4.5-6.1]	5.97 [4.9-7.3]	4.37 [3.5-5.5]
Cannabis dependence, unspecified use	9.73	1.88	5.19	[4-6.7]	4.69 [2.8-7.8]	4.88 [3.6-6.6]
Bipolar affective disorder, depressed, severe degree, without mention of psychotic behavior	10.05	1.94	5.18	[4-6.7]	5.83 [4.2-8]	4.44 [2.9-6.8]
Other and unspecified reactive psychosis	6.38	1.23	5.18	[3.8-7.1]	7.97 [5.4-11.8]	2.85 [1.6-5]
Alcohol abuse, unspecified drinking behavior	146.0 6	28.84	5.06	[4.7-5.4]	6.14 [5.5-6.9]	4.2 [3.9-4.6]

Multiple and unspecified open wound of upper limb, without mention of complication	11.96	2.36	5.06	[4-6.4]	5.08 [3.4-7.5]	4.67 [3.5-6.3]
Late effect of tendon injury	3.99	0.79	5.04	[3.4-7.5]	5.05 [2.6-9.9]	4.65 [2.8-7.7]
Cannabis abuse, unspecified use	22.80	4.54	5.03	[4.2-6]	6.76 [5.2-8.8]	3.9 [3.1-4.8]
Counseling on substance use and abuse	3.99	0.79	5.03	[3.4-7.5]	4.86 [2.7-8.9]	4.95 [2.9-8.5]
Poisoning and toxic effects of drugs age >17 w cc	4.94	0.99	5.02	[3.5-7.2]	3.44 [1.8-6.7]	5.84 [3.8-9]
Other and unspecified injury to head, face, and neck	3.83	0.76	5.00	[3.3-7.6]	5.87 [3-11.5]	4.19 [2.5-7.1]
Schizo-affective type schizophrenia, unspecified state	25.19	5.05	4.99	[4.3-5.9]	4.78 [3.8-6.1]	4.96 [4-6.1]
Alcohol detoxification	5.10	1.03	4.94	[3.5-7]	3.31 [1.2-9]	4.7 [3.2-6.9]
Alcohol abuse, episodic drinking behavior	5.74	1.17	4.91	[3.5-6.9]	6.54 [3.6-11.7]	3.91 [2.6-5.9]
Trauma To The Skin, Subcut Tiss and Breast Age >17 W CC	3.67	0.75	4.90	[3.2-7.5]	5.1 [2.7-9.6]	4.49 [2.6-7.9]
Bipolar affective disorder, manic, unspecified degree	32.69	6.69	4.89	[4.2-5.6]	5.67 [4.7-6.8]	4.03 [3.3-5]
Osteomyelitis	2.55	0.53	4.85	[2.9-8]	4.32 [1.8-10.6]	4.73 [2.6-8.7]
Assault by other specified means	12.76	2.63	4.85	[3.9-6.1]	6.1 [4.5-8.2]	3.63 [2.6-5.1]
Assault by striking by blunt or thrown object	10.52	2.18	4.83	[3.8-6.2]	6.25 [3.8-10.2]	3.98 [3-5.3]
Assault by unspecified means	18.18	3.77	4.82	[4-5.8]	6.04 [4.3-8.5]	3.96 [3.2-5]
Unspecified affective psychosis	126.9	3	26.65	4.76 [4.4-5.1]	5.02 [4.5-5.5]	4.4 [4-4.9]
Residual schizophrenia, unspecified state	3	26.65	4.76	[4.4-5.1]	5.02 [4.5-5.5]	4.4 [4-4.9]
Open wound of abdominal wall, lateral, without mention of complication	3.83	0.80	4.76	[3.2-7.2]	8.21 [4.9-13.7]	2.41 [1.2-4.9]
Major depressive disorder, recurrent episode, severe degree, specified as with psychotic behavior	3.83	0.80	4.76	[3.2-7.2]	3.72 [1.5-9.1]	4.63 [2.9-7.4]
Contusion of back	21.05	4.45	4.73	[4-5.6]	5.39 [4.3-6.7]	3.95 [2.9-5.4]
Prolonged posttraumatic stress disorder	3.67	0.78	4.73	[3.1-7.2]	5.72 [3.3-9.8]	3.66 [1.9-7.1]
Alcohol abuse, continuous drinking behavior	75.74	16.07	4.71	[4.3-5.2]	4.96 [4.4-5.6]	4.59 [3.9-5.4]
Injury to unspecified blood vessel of head and neck	28.70	6.11	4.70	[4-5.5]	5.87 [4.4-7.9]	3.9 [3.3-4.6]
Acute or unspecified hepatitis C without mention of hepatic coma	2.07	0.44	4.69	[2.7-8.2]	3.96 [1.5-10.8]	4.73 [2.4-9.3]
Alcohol withdrawal delirium	38.91	8.34	4.66	[4.1-5.3]	4.3 [3.4-5.4]	4.5 [3.8-5.3]
Major depressive disorder, single episode, unspecified degree	9.73	2.09	4.65	[3.6-6]	5.74 [3.3-9.8]	3.89 [2.9-5.2]
	109.5	5	23.60	4.64 [4.3-5]	4.58 [4.1-5.1]	4.82 [4.3-5.4]

Chronic hepatitis C without mention of hepatic coma	55.01	11.89	4.63	[4.2-5.2]	4.72 [3.9-5.7]	4.21 [3.7-4.8]
Cellulitis and abscess of hand, except fingers and thumb	21.85	4.77	4.58	[3.9-5.4]	5.42 [4.2-7]	3.76 [3-4.8]
Cocaine abuse, in remission	5.58	1.24	4.52	[3.2-6.3]	4.34 [2.3-8.2]	4.17 [2.8-6.2]
Other suture of other tendon of hand	4.78	1.06	4.51	[3.1-6.5]	4.92 [2.4-10]	3.93 [2.6-6]
Other manic-depressive psychosis	19.14	4.27	4.49	[3.7-5.4]	5.15 [4.1-6.5]	3.7 [2.7-5.1]

B. Top 100 medications associated with suicidal behavior.

Medication	TOTAL			Women	Men
	Cases (1:100k)	Controls (1:100k)	Risk Score [95% CI]	Risk Score [95% CI]	Risk Score [95% CI]
Fluphenazine	17.55	2.53	6.94 [4.5-10.7]	5.05 [2.4-10.8]	8.03 [4.7-13.6]
Buprenorphine-Naloxone	51.86	8.63	6.01 [4.7-7.7]	6.53 [4.4-9.6]	5.35 [3.9-7.4]
Ziprasidone	68.61	11.64	5.89 [4.7-7.3]	5.16 [3.8-7]	7.18 [5.2-9.9]
Lithium	192.28	33.60	5.72 [5-6.5]	6.61 [5.6-7.8]	4.68 [3.8-5.8]
Disulfiram	8.78	1.91	4.60 [2.5-8.4]	3.27 [1-10.3]	5.12 [2.5-10.5]
Naltrexone	34.31	7.51	4.57 [3.4-6.2]	6.16 [4.2-9.1]	3.07 [1.9-5]
Chlordiazepoxide	101.33	22.33	4.54 [3.8-5.4]	3.88 [2.8-5.3]	4.59 [3.7-5.7]
Methadone	226.59	50.01	4.53 [4-5.1]	4.33 [3.6-5.2]	4.5 [3.8-5.3]
Stavudine	17.55	4.06	4.32 [2.8-6.6]	4.87 [2.4-9.9]	3.77 [2.2-6.4]
Nefazodone	43.08	9.98	4.32 [3.3-5.7]	3.79 [2.6-5.6]	5.08 [3.4-7.5]
Benzotropine	119.68	28.27	4.23 [3.6-5]	4.55 [3.6-5.7]	3.82 [3-4.9]
Hydrocodone	11.17	2.86	3.91 [2.3-6.7]	6.15 [3.5-10.8]	0.7 [0.1-5]
Acamprosate	18.35	4.80	3.82 [2.5-5.8]	4.85 [2.6-8.9]	3 [1.7-5.3]
Clonidine	283.23	75.07	3.77 [3.4-4.2]	3.61 [3.1-4.2]	3.81 [3.3-4.4]
Risperidone	241.75	64.70	3.74 [3.3-4.2]	4.14 [3.5-4.8]	3.26 [2.8-3.9]
Aripiprazole	178.72	48.25	3.70 [3.2-4.2]	4.23 [3.6-5]	3.05 [2.4-3.8]
Divalproex Sodium	240.95	65.29	3.69 [3.3-4.1]	3.81 [3.2-4.5]	3.46 [3-4.1]
Oxcarbazepine	96.54	26.32	3.67 [3.1-4.4]	3.75 [2.9-4.8]	3.55 [2.7-4.6]
Clozapine	23.14	6.38	3.63 [2.5-5.3]	3.99 [2.3-6.9]	3.2 [1.9-5.3]
Nelfinavir	9.57	2.68	3.57 [2-6.3]	6.86 [3.4-14]	1.7 [0.6-4.6]
Mafenide Topical	13.56	3.83	3.54 [2.2-5.7]	5.51 [2.7-11.2]	2.49 [1.3-4.8]
Quetiapine	632.69	179.23	3.53 [3.3-3.8]	3.89 [3.5-4.3]	3.1 [2.8-3.4]
Fluvoxamine	32.71	9.67	3.38 [2.5-4.6]	3.91 [2.6-5.8]	2.73 [1.6-4.6]
Clomipramine	12.77	3.83	3.33 [2-5.5]	4.79 [2.6-8.8]	1.94 [0.8-4.7]
Nicotine	505.83	151.93	3.33 [3.1-3.6]	3.46 [3.1-3.9]	3.08 [2.8-3.4]
Zafirlukast	15.96	4.89	3.26 [2.1-5.1]	3.59 [2.1-6.1]	2.84 [1.3-6.4]
Lamivudine	27.13	8.34	3.25 [2.3-4.6]	4.4 [2.6-7.5]	2.54 [1.6-4]
Trimethobenzamide	35.90	11.06	3.25 [2.4-4.4]	3.11 [2.1-4.5]	3.75 [2.3-6.1]
Lindane Topical	6.38	2.06	3.10 [1.5-6.3]	0.73 [0.1-5.2]	5.78 [2.7-12.4]

Dicyclomine	100.53	32.89	3.06	[2.6-3.6]	2.29 [1.8-3]	4.44 [3.5-5.7]
Chlorpromazine	62.23	20.48	3.04	[2.4-3.8]	6.08 [4.3-8.5]	1.94 [1.4-2.6]
Zidovudine	8.78	2.91	3.02	[1.7-5.5]	3.4 [1.5-7.7]	2.58 [1.1-6.3]
Phenobarbital	30.32	10.63	2.85	[2.1-3.9]	2.92 [1.8-4.7]	2.69 [1.7-4.2]
Olanzapine	358.23	125.77	2.85	[2.6-3.1]	3.12 [2.7-3.6]	2.52 [2.2-2.9]
Paliperidone	4.79	1.69	2.83	[1.3-6.4]	1.96 [0.5-7.9]	3.54 [1.3-9.6]
Bacitracin Topical	75.80	27.05	2.80	[2.3-3.4]	3.32 [2.4-4.5]	2.35 [1.8-3.1]
Ribavirin	16.75	6.00	2.79	[1.8-4.3]	2.79 [1.3-5.9]	2.6 [1.5-4.4]
Candida Albicans Extract	28.72	10.30	2.79	[2-3.9]	3.83 [2.4-6.1]	2.01 [1.2-3.3]
Thiamine	406.10	148.70	2.73	[2.5-3]	2.62 [2.2-3.1]	2.57 [2.3-2.9]
Mumps Skin Test Antigen	23.94	8.90	2.69	[1.9-3.9]	3.96 [2.4-6.4]	1.78 [1-3.1]
Prazosin	42.29	15.78	2.68	[2-3.5]	4.13 [3-5.8]	1.47 [0.9-2.4]
Interferon Alfa-2a	10.37	3.92	2.64	[1.5-4.6]	3.13 [1.3-7.6]	2.24 [1.1-4.5]
Efavirenz	16.75	6.34	2.64	[1.7-4.1]	2.67 [1.1-6.5]	2.4 [1.5-4]
Bupropion	111.70	42.43	2.63	[2.2-3.1]	2.77 [2.2-3.5]	2.46 [1.9-3.2]
Lamotrigine	189.89	73.19	2.59	[2.3-3]	3.03 [2.6-3.5]	1.99 [1.6-2.5]
Hexachlorophene Topical	5.58	2.17	2.57	[1.2-5.4]	0.84 [0.1-6]	3.76 [1.7-8.5]
Clonazepam	599.18	233.43	2.57	[2.4-2.8]	2.61 [2.4-2.9]	2.58 [2.3-2.9]
Urokinase	14.36	5.61	2.56	[1.6-4.1]	2.82 [1.5-5.5]	2.26 [1.2-4.4]
Doxepin	71.81	28.49	2.52	[2-3.1]	2.48 [1.9-3.3]	2.64 [1.9-3.6]
Mirtazapine	223.40	88.84	2.51	[2.2-2.8]	2.42 [2-2.9]	2.56 [2.2-3]
Methylnaltrexone	7.18	2.86	2.51	[1.3-4.9]	3.16 [1.3-7.7]	1.91 [0.7-5.1]
Triethanolamine Polypeptide						
Oleate Otic	5.58	2.24	2.49	[1.2-5.3]	3.8 [1.7-8.6]	0.82 [0.1-5.9]
Interferon Alfa-2a	9.57	3.91	2.45	[1.4-4.3]	2.61 [1-7]	2.2 [1.1-4.4]
Atazanavir	11.97	5.00	2.39	[1.4-4]	2.6 [1.1-6.3]	2.12 [1.1-4]
Carisoprodol	43.88	18.43	2.38	[1.8-3.1]	2.55 [1.8-3.5]	2.21 [1.4-3.5]
Iron Dextran	8.78	3.72	2.36	[1.3-4.3]	3.19 [1.6-6.4]	1.39 [0.4-4.3]
Bretylium	3.99	1.73	2.31	[1-5.6]	3.23 [1-10.2]	1.54 [0.4-6.2]
Quinine	67.02	29.25	2.29	[1.8-2.8]	2.61 [2-3.5]	1.92 [1.4-2.7]
Chlordiazepoxide- Clidinium	7.98	3.56	2.24	[1.2-4.2]	2.69 [1.3-5.4]	1.46 [0.4-5.9]
Choline Salicylate- Magnesium Salicylate	15.96	7.16	2.23	[1.4-3.5]	2.21 [1.3-3.8]	2.45 [1.2-5.2]
Abacavir	7.98	3.59	2.22	[1.2-4.2]	2.42 [0.8-7.6]	1.98 [0.9-4.2]
Tiagabine	4.79	2.16	2.21	[1-5]	1.9 [0.6-5.9]	2.71 [0.9-8.5]
Lanolin Topical	8.78	3.97	2.21	[1.2-4]	2.45 [0.9-6.6]	1.95 [0.9-4.1]
Trazodone	698.91	317.55	2.20	[2.1-2.4]	2.26 [2.1-2.5]	2.12 [1.9-2.3]
Paroxetine	319.93	145.46	2.20	[2-2.4]	2.09 [1.8-2.4]	2.44 [2.1-2.8]
Ritonavir	16.75	7.63	2.20	[1.4-3.4]	2.47 [1.2-5.2]	1.92 [1.1-3.3]
Selegiline	7.18	3.28	2.19	[1.1-4.2]	3.3 [1.5-7.4]	1.25 [0.4-3.9]
Ramelteon	10.37	4.76	2.18	[1.3-3.8]	3.21 [1.8-5.8]	0.8 [0.2-3.2]
Desipramine	30.32	14.03	2.16	[1.6-3]	2.61 [1.8-3.8]	1.52 [0.8-2.8]

Ticlopidine	20.74	9.60	2.16	[1.5-3.2]	1.61 [0.7-3.6]	2.23 [1.4-3.5]
Haloperidol	363.82	169.05	2.15	[2-2.4]	2.51 [2.2-2.9]	1.81 [1.6-2.1]
Lamivudine- Zidovudine	12.77	5.98	2.13	[1.3-3.5]	2.82 [1.4-5.7]	1.61 [0.8-3.2]
Al Hydroxide/Mg Hydroxide/Simethi cone	209.83	98.89	2.12	[1.9-2.4]	2.11 [1.8-2.5]	2.11 [1.8-2.5]
Amphotericin B Topical	7.18	3.39	2.12	[1.1-4.1]	3.13 [1.3-7.6]	1.42 [0.5-3.8]
Carbamazepine	81.38	38.40	2.12	[1.7-2.6]	2.35 [1.8-3]	1.85 [1.4-2.5]
Fluoxetine	482.69	228.51	2.11	[1.9-2.3]	2.13 [1.9-2.4]	2.24 [2-2.6]
Salsalate	22.34	10.61	2.11	[1.4-3.1]	2.6 [1.7-4]	1.38 [0.7-2.9]
Theophylline	35.90	17.19	2.09	[1.6-2.8]	2.54 [1.7-3.7]	1.59 [1-2.6]
Perphenazine	62.23	29.85	2.08	[1.7-2.6]	2.71 [2.1-3.5]	1.34 [0.9-2]
Venlafaxine	238.55	114.99	2.07	[1.8-2.3]	2.12 [1.9-2.4]	2.19 [1.8-2.7]
Emtricitabine- Tenofovir	31.12	15.02	2.07	[1.5-2.8]	2.39 [1.5-3.8]	1.75 [1.1-2.7]
Trihexyphenidyl	9.57	4.73	2.02	[1.1-3.6]	1.92 [0.8-4.6]	2.02 [1-4.3]
Salmeterol	93.35	46.43	2.01	[1.7-2.4]	2.14 [1.7-2.7]	1.86 [1.4-2.5]
Cisapride	20.74	10.38	2.00	[1.4-2.9]	2.12 [1.3-3.5]	1.84 [1-3.4]
Hydrocodone- Ibuprofen	7.98	4.06	1.97	[1.1-3.7]	1.03 [0.3-3.2]	3.26 [1.5-6.9]
Multivitamin With Minerals	179.51	91.83	1.95	[1.7-2.2]	2.31 [1.9-2.8]	1.57 [1.3-1.9]
Valdecoxib	15.16	7.77	1.95	[1.2-3.1]	1.87 [1.1-3.3]	2.27 [1.1-4.8]
Hepatitis B Immune Globulin	7.98	4.10	1.95	[1-3.6]	2.8 [1.4-5.6]	0.88 [0.2-3.5]
Valproic Acid	41.49	21.39	1.94	[1.5-2.6]	1.56 [1-2.5]	2.12 [1.5-3]
Tuberculin Purified Protein Derivative	157.97	82.32	1.92	[1.7-2.2]	1.86 [1.5-2.3]	1.96 [1.6-2.4]
Nafcillin	110.90	58.61	1.89	[1.6-2.2]	1.9 [1.5-2.5]	1.79 [1.4-2.2]
Mexiletine	7.98	4.22	1.89	[1-3.5]	3.36 [1.4-8.2]	1.21 [0.5-2.9]
Tetracaine Ophthalmic	30.32	16.06	1.89	[1.4-2.6]	1.45 [0.9-2.4]	2.41 [1.6-3.7]
Acetaminophen- Tramadol	16.75	8.92	1.88	[1.2-2.9]	2.19 [1.2-3.9]	1.54 [0.8-3]
Bupropion	481.90	256.99	1.88	[1.7-2]	1.89 [1.7-2.1]	1.89 [1.7-2.1]
Flunisolide	22.34	11.95	1.87	[1.3-2.7]	2.38 [1.5-3.7]	1.28 [0.7-2.5]
Ticarcillin- Clavulanate	4.79	2.56	1.87	[0.8-4.2]	3.75 [1.4-10.2]	0.87 [0.2-3.5]
Rofecoxib	154.78	83.23	1.86	[1.6-2.1]	2.02 [1.7-2.4]	1.68 [1.3-2.1]
Coal Tar Topical	3.19	1.72	1.85	[0.7-5]	2 [0.5-8.1]	1.67 [0.4-6.8]
Citric Acid- Potassium Citrate	5.58	3.04	1.84	[0.9-3.9]	3.2 [1.3-7.8]	0.84 [0.2-3.4]

C. Top 100 lab-tests associated with suicidal behavior. Each test is shown with its associated result in brackets encoded as: N=negative, H=high, L=low, A=abnormal, and U=un-interpretable.

Lab Test (result)	Cases (1:100k)	TOTAL			Women	Men
		Controls (1:100k)	Risk Score [95% CI]		Risk Score [95% CI]	Risk Score [95% CI]
Norchlordiazepoxide [Presence] in Serum or Plasma (N)	25.68	1.37	18.74	[15.5-22.6]	23.75 [15.9-35.4]	15.4 [12.4-19.1]
Chlordiazepoxide [Mass/volume] in Serum or Plasma by Screen method (N)	24.90	1.41	17.63	[14.6-21.3]	22.96 [15.3-34.4]	14.38 [11.6-17.9]
Demoxepam [Mass/volume] in Serum or Plasma (N)	31.76	1.81	17.58	[14.8-20.8]	21.38 [14.9-30.7]	14.62 [12.1-17.7]
Cocaethylene [Presence] in Serum or Plasma (N)	15.49	0.89	17.35	[13.6-22.1]	21.64 [13.6-34.4]	14.22 [10.7-18.9]
Methadone [Mass/volume] in Serum or Plasma by Screen method (N)	28.62	1.80	15.90	[13.3-19]	14.68 [10.9-19.8]	15.34 [12.3-19.1]
Alprazolam [Mass/volume] in Serum or Plasma (N)	21.37	1.36	15.70	[12.8-19.3]	21.11 [15.9-28.1]	11.45 [8.5-15.3]
Cocaine [Presence] in Serum or Plasma (N)	33.13	2.12	15.66	[13.3-18.5]	19.48 [14.5-26.2]	12.8 [10.5-15.6]
Nordiazepam [Mass/volume] in Serum or Plasma by Screen method (N)	61.56	4.07	15.14	[13.4-17.1]	16.18 [13.1-19.9]	13.29 [11.5-15.4]
Oxazepam [Mass/volume] in Serum or Plasma by Screen method (N)	10.39	0.70	14.84	[11.1-19.9]	17.71 [11.2-27.9]	12.22 [8.3-17.9]
Clonazepam [Mass/volume] in Serum or Plasma by Screen method (N)	57.05	3.91	14.61	[12.9-16.5]	14.77 [12.3-17.7]	14.02 [11.8-16.6]
Diazepam [Mass/volume] in Serum or Plasma by Screen method (N)	30.19	2.25	13.43	[11.3-15.9]	14.1 [10.6-18.7]	11.99 [9.7-14.8]
Norpropoxyphene [Mass/volume] in Serum or Plasma by Screen method (N)	5.69	0.48	11.90	[8.1-17.6]	11.62 [6.5-20.6]	11.77 [6.9-20]
M-chlorophenylpiperazine [Presence] in Serum or Plasma (N)	17.84	1.53	11.64	[9.3-14.5]	13.34 [10-17.8]	9.89 [7-13.9]
Diphenhydramine [Mass/volume] in Serum or Plasma by Screen method (N)	36.27	3.17	11.46	[9.8-13.4]	12.34 [9.8-15.5]	10.25 [8.3-12.6]
Fluoxetine [Mass/volume] in Serum or Plasma by Screen method (N)	25.29	2.40	10.53	[8.8-12.6]	11.47 [8.9-14.8]	9.47 [7.3-12.3]
Norfluoxetine [Mass/volume] in Serum or Plasma by Screen method (N)	30.98	2.96	10.47	[8.9-12.3]	12.14 [9.7-15.2]	8.77 [6.9-11.2]

Trazodone [Mass/volume] in Serum or Plasma by Screen method (N)	32.35	3.12	10.35	[8.8-12.2]	11.94 [9.5-15]	8.73 [6.9-11]
Paroxetine [Presence] in Serum or Plasma (N)	9.41	0.95	9.90	[7.3-13.3]	12.39 [8.4-18.2]	7.45 [4.6-11.9]
Ibuprofen [Mass/volume] in Serum or Plasma by Screen method (N)	12.35	1.27	9.72	[7.5-12.6]	12.5 [8.7-17.9]	7.31 [5-10.7]
Opiates [Presence] in Urine (H)	16.08	1.72	9.35	[7.4-11.8]	8.36 [5.6-12.5]	9.12 [6.9-12]
Cocaine [Presence] in Serum or Plasma by Screen method (H)	14.31	1.53	9.35	[7.3-11.9]	11.78 [8.1-17.2]	7.45 [5.4-10.2]
Sertraline [Presence] in Serum or Plasma (N)	16.08	1.73	9.27	[7.4-11.6]	10.85 [8-14.8]	7.67 [5.5-10.8]
Norsertaline [Presence] in Serum or Plasma (N)	18.82	2.13	8.82	[7.1-10.9]	10.51 [7.9-14]	7.17 [5.3-9.8]
Amitriptyline [Mass/volume] in Serum or Plasma by Screen method (N)	6.47	0.74	8.74	[6.1-12.5]	8.12 [4.7-14]	8.98 [5.6-14.5]
Acetaminophen [Mass/volume] in Serum or Plasma by Screen method (L)	17.25	1.99	8.67	[7-10.8]	10.06 [7.5-13.5]	7.25 [5.2-10.1]
Nortriptyline [Mass/volume] in Serum or Plasma by Screen method (N)	8.82	1.02	8.63	[6.3-11.7]	7.95 [5-12.5]	9.1 [6-13.8]
Salicylates [Mass/volume] in Serum or Plasma by Screen method (N)	16.86	2.02	8.34	[6.7-10.4]	9.28 [6.9-12.4]	7.37 [5.3-10.3]
Oxycodone [Presence] in Serum or Plasma (N)	10.39	1.25	8.30	[6.3-11]	8.9 [5.6-14.2]	7.31 [5.1-10.4]
Venlafaxine [Presence] in Serum or Plasma (N)	8.63	1.10	7.85	[5.8-10.7]	9.54 [6.5-14]	6.01 [3.5-10.2]
Benzodiazepines [Presence] in Serum or Plasma (A)	3.92	0.50	7.79	[4.9-12.3]	6.68 [3.1-14.4]	8.06 [4.5-14.3]
Lorazepam [Mass/volume] in Serum or Plasma by Screen method (N)	14.31	1.88	7.62	[6-9.7]	9.65 [6.7-13.9]	6.01 [4.4-8.3]
Carbamazepine [Mass/volume] in Serum or Plasma by Screen method (N)	5.69	0.77	7.38	[5.1-10.8]	8.85 [5.2-15]	5.98 [3.5-10.3]
Salicylates [Mass/volume] in Serum or Plasma (N)	11.76	1.65	7.13	[5.5-9.3]	7.47 [5.1-11]	6.6 [4.6-9.5]
Benzoylcegonine [Presence] in Urine (A)	11.96	1.75	6.85	[5.3-8.9]	8.51 [5.7-12.6]	5.46 [3.9-7.7]
Ethanol [Presence] in Urine (N)	17.84	2.64	6.75	[5.5-8.4]	5.9 [4.4-8]	8.12 [6-11]
Benzodiazepines [Presence] in Urine (A)	28.43	4.23	6.72	[5.7-8]	6.85 [5.4-8.7]	6.53 [5.1-8.3]
Acetaminophen [Mass/volume] in Serum or Plasma (N)	16.27	2.45	6.64	[5.3-8.3]	7.44 [5.5-10.1]	5.78 [4.2-8]
Ethanol [Mass/volume] in Blood (N)	130.96	19.99	6.55	[6.1-7.1]	7.81 [6.8-8.9]	5.43 [4.9-6]

Deprecated						
Tetrahydrocannabinol [Presence] in Urine by Screen method (H)	10.98	1.68	6.53	[5-8.6]	6.85 [4.3-10.9]	5.8 [4.1-8.1]
Hepatitis C virus Ab [Presence] in Serum (A)	7.84	1.24	6.34	[4.6-8.7]	6.37 [3.9-10.4]	6.01 [3.9-9.2]
Benzodiazepines [Presence] in Urine (H)	12.94	2.12	6.11	[4.8-7.8]	5.85 [3.9-8.8]	5.88 [4.3-8.1]
Deprecated						
Tetrahydrocannabinol [Presence] in Urine by Screen method (N)	56.07	9.26	6.05	[5.4-6.8]	6.18 [5.2-7.4]	5.66 [4.8-6.6]
Tricyclic antidepressants [Presence] in Serum or Plasma (A)	6.27	1.04	6.04	[4.2-8.6]	7.25 [4.4-12]	4.9 [3-8.1]
Amphetamines [Presence] in Serum or Plasma by Screen method (N)	62.93	10.51	5.99	[5.3-6.7]	6.2 [5.2-7.4]	5.5 [4.7-6.4]
Lithium [Mass/volume] in Serum or Plasma (L)	17.84	3.02	5.90	[4.8-7.3]	6.98 [5.2-9.3]	4.83 [3.5-6.6]
Amitriptyline [Mass/volume] in Serum or Plasma (N)	5.49	0.95	5.77	[3.9-8.5]	4.69 [2.7-8]	8.39 [4.8-14.6]
Opiates [Presence] in Urine (A)	16.27	2.84	5.73	[4.6-7.2]	6.42 [4.6-8.9]	4.96 [3.7-6.7]
Lithium [Mass/volume] in Serum or Plasma (N)	30.00	5.31	5.65	[4.8-6.7]	7.03 [5.7-8.7]	4.32 [3.4-5.6]
Cocaine [Presence] in Serum or Plasma by Screen method (N)	52.74	9.41	5.60	[5-6.3]	5.57 [4.6-6.7]	5.34 [4.5-6.3]
Cannabinoids [Presence] in Urine by Screen method (N)	5.69	1.03	5.53	[3.8-8.1]	4.85 [2.7-8.7]	6 [3.7-9.8]
Amitriptyline+Nortriptyline [Mass/volume] in Serum or Plasma (N)	8.04	1.51	5.32	[3.9-7.3]	5.33 [3.5-8.2]	5.44 [3.4-8.7]
Salicylates [Presence] in Serum or Plasma (L)	12.94	2.46	5.25	[4.1-6.7]	5.06 [3.4-7.6]	5.03 [3.7-6.9]
Ethanol [Mass/volume] in Blood (H)	10.00	1.96	5.10	[3.8-6.8]	5.16 [3.2-8.4]	4.63 [3.3-6.5]
Methanol [Mass/volume] in Serum or Plasma (N)	13.53	2.68	5.04	[4-6.4]	5.32 [3.4-8.4]	4.41 [3.3-5.9]
Lithium [Moles/volume] in Serum or Plasma (L)	5.49	1.09	5.03	[3.4-7.4]	3.91 [2.1-7.4]	5.78 [3.6-9.4]
Lamotrigine [Mass/volume] in Serum or Plasma by Screen method (N)	2.55	0.51	5.02	[2.9-8.8]	6.39 [3.1-13.1]	3.68 [1.5-9]
Isopropanol [Mass/volume] in Serum or Plasma (N)	14.70	2.94	5.01	[4-6.3]	5.51 [3.6-8.5]	4.31 [3.3-5.7]
Ethanol [Mass/volume] in Serum or Plasma (U)	13.53	2.74	4.93	[3.9-6.3]	6.96 [4.8-10]	3.62 [2.6-5]
Cannabinoids [Units/volume] in Urine (A)	15.10	3.07	4.92	[3.9-6.2]	5.17 [3.6-7.5]	4.42 [3.3-5.9]
Gabapentin [Mass/volume] in Serum or Plasma (N)	5.49	1.12	4.91	[3.4-7.2]	5.45 [3.3-9]	4.37 [2.4-7.8]
Acetaminophen [Presence] in Urine (N)	69.40	14.18	4.90	[4.4-5.4]	5.35 [4.5-6.3]	4.29 [3.7-4.9]

Amphetamines [Presence] in Urine (A)	4.90	1.02	4.83	[3.2-7.2]	7.6 [4.6-12.6]	2.76 [1.4-5.4]
Methamphetamine [Presence] in Urine (N)	83.91	17.45	4.81	[4.4-5.3]	5.21 [4.5-6.1]	4.26 [3.7-4.8]
Metoprolol [Presence] in Serum or Plasma by Screen method (N)	2.94	0.62	4.77	[2.8-8]	4.83 [2.1-11]	4.43 [2.3-8.7]
Clozapine [Mass/volume] in Serum or Plasma (N)	2.35	0.50	4.74	[2.7-8.5]	6.09 [2.7-13.9]	3.63 [1.6-8.2]
Benzodiazepines [Presence] in Urine by Screen method (N)	4.90	1.04	4.70	[3.1-7]	3.86 [2-7.5]	5.12 [3.1-8.5]
Tricyclic antidepressants [Presence] in Urine (N)	94.50	20.33	4.65	[4.2-5.1]	5.01 [4.4-5.7]	4.15 [3.7-4.7]
Phenytoin [Mass/volume] in Serum or Plasma by Screen method (N)	9.02	1.95	4.63	[3.4-6.2]	4.48 [2.7-7.5]	4.3 [3-6.2]
Barbiturates [Presence] in Urine by Screen method (N)	5.29	1.15	4.62	[3.1-6.8]	4.3 [2.4-7.9]	4.66 [2.8-7.7]
Phencyclidine [Mass/volume] in Urine (N)	3.14	0.69	4.54	[2.7-7.5]	4.06 [1.8-9.2]	4.63 [2.4-8.8]
Imipramine+Desipramine [Mass/volume] in Serum or Plasma (N)	2.35	0.53	4.45	[2.5-8]	3.72 [1.5-9.1]	5.15 [2.4-11.1]
Tetrahydrocannabinol [Presence] in Urine (A)	2.94	0.66	4.43	[2.6-7.5]	4.27 [1.9-9.7]	4.31 [2.2-8.4]
Lithium [Moles/volume] in Serum or Plasma (N)	8.04	1.83	4.39	[3.2-6]	5.11 [3.4-7.7]	3.64 [2.2-5.9]
Hepatitis C virus RNA [Units/volume] (viral load) in Serum or Plasma by Probe and target amplification method (H)	5.49	1.25	4.38	[3-6.4]	6.21 [3.5-10.9]	3.18 [1.9-5.3]
Salicylates [Mass/volume] in Serum or Plasma (L)	55.09	12.70	4.34	[3.8-4.9]	4.81 [4.1-5.7]	3.8 [3.2-4.5]
Benzoylcegonine [Presence] in Urine (N)	317.40	73.23	4.33	[4.1-4.6]	4.48 [4.2-4.8]	3.99 [3.7-4.3]
Barbiturates [Presence] in Urine (A)	3.92	0.93	4.22	[2.7-6.6]	6.72 [3.9-11.5]	2.16 [1-4.9]
Ethanol [Presence] in Blood (U)	6.27	1.52	4.12	[2.9-5.9]	4.58 [2.3-9.3]	3.52 [2.3-5.3]
Phencyclidine [Presence] in Urine (N)	381.71	93.11	4.10	[3.9-4.3]	4.32 [4-4.6]	3.72 [3.5-4]
Ethanol [Mass/volume] in Serum or Plasma (N)	97.44	23.82	4.09	[3.7-4.5]	4.37 [3.8-5]	3.72 [3.3-4.2]
Amphetamine [Presence] in Urine by Screen method (N)	25.88	6.33	4.09	[3.4-4.9]	4.23 [3.3-5.4]	3.94 [3.1-5.1]
Oxycodone [Presence] in Urine (H)	2.55	0.63	4.04	[2.3-7]	8.12 [4.1-16]	1.74 [0.6-4.7]
Benzodiazepines [Presence] in Serum or Plasma (N)	158.41	39.43	4.02	[3.7-4.3]	4.4 [4-4.9]	3.54 [3.2-3.9]
Hepatitis C virus RNA [Units/volume] (viral load) in Serum or Plasma by Probe and target amplification method (N)	56.07	13.97	4.01	[3.6-4.5]	3.85 [3.2-4.7]	3.82 [3.3-4.4]

Hepatitis C virus genotype [Identifier] in Serum or Plasma by Probe and target amplification method (N)	38.62	9.75	3.96	[3.4-4.6]	3.37 [2.6-4.4]	3.92 [3.3-4.7]
Cannabinoids [Units/volume] in Urine (N)	54.11	13.71	3.95	[3.5-4.5]	3.81 [3.2-4.5]	4.24 [3.6-5.1]
Valproate [Mass/volume] in Serum or Plasma (L)	38.82	9.85	3.94	[3.4-4.5]	4.41 [3.6-5.4]	3.41 [2.8-4.1]
Lidocaine [Mass/volume] in Serum or Plasma by Screen method (N)	8.04	2.05	3.93	[2.9-5.4]	5.34 [3.3-8.6]	2.96 [1.9-4.5]
Tetrahydrocannabinol [Presence] in Urine (N)	365.44	94.83	3.85	[3.7-4]	4.01 [3.7-4.3]	3.54 [3.3-3.8]
Cocaine [Presence] in Urine (N)	22.55	5.86	3.85	[3.2-4.6]	4.25 [3.3-5.4]	3.44 [2.6-4.6]
Acetaminophen [Mass/volume] in Serum or Plasma (L)	86.26	22.50	3.83	[3.5-4.2]	4.16 [3.6-4.8]	3.44 [3-3.9]
Amphetamines [Presence] in Urine (N)	400.72	105.01	3.82	[3.7-4]	3.89 [3.6-4.2]	3.58 [3.4-3.8]
Barbiturates [Presence] in Serum, Plasma or Blood (N)	105.67	27.88	3.79	[3.5-4.1]	4.07 [3.6-4.6]	3.38 [3-3.8]
Barbiturates [Presence] in Urine (N)	434.84	115.12	3.78	[3.6-3.9]	3.85 [3.6-4.1]	3.55 [3.4-3.8]
Theophylline [Mass/volume] in Blood (L)	3.14	0.84	3.73	[2.3-6.1]	5.98 [3.3-11]	1.94 [0.8-4.7]
Opiates [Presence] in Urine (N)	409.15	112.10	3.65	[3.5-3.8]	3.78 [3.5-4]	3.39 [3.2-3.6]
Tricyclic antidepressants [Presence] in Serum or Plasma (N)	165.86	45.50	3.65	[3.4-3.9]	3.86 [3.5-4.3]	3.3 [3-3.6]
Salicylates [Mass/volume] in Serum or Plasma by Screen method (L)	35.48	9.75	3.64	[3.1-4.2]	4.18 [3.4-5.1]	3.08 [2.5-3.8]
Benzodiazepines [Presence] in Urine (N)	399.74	110.75	3.61	[3.5-3.8]	3.69 [3.5-4]	3.38 [3.2-3.6]
Valproate [Mass/volume] in Serum or Plasma (N)	36.07	10.12	3.57	[3.1-4.1]	3.94 [3.2-4.9]	3.13 [2.6-3.8]

Table S-3 - Overall model performance by age and gender (based on testing-cohort). Accuracy: the percentage of correct predictions made out of all predictions; PPV: Positive Predictive Value; NPV: Negative Predictive Value.

Age	Accuracy	Sensitivity	Specificity	PPV	NPV
MEN (AUC=0.76)					
0-25	0.89	0.32	0.90	0.03	0.99
	0.94	0.20	0.95	0.04	0.99
25-45	0.89	0.43	0.90	0.07	0.99
	0.94	0.29	0.95	0.09	0.99
45-65	0.89	0.50	0.90	0.06	0.99
	0.94	0.36	0.95	0.09	0.99
65+	0.90	0.29	0.90	0.02	0.99
	0.95	0.21	0.95	0.03	0.99
WOMEN (AUC=0.77)					
0-25	0.89	0.40	0.90	0.04	0.99
	0.94	0.29	0.95	0.06	0.99
25-45	0.90	0.54	0.90	0.04	1.00
	0.95	0.40	0.95	0.07	0.99
45-65	0.90	0.54	0.90	0.04	1.00
	0.95	0.43	0.95	0.06	1.00
65+	0.90	0.28	0.90	0.02	0.99
	0.95	0.20	0.95	0.03	0.99