Table S1: Sensitivity, specificity, PPV, NPV, and F1 score of NLP vs. ICD for identification of symptoms for (A) BioMe development cohort; (B) BioMe validation cohort; (C) MIMIC-III; (D) 1 year of notes from patients in BioMe calculated using manual chart review.

A)

	Fatigue			Nausea and/or vomiting			Anxiety			Depression		
	NLP (95% CI)	**ICD (95% CI)**	**P**	**NLP (95% CI)**	**ICD (95% CI)**	**P**	**NLP (95% CI)**	**ICD (95% CI)**	**P**	**NLP (95% CI)**	**ICD (95% CI)**	**P**
Sensitivity	0.99 (0.93-1)	0.59 (0.43-0.73)	<0.001	0.99 (0.9 – 1)	0.25 (0.12-0.42)	<0.001	0.98 (0.88 -1)	0.3 (0.15-0.5)	<0.001	0.85 (0.65-96)	0.54 (0.33-0.73)	0.02
Specificity	0.89 (0.4-1)	0.75 (0.19-1)	0.68	0.57 (0.29-0.82)	0.97 (0.77-1)	0.03	0.9 (0.68-0.99)	0.98 (0.83-1)	0.22	0.81 (0.53-0.9)	0.96 (0.79-1)	0.06
PPV	0.99 (0.92-1)	0.96 (0.82-1)	0.3	0.86 (0.71-0.95)	0.95 (0.66-1)	0.02	0.94 (0.79-0.99)	0.95 (0.66-1)	0.16	0.79 (0.59-0.92)	0.93 (0.68-1)	0.12
NPV	0.89 (0.4-1)	0.13 (0.03-0.35)	0.007	0.94 (0.63-1)	0.34 (0.2-0.51)	<0.001	0.97 (0.81-1)	0.49 (0.33-0.65)	<0.001	0.86 (0.6-0.95)	0.66 (0.48-0.81)	0.04
F1 Score	0.99	0.83	<0.001	0.88	0.57	<0.001	0.95	0.63	<0.001	0.82	0.79	0.002

	Itching			Cramp			Pain		
	NLP (95% CI)	**ICD (95% CI)**	**P**	**NLP (95% CI)**	**ICD (95% CI)**	**P**	**NLP (95% CI)**	**ICD (95% CI)**	**P**
Sensitivity	0.98 (0.86-1)	0.24 (0.09-0.45)	<0.001	0.98 (0.85-1)	0.09 (0.01-0.29)	<0.001	0.99 (0.93-1)	0.52 (0.37-0.66)	<0.001
Specificity	0.96 (0.8-1)	0.98 (0.86-1)	0.68	0.89 (0.72-0.98)	0.98 (0.88-1)	0.18	0.5 (0-1)	0.5 (0.37-0.66)	1
PPV	0.96 (0.8-1)	0.8 (0.54-1)	0.32	0.88 (0.69-0.97)	0.8 (0.16-1)	0.22	0.99 (0.93-1)	0.98 (0.87-1)	NA*
NPV	0.98 (0.85-1)	0.57 (0.41-0.72)	<0.001	0.98 (0.86-1)	0.58 (0.43-0.72)	<0.001	0.5 (0-1)	0.02 (0-0.08)	NA*
F1 Score	0.97	0.56	<0.001	0.91	0.28	<0.001	0.99	0.68	<0.001

*Denotes 95% confidence intervals and P values that could not be calculated due to insufficient cells in 2x2 tables.

B)

	Fatigue			Nausea and/or vomiting			Anxiety			Depression		
	NLP (95% CI)	**ICD (95% CI)**	**P**	**NLP (95% CI)**	**ICD (95% CI)**	**P**	**NLP (95% CI)**	**ICD (95% CI)**	**P**	**NLP (95% CI)**	**ICD (95% CI)**	**P**
Sensitivity	0.99 (0.92-1)	0.71 (0.56-0.85)	0.51	0.93 (0.78-0.99)	0.33 (0.17-0.51)	0.54	0.91 (0.71-0.99)	0.14 (0.03-0.32)	1	0.78 (0.52-0.94)	0.44 (0.19-0.64)	0.09
Specificity	0.75 (0.19-0.99)	0.5 (0.09-0.99)	1	0.81 (0.54-0.96)	0.74 (0.68-1)	1	0.83 (0.63-0.95)	1 (0.85-1)	0.4	0.79 (0.59-0.92)	1 (0.87-1)	0.5
PPV	0.98 (0.88-1)	0.94 (0.84-1)	0.21	0.9 (0.74-0.98)	0.91 (0.59-1)	0.95	0.83 (0.63-0.95)	1 (0.29-1)	0.12	0.7 (0.46-0.88)	1 (0.63-1)	0.006
NPV	0.86 (0.29-1)	0.14 (0.02-0.43)	0.02	0.87 (0.60-0.98)	0.43 (0.24-0.58)	<0.001	0.91 (0.71-0.99)	0.56 (0.35-0.67)	<0.001	0.85 (0.65-0.96)	0.74 (0.51-0.83)	0.06
F1 Score	0.98	0.81		0.92	0.48		0.87	0.25		0.74	0.61	

	Itching			Cramp			Pain		
	NLP (95% CI)	**ICD (95% CI)**	**P**	**NLP (95% CI)**	**ICD (95% CI)**	**P**	**NLP (95% CI)**	**ICD (95% CI)**	**P**
Sensitivity	0.97 (0.82-1)	0.26 (0.06-0.37)	0.50	0.98 (0.86-1)	0.13 (0.02-0.27)	0.3	0.99 (0.91-1)	0.39 (0.24-0.53)	0.82
Specificity	0.67 (0.46-0.83)	1 (0.81-1)	0.73	0.77 (0.55-0.92)	1 (0.8-1)	0.53	0.2 (0.005-0.72)	0.8 (0.03-1)	1
PPV	0.68 (0.48-0.84)	1 (0.48-1)	0.02	0.83 (0.64-0.94)	1 (0.29-1)	0.11	0.91 (0.79-0.98)	0.94 (0.8-1)	0.56
NPV	0.97 (0.81-1)	0.66 (0.28-0.6)	<0.001	0.97 (0.80-1)	0.51 (0.25-0.56)	<0.001	0.67 (0.03-1)	0.14 (0-0.18)	0.29
F1 Score	0.80	0.41		0.90	0.03		0.95	0.55	

C)

	Fatigue			Nausea and/or vomiting			Anxiety			Depression		
	NLP (95% CI)	ICD (95% CI)	P	NLP (95% CI)	ICD (95% CI)	P	NLP (95% CI)	ICD (95% CI)	P	NLP (95% CI)	ICD (95% CI)	P
Sensitivity	0.98 (0.86-1)	0.04 (0-0.21)	<0.001	0.82 (0.6-0.95)	0.05 (0-0.23)	<0.001	0.96 (0.78-1)	0.13 (0.03-0.34)	<0.001	0.71 (0.42-0.92)	0.43 (0.18-0.71)	0.22
Specificity	0.77 (0.56-0.91)	0.98 (0.87-1)	0.03	0.86 (0.67-0.96)	0.98 (0.88-1)	0.1	0.93 (0.76-1)	0.98 (0.87-1)	0.34	0.81 (0.64-0.92)	0.99 (0.9-1)	0.02
PPV	0.8 (0.61-0.92)	0.67 (0.03-1)	NA*	0.82 (0.6-0.95)	0.67 (0.03-1)	0.39	0.92 (0.73-0.99)	0.86 (0.29-1)	0.35	0.59 (0.33-0.82)	0.92 (0.54-1)	NA*
NPV	0.98 (0.83-1)	0.53 (0.38-0.67)	NA*	0.86 (0.67-0.96)	0.57 (0.42-0.71)	<0.001	0.96 (0.8-1)	0.57 (0.42-0.72)	<0.001	0.88 (0.72-0.97)	0.82 (0.67-0.92)	NA*
F1 Score	0.88	0.08	0.09	0.82	0.09	0.003	0.94	0.23	<0.001	0.65	0.59	

	Itching			Cramp			Pain		
	NLP (95% CI)	ICD (95% CI)	P	NLP (95% CI)	ICD (95% CI)	P	NLP (95% CI)	ICD (95% CI)	P
Sensitivity	0.8 (0.16-1)	0.2 (0.16-1)	0.34	0.5*	0.5*	NA*	0.99 (0.91-1)	0.07 (0.02-0.2)	<0.001
Specificity	0.98 (0.89-1)	0.99 (0.93-1)	0.68	0.96 (0.86-1)	0.99 (0.93-1)	0.34	0.11 (0-0.48)	0.95 (0.66-1)	<0.001
PPV	0.67 (0.09-0.99)	0.5*	0.26	0.2 (0.01-0.99)	0.5*	NA*	0.84 (0.7-0.93)	0.86 (0.29-1)	0.19
NPV	0.99 (0.92-1)	0.96 (0.86-1)	0.04	0.99 (0.93-1)	0.99 (0.93-1)	NA*	0.67 (0.03-1)	0.19 (0.09-0.33)	0.3
F1 Score	0.72	0.29	<0.001	0.29	0.5	1	0.91	0.13	0.24

*Denotes 95% confidence intervals and P values that could not be calculated due to insufficient cells in 2x2 tables.

D)

	Fatigue		Nausea and /or vomiting		Anxiety		Depression	
	NLP (95% CI)	ICD (95% CI)	NLP (95% CI)	ICD (95% CI)	NLP (95% CI)	ICD (95% CI)	NLP (95% CI)	ICD (95% CI)
Sensitivity	1 (0.79-1)	0.25 (0.07-0.52)	0.96 (0.72-1)	0.09 (0.002 – 0.41)	0.91 (0.5-1)	0.09 (0-0.33)	0.70 (0.35-0.93)	0.20 (0.03-0.56)
Specificity	0.79 (0.49-0.95)	0.97 (0.77-1)	0.89 (0.67-0.99)	0.97 (0.82-1)	0.91 (0.74-0.99)	0.98 (0.86-1)	0.98 (0.83-1)	1.00 (0.83-1)
PPV	0.84 (0.6-0.97)	0.89 (0.4-1)	0.85 (0.55-0.98)	0.67 (0.03-1)	0.71 (0.29-0.96)	0.5 (0-1)	0.93 (0.59-1)	1.00 (0.16-1)
NPV	1 (0.72-1)	0.54 (0.33-0.73)	0.97 (0.8-1)	0.66 (0.42-0.79)	0.98 (0.85-1)	0.83 (0.65-0.94)	0.87 (0.66-0.97)	0.71 (0.51-0.87)
F1 Score	0.91	0.39	0.9	0.16	0.8	0.15	0.8	0.32

	Itching		Cramp		Pain	
	NLP (95% CI)	ICD (95% CI)	NLP (95% CI)	ICD (95% CI)	NLP (95% CI)	ICD (95% CI)
Sensitivity	0.93 (0.59 -1)	0.14 (0.004-0.58)	0.91 (0.48-1)	0.2 (0.005-0.72)	0.96 (0.78-1)	0.09 (0.01-0.28)
Specificity	0.98 (0.85-1)	1.00 (0.85-1)	0.98 (0.86-1)	0.98 (0.86-1)	0.57 (0.18-0.9)	0.93 (0.59-1)
PPV	0.93 (0.59-1)	1.00 (0.03-1)	0.91 (0.48-1)	0.67 (0.03-1)	0.88 (0.69-0.97)	0.8 (0.16-1)
NPV	0.98 (0.82-1)	0.79 (0.6-0.92)	0.98 (0.86-1)	0.86 (0.68-0.96)	0.80 (0.28-0.99)	0.25 (0.11-0.45)
F1 Score	0.93	0.25	0.91	0.31	0.92	0.16

Table S2: ICD 9 and 10 codes for identification of A) hemodialysis and peritoneal dialysis patients; B) comorbidities; and C) symptoms.

A)

Study Variable	ICD9	Description
Diagnosis Code	585.6	End Stage Kidney Disease
Dialysis procedures	39.95	Hemodialysis
Dialysis diagnosis	V45.11, V45.12, V56.0, V56.1	Hemodialysis
Acute Kidney Injury	584.x, 586	Acute kidney failure, Renal failure, unspecified
Peritoneal Dialysis procedures	54.98, V56.2, V56.8, 996.68, V56.32	Peritoneal Dialysis, Fitting and adjustment of peritoneal dialysis catheter, Encounter for other dialysis, Infection and inflammatory reaction due to peritoneal dialysis catheter, Encounter for adequacy testing for peritoneal dialysis

Study Variable	ICD10	Description
Diagnosis Code	N18.6	End Stage Kidney Disease
Dialysis procedures	5A1D70Z	Hemodialysis
Dialysis diagnosis	Z99.2, Z91.15, Z49.01, Z49.3, Z49.31, Z49.32	Hemodialysis, Encounter for fitting and adjustment of extracorporeal dialysis catheter
Acute Kidney Injury	N17.x	
Peritoneal Dialysis procedures	3E1M39Z, Z49.02, Z49.32, T85.611x, T85.621x, T85.631, T85.691x, T85.71x, Z49.32	Irrigation of Peritoneal Cavity using Dialysate, Percutaneous Approach, Encounter for fitting and adjustment of peritoneal dialysis catheter, Breakdown (mechanical) of intraperitoneal dialysis catheter, Displacement of intraperitoneal dialysis catheter, Leakage of intraperitoneal dialysis catheter, Other mechanical complication of intraperitoneal dialysis catheter, Infection and inflammatory reaction due to peritoneal dialysis catheter, Encounter for adequacy testing for peritoneal dialysis

B)

Comorbidity	CCS Category	ICD 9	ICD 10
DM	49 Diabetes mellitus without complication 50 Diabetes mellitus with complications	249.00, 250.00, 250.01, 790.2, 790.21, 790.22 790.29, 791.5, 791.6, V45.85, V53.91, V65.46, 249.01, 249.10, 249.11, 249.20, 249.21, 249.30, 249.31, 249.40, 249.41, 249.50, 249.51, 249.60, 249.61, 249.70, 249.71, 249.80, 249.81, 249.90, 249.91, 250.02, 250.03, 250.10, 250.11, 250.12, 250.13, 250.20, 250.21, 250.22, 250.23, 250.30, 250.31, 250.32, 250.33, 250.40, 250.41, 250.42, 250.43, 250.50, 250.51, 250.52, 250.53, 250.60, 250.61, 250.62, 250.63, 250.70, 250.71, 250.72, 250.73, 250.80, 250.81, 250.82, 250.83, 250.90, 250.91, 250.92, 250.93	E08.x, E09.x, E10.x, E11.x, E13.x, R73.x R81, R82.4, Z46.81, Z96.41,
Hypertension	98 Essential hypertension 99 Hypertension with complications and secondary hypertension	401.1, 401.9, 401.0, 402.00, 402.01, 402.10, 402.11, 402.90, 402.91, 403.0, 403.00, 403.01, 403.1, 403.10, 403.11, 403.9, 403.90, 403.91, 404.0, 404.00, 404.01, 404.02, 404.03, 404.1, 404.10, 404.11, 404.12, 404.13, 404.9, 404.90, 404.91, 404.92, 404.93, 405.01, 405.09, 405.11, 405.19, 405.91, 405.99, 437.2	I10, I11.x, I12.x, I13.x, I15.x, I16.x, I67.4, N26.2
Coronary artery disease	101 Coronary atherosclerosis and other heart disease	411.0, 411.1, 411.8, 411.81, 411.89, 412, 413.0, 413.1, 413.9, 414.0, 414.00, 414.01, 414.06, 414.2, 414.3, 414.4 414.8, 414.9, V45.81, V45.82	I20.x, I23.7, I24.x, I25.x, Z95.1, Z95.5, Z98.61
Congestive Heart Failure	108 Congestive heart failure; nonhypertensive	398.91, 428.0, 428.1, 428.20, 428.21, 428.22, 428.23, 428.30, 428.31, 428.32, 428.33, 428.40, 428.41, 428.42, 428.43, 428.9	I09.81, I50.x

C)

Symptoms	ICD-9	ICD-10
Cramps	729.82 cramp in limb 728.85 spasm of muscle	R25.2 cramp and spasm M62.83 Muscle spasm
Fatigue	780.79 Other malaise and fatigue 780.7 Malaise and fatigue	R53.1 Weakness R53.81 Other malaise R53.83 Other fatigue
Depression(1)	296.20-.25: Major depressive disorder single episode 296.30-.35: Major depressive disorder recurrent episode 300.4: Dysthymic Disorder 311: Depressive disorder, not elsewhere classified 309.0: Adjustment disorder with depressed mood 309.1: Prolonged depressive reaction 309.28: Adjustment disorder with mixed anxiety and depressed mood 296.5: Bipolar i disorder, most recent episode (or current) depressed 296.6: Bipolar i disorder, most recent episode (or current) mixed 296.82: Atypical depressive disorder	F32.0-32.9: Major depressive disorder, single episode F33.0-33.3: Major depressive disorder, recurrent F33.8: Other recurrent depressive disorders F33.9: Major depressive disorder, recurrent, unspecified F34.1: Dysthymic disorder F41.2: Mixed anxiety and depressive disorder F31.3-F31.6: Bipolar disorder, current episode depressed, mild or moderate severity/mixed F34.8: Other persistent mood [affective] disorders F34.9: Persistent mood [affective] disorder, unspecified F38.0: Other single mood [affective] disorders F38.1: Other recurrent mood [affective] disorders F38.8: Other specified mood [affective] disorders F39: Unspecified mood [affective] disorder F99: Unspecified mental disorder
Pain(2)(3)	307.8: Pain disorders related to psychological factors 388.7: Otalgia 338.0: Central Pain Syndrome pain 338.19: Other acute pain 339: Other headache syndromes 780.96: Generalized Pain 719.4: Pain in joint 723.1: Cervicalgia 724.1: pain in thoracic spine 724.2: lumbago 724.3: sciatica 724.4: Thoracic or lumbosacral neuritis or radiculitis, unspecified 724.5: Backache, unspecified 729.1: Myalgia and myositis, unspecified 729.2: Neuralgia, neuritis, and radiculitis, unspecified	F45.4: Pain disorder with related psychological factors H92.0: ear pain R52: Pain, unspecified G89.0: Pain, not elsewhere classified R51: headache R10.2: Pelvic and perineal pain M54: Dorsalgia M25.5: Pain in Joint M79.1: Myalgia M79.2: neuralgia and neuritis, unspecified M72.9: Fibroblastic disorder, unspecified/Fasciitis R10: Abdominal and pelvic pain R07: Pain in throat and chest H57.1: eye pain M79.6: Pain in limb, hand, foot, fingers and toes R14.1: Gas Pain

	729.4: fasciitis 729.5: Pain in limb 784.92: Jaw Pain 786.5: Chest Pain 789.0: Abdominal Pain 789.6: Abdominal Tenderness 786.50, 786.51, 786.59: nonspecific chest pain 787.3: Flatulence, eructation, and gas pain	R68.84 Jaw Pain
Itching	698.8 Other specified pruritic conditions 698.9: Unspecified pruritic disorder	L29.8 Other pruritus L29.9 Pruritus, unspecified
Nausea and vomiting	787.01 Nausea with Vomiting 787.02 Nausea alone 787.03 Vomiting alone 787.04 Bilious emesis	R11.0 Nausea R11.1 Vomiting R11.10 …… unspecified R11.11 …… without nausea R11.12 Projectile vomiting R11.13 …… of fecal matter R11.14 Bilious vomiting R11.2 Nausea with vomiting, unspecified
anxiety(4)	300.0 Anxiety states 300.00 Anxiety state, unspecified 300.01 Panic disorder without agoraphobia 300.02 Generalized anxiety disorder 300.09 Other anxiety states	F41 Other anxiety disorders F41.0 Panic disorder [episodic paroxysmal anxiety] F41.1 Generalized anxiety disorder F41.3 Other mixed anxiety disorders F41.8 Other specified anxiety disorders F41.9 Anxiety disorder, unspecified

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Table S3: List of SNOMED concepts and children terms used for symptom identification

Parent Term	Children Terms
Cramps	Bathing cramp, cramp in limb, cramp in lower limb, hand cramps, heat cramp, recumbency cramps, stomach cramps
Fatigue	Asthenia (finding), excessive postexertional fatigue, fatigue, fatigue associated with acquired immunodeficiency syndrome, fatigue associated with malignant neoplastic disease, fatigue due to treatment, heavy feeling, psychogenic fatigue, rapid fatigue of gait, tired
Depression disorder	Major depression in remission, major depression with psychotic features, major depression, melancholic type, major depression, single episode, major depressive disorder in mother complicating childbirth, major depressive disorder in mother complicating pregnancy, mild major depression, minimal major depression, moderate major depression, recurrent major depression, severe major depression
Pain	Alteration in comfort: pain, complaining of a pain, disorder characterised by pain, finding of pain sense, finding of pattern of pain, finding of present pain intensity, finding of response to pain, finding related to pain control behavior, generalized aches and pains, inflammatory pain, mild pain, moderate pain, O/E – pain, obstetric pain, pain by sensation quality, pain characterised by relieving factor, pain characterized by provoking factor, pain crisis, pain due to neoplastic disease, pain due to varicose veins of lower extremity, pain during labor and delivery, pain during regional anaesthesia for caesarean section, pain finding - geographic location, pain finding at anatomical site, pain following administration of agent, pain following cerebrovascular accident, pain from metastases, pain in area of anaesthesia, pain on flushing of implanted venous access device, pain threshold – finding, pain with no relieving factor, patient unable to rate pain, posttreatment pain, severe pain, specific body function causing pain, sympathetically independent pain, sympathetically maintained pain, treatment pain
Itching	C/O: itching, itching of ear, itching of eye, itching of skin, referred itching
Nausea and vomiting	Functional nausea, minimal nausea, morning sickness, motion sickness, nausea and vomiting, nausea and vomiting following administration of anaesthetic agent, postoperative nausea, acute vomiting, bilious vomiting, chronic vomiting, concealed vomiting, erotic vomiting, habit vomiting, haematemesis, hyperemesis, intermittent vomiting, nausea and vomiting, persistent vomiting, postoperative vomiting, post-tussive vomiting, projectile vomiting, psychogenic vomiting, self-induced vomiting, uncontrollable vomiting, vomiting – infective, vomiting faecal matter, vomiting in infants AND/OR children, vomiting of pregnancy, vomiting without nausea
Anxiety	Anticipatory anxiety, anxiety about behaviour or performance, anxiety about body function or health, anxiety about forced dependence, anxiety about loss of control, anxiety about treatment, anxiety attack, anxiety state, death anxiety, free-floating anxiety, mild anxiety, mild major depressive disorder co-occurrent with anxiety single episode, moderate anxiety, moderate major depressive disorder co-occurrent with anxiety single episode, on examination – anxious, panic, parental anxiety, performance anxiety, severe major depressive disorder co-occurrent with anxiety single episode

Supplemental Table 4: Example of false positives and false negatives found with NLP

Symptom	**Text**
Depression	False Positive: • Ca++ is ***depressed*** • The plan of care was developed in collaboration with the patient and addresses the following: 1. Treatment goals (eg, A1c goal, BP goal) 2. Barriers to meeting treatment goals 3. Self-management abilities, plans, and goals Self-management tools to record self-care results were given to the patient (eg, blood glucose log, home blood pressure log, activity log for ***depression*** [record of healthy/pleasurable activities identified as goals in Behavioral Activation Treatment]). • HVF RE nonspecific ***depression*** sup and inf stable LE dense sup scotoma stable False Negative: • Does have h/o ***depression***/anxiety
Cramps	False Positive: • [] Excessive***Cramps***:
Fatigue	False Positive: • ***Tired*** of taking pills and feeling sick. • ***Weakness*** is junk food • (Discussing risk associated with surgery) Discussed generalized malaise, ***fatigue***,muscle wasting.
Nausea and/or vomiting	False Positive: • IF she notices more pus, increased redness, swelling, pain, fever, chills, ***nausea, vomiting***, etc • He was instructed to call for any fever, chills, ***nausea or vomiting*** or any new symptoms.
Itching	False Positive: • Allergies: DUST, POLLEN: REACTION--RASH.***ITCHING***,

Supplementary Table S5: List of medications for pain, nausea and/or vomiting, depression, and anxiety as per RXnorm.

Indication	Medications	Medications manually removed
Pain	Alfentanil, Alphaprodine, Buprenorphine, Butorphanol, Codeine, Dextromoramide, Ethylmorphine, Fentanyl, Heroin, Hydrocodone, Hydromorphone, Levorphanol, Meperidine, Meptazinol, Methadone, Morphine, Opium, Oxycodone, Oxymorphone, Papaveretum, Pentazocine, Phenazocine, Phenoperidine, Pirinitramide, Propoxyphene, Sufentanil, Tilidine, Tramadol, Acetaminophen / Hydrocodone, Buprenorphine / Naloxone, dezocine, dihydrocodeine, Diphenoxylate, Levomethadyl, Methadyl Acetate, Nalbuphine, normethadone, remifentanil, tapentadol, tetrapeptide-15, 2-diethylaminoethanol, aceclofenac, acemetacin, Acetaminophen, Acetaminophen / Aspirin / Caffeine, Acetaminophen / butalbital /C affeine, Acetaminophen / Hydrocodoneacexamic acid, adapalene, adapalene / Benzoyl Peroxide, alminoprofen, Aluminum Hydroxide / Aspirin / Magnesium Hydroxide, Amantadine, Amitriptyline, Antipyrine, Apazone, apremilast, Aspirin / Meprobamate, baicalin, balsalazide, benorilate, bromfenac, Bufexamac, bumadizone, butibufen, Carbachol, Carbamazepine, Carbamoylcholine, carprofen, caryophyllene, celecoxib , Chloroquine, Choline Magnesium , Trisalicyclate, chrysarobin, Clonixin, Curcumin, Dexketoprofen, Dexmedetomidine, Diclofenac, Diflunisal, Dihydroergotamine, Dipyrone, dronabinol, droxicam, ecallantide, Ergotamine, Etanercept, ethenzamide, Etodolac, etofenamate, etoricoxib, Evening primrose oil, Felbinac, fenbufen, Fenoprofen, Feprazone, ferulate, floctafenine, flunixin, Flurbiprofen, glucametacin, Ibuprofen, icatibant, imidazole-2-hydroxybenzoate, indobufen, Indomethacin, kebuzone, Ketoprofen, Ketorolac, lonazolac, lornoxicam, loxoprofen, Magnesium Salicylate, Masoprocol, Meclofenamate, Meclofenamic Acid, Medetomidine, Mefenamate, meloxicam, mesalamine, Methotrimeprazine, milnacipran, mofebutazone, mofezolac, nabumetone, Naproxen, Nefopam, nepafenac, Niflumic Acid, nimesulide, Nitrous Oxide, olopatadine, olsalazine, orgotein, oxaprozin, Oxyphenbutazone, palmidrol, parecoxib, parthenolide, Phenacetin, Phenylbutazone, Pimecrolimus, pirfenidone, Piroxicam, Pizotyline, proglumetacin, propyphenazone, Quinine, resveratrol, rofecoxib, salicin, salicylamide, Salicylic Acid, Salsalate, Samarium SM 153 , exidronam, serratiopeptidase, Sulfasalazine, Sulindac, Suprofen, tenoxicam, Tiaprofenate, tolfenamic acid, Tolmetin, tranilast, tribenoside, ursolate, valdecoxib, ziconotide, zileuton, zomepirac	Aspirin
Anti-emetic	Alizapride, aprepitant, bromopride, Chlorpromazine, clebopride, Cyclizine, Dexamethasone, Dimenhydrinate, diphenidol, Dolasetron, Domperidone, Doxylamine, Droperidol, fosaprepitant, Granisetron, maropitant, Meclizine, Metoclopramide, metopimazine, nabilone, Ondansetron, palonosetron, Peppermint oil, Prochlorperazine, Promazine, Scopolamine, Thiethylperazine, Trifluoperazine, Triflupromazine, trimethobenzamide, tropisetron	Diazepam Diphenhydramine Haloperidol Lorazepam Methylprednisolone olanzapine

Depression	5-Hydroxytryptophan, amineptin, Amisulpride, Amitriptyline, Amoxapine, aniracetam, aripiprazole, Benactyzine, bifemelane, Bupropion, butriptyline, Citalopram, Clomipramine, cyclobenzaprine, Deanol, Desipramine, Desvenlafaxine, dibenzepin, Dothiepin, Doxepin, duloxetine, Escitalopram, Fluoxetine, Fluvoxamine, hypericin, Imipramine, indeloxazine, Iprindole, Iproniazid, Isocarboxazid, levomilnacipran, Lithium Carbonate, Lofepramine, Maprotiline, Mianserin, minaprine, Mirtazapine, Moclobemide, nefazodone, Nialamide, Nortriptyline, Opipramol, Paroxetine, Phenelzine, Pizotyline, progabide, Protriptyline, quetiapine, reboxetine, Selegiline, Sertraline, sibutramine, Sulpiride, sultopride, tianeptine, tofisopam, toloxatone, Tranylcypromine, Trazodone, Trimipramine, Tryptophan, venlafaxine, vilazodone, Viloxazine, vortioxetine	
Anxiety	Alprazolam, Bromazepam, Buspirone, butriptyline, carpipramine, Chlordiazepoxide, Chlordiazepoxide / clidinium, Chlormezanone, clobazam, clorazepate, Diazepam, doramectin, Estazolam, ethyl loflazepate, etifoxine, Flunitrazepam, Flurazepam, Fluvoxamine, halazepam, ketazolam, Lorazepam, Medazepam, Meprobamate, Midazolam, Mirtazapine, nabilone, Nitrazepam, Nordazepam, Ondansetron, Oxazepam, Oxprenolol, Prazepam, pregabalin, Temazepam, Tranylcypromine, Trazodone, Triazolam, triazulenone, vortioxetine, Zolazepam	gabapentin

Figure S1: Study flow diagram for A) Bio*ME* and B) MIMIC-III

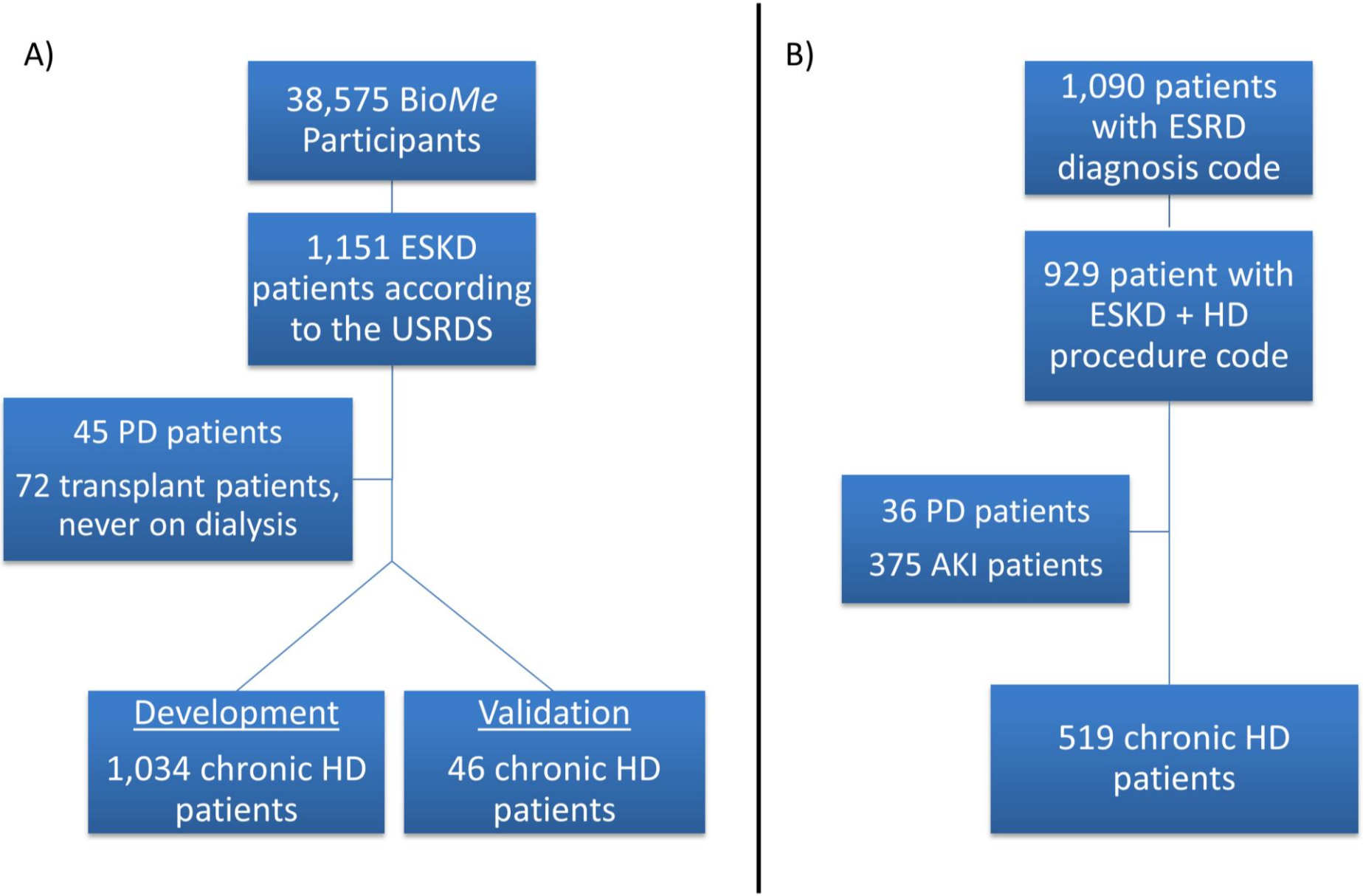

Figure S2: Test parameters for A) addition of medication on ICD performance, B) NLP performance for pain severity identification, C) NLP performance on symptom identification in inpatient vs. outpatient notes.

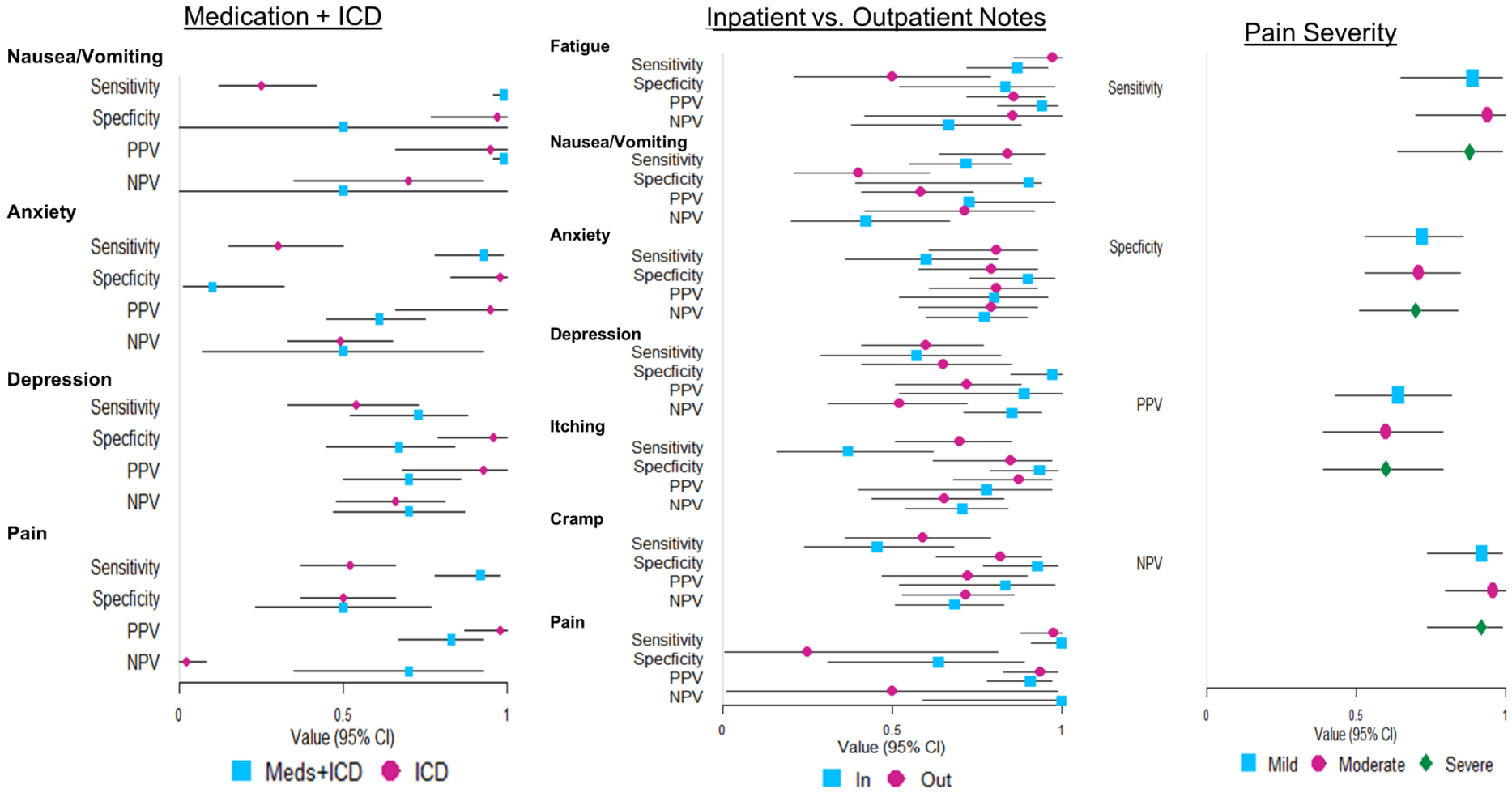

Figure S3: Frequency of symptoms from Bio*Me* patients identified from 1 year of notes

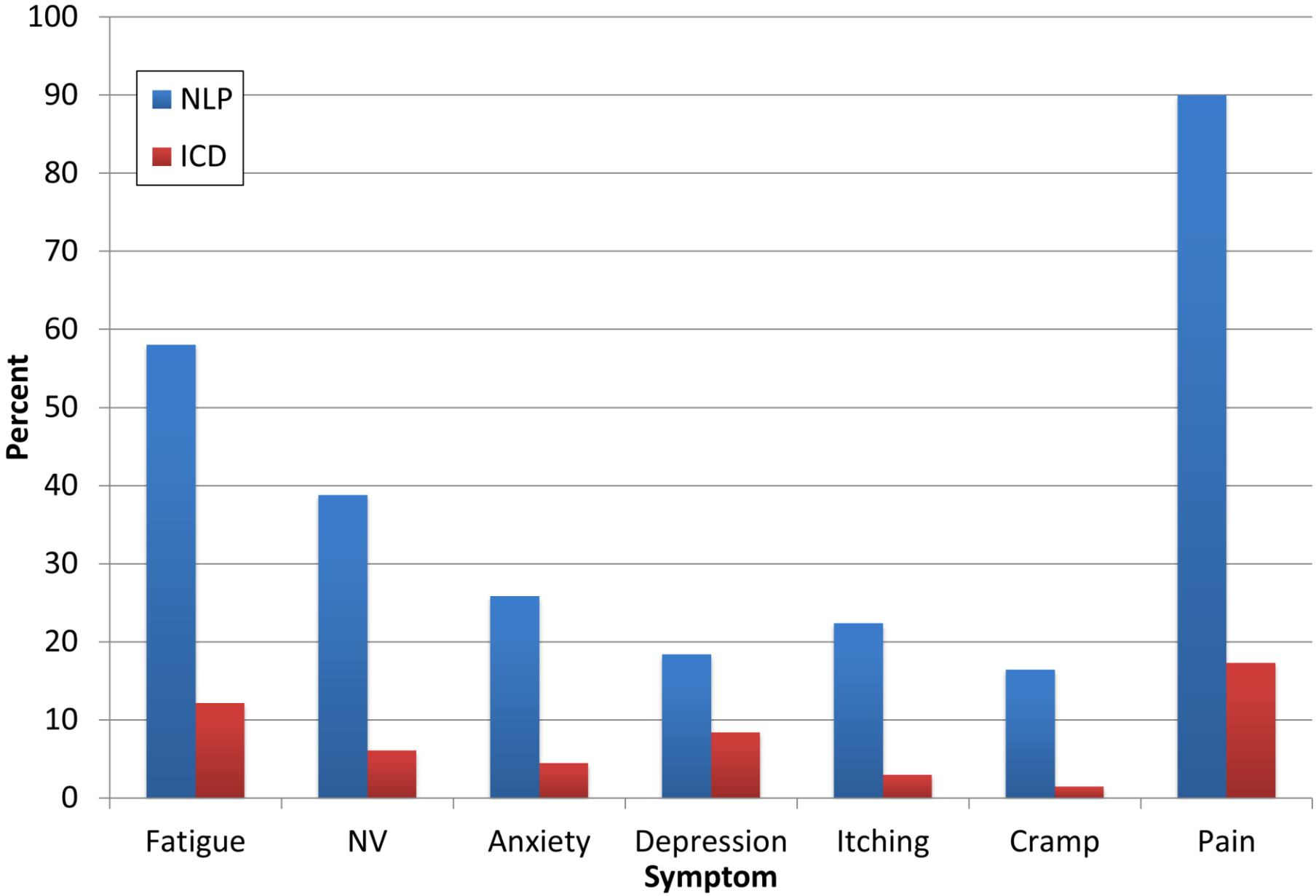

Figure S4: Frequency of symptoms identified by NLP and ICD across tertiles of encounters

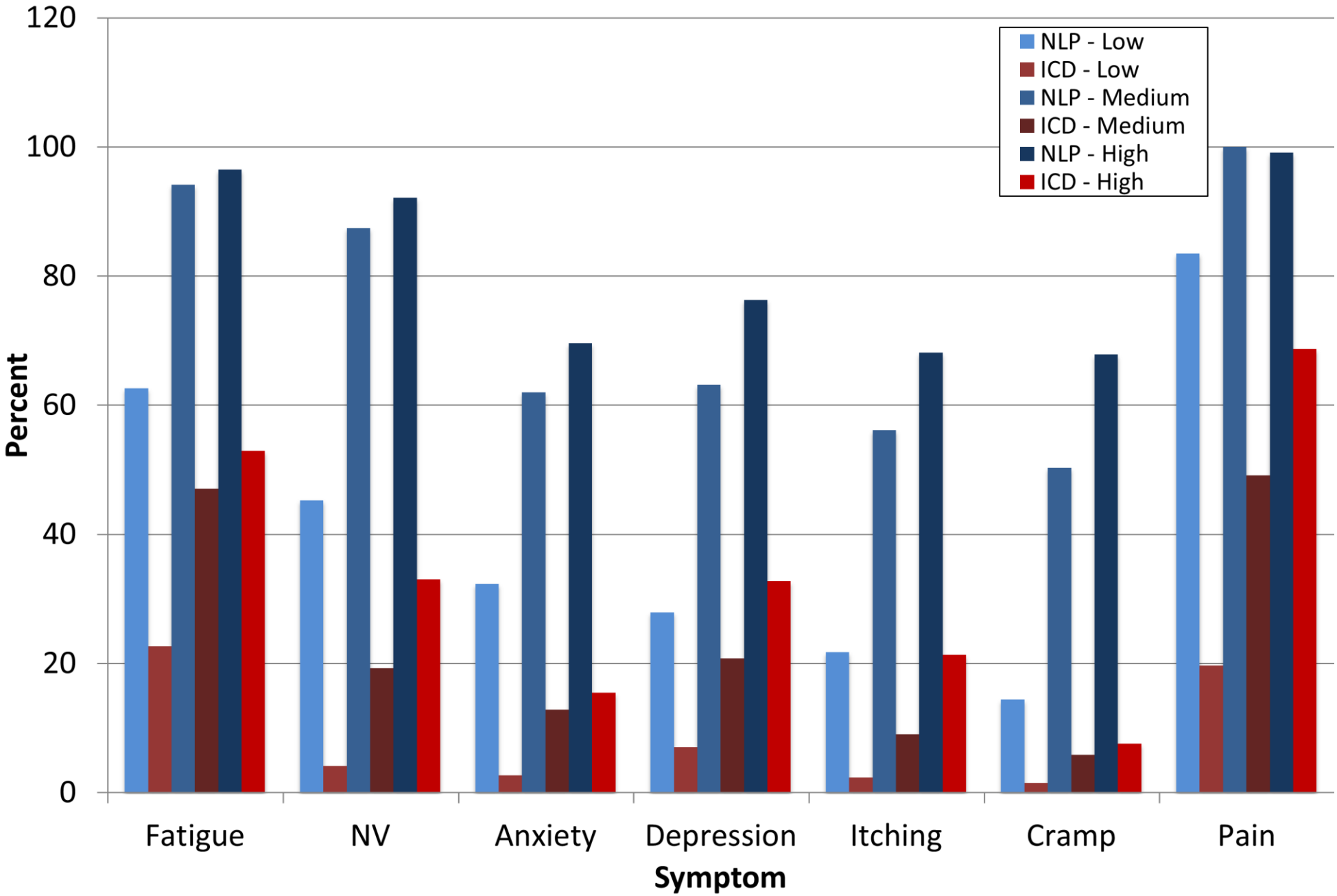

Figure S5: Proportion of symptoms identified in inpatient and outpatient notes

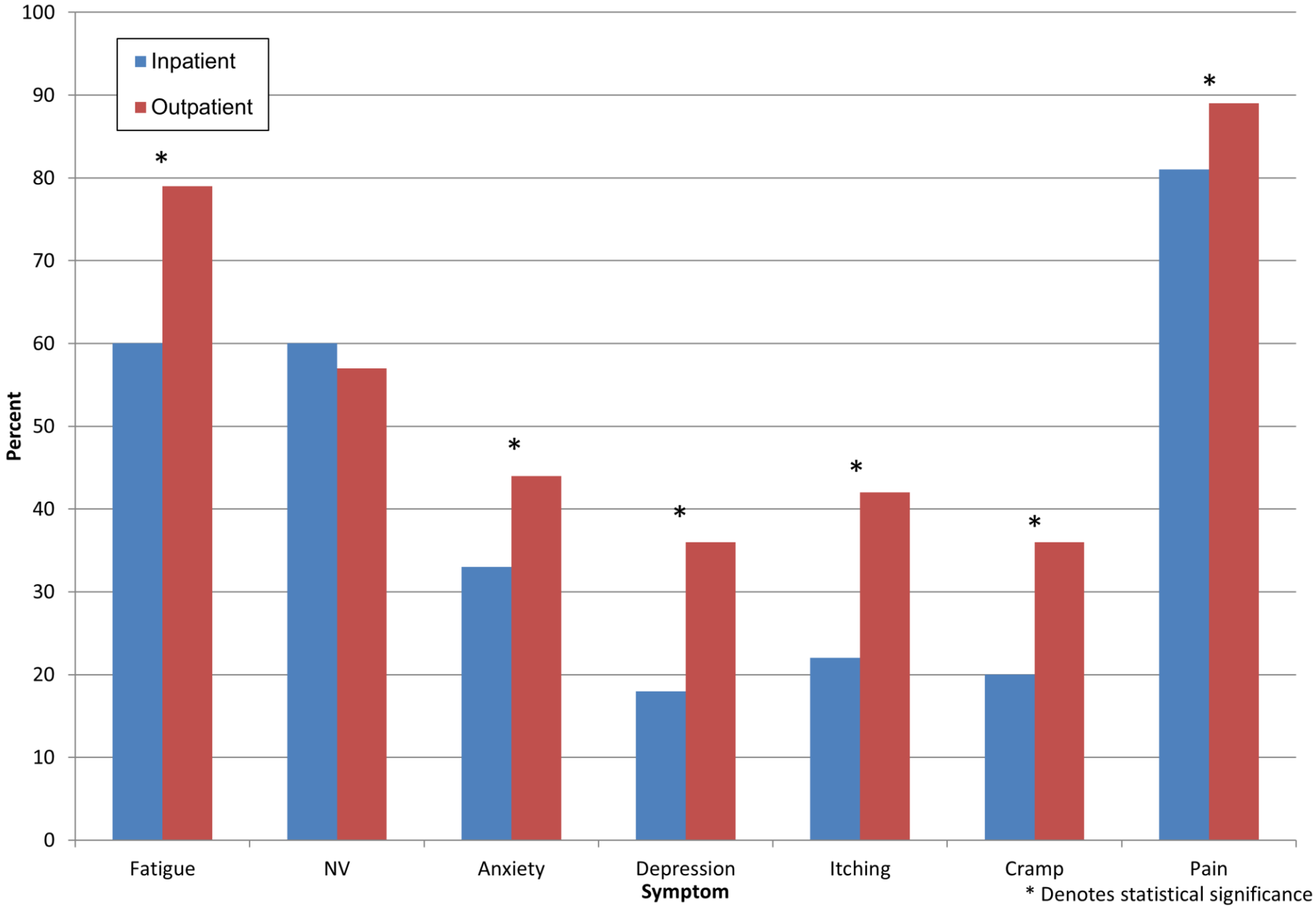

Figure S6: SNOMED Hierarchy for concept of “Cramp”

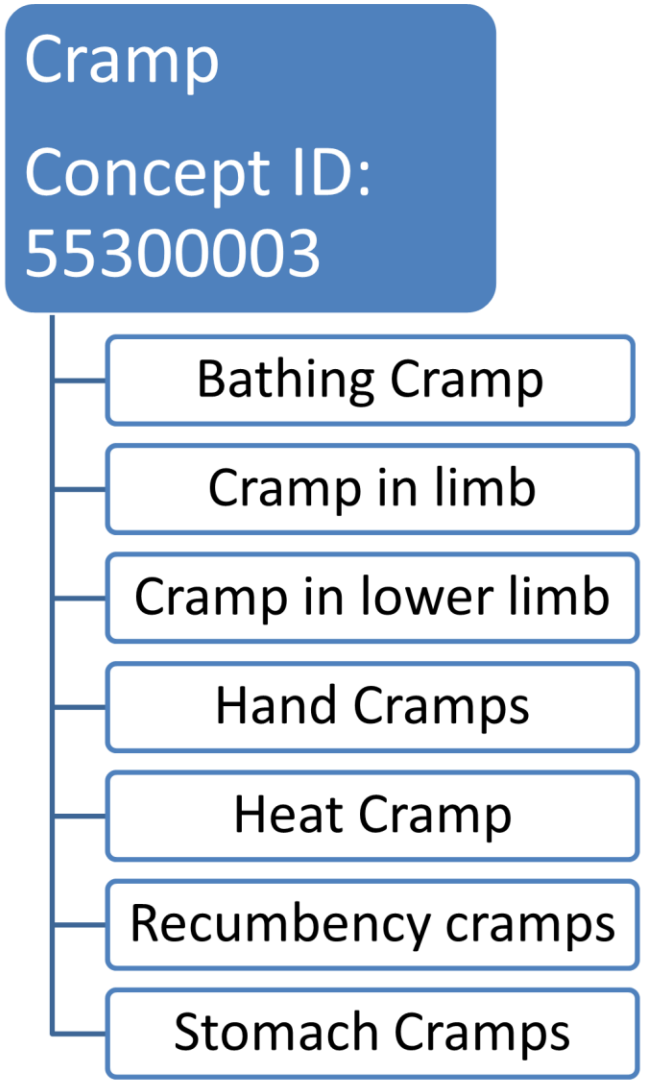

Figure S7: Example of CLiX parsing the phrase “cramp in left leg”.

	SNOMED CT
When?	408731000|Temporal context|=410512000|***Current or specified***
What?	246090004|Associated finding|=(449917004|***Cramp in lower limb***)
Where?	363698007|Finding site|=(102292000|Skeletal muscle structure of ***lower limb***|:272741003|Laterality|=7771000|***Left***|)
Who?	408732007|Subject relationship context|=410604004|**Subject of record**
Present?	408729009|Finding context|=410515003|Known **present**|}