

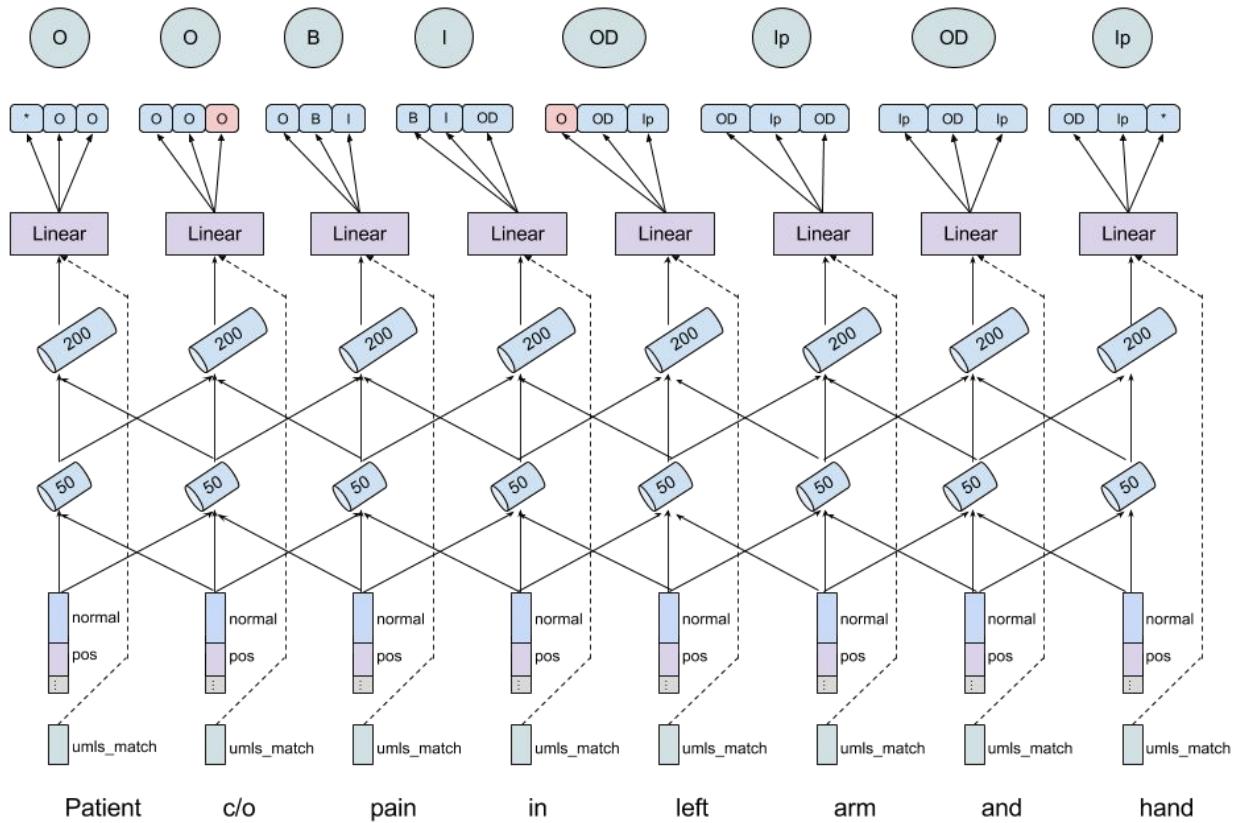
Conditional Language Modeling for Clinical Text

Background

Original task: trying to do mention detection in clinical text using SemEval data

- Examples
 - the patient suffers from a **broken jaw** .
 - the **pain** is strongest in the **arm** .
 - **inflammation of left kidney and spleen**
- Very small dataset, text only, difficult to get good results (esp. on disconnected mentions)

Background



Background

Need: semi-supervised learning

- *Simple idea:* Learn word embeddings from MIMIC and use them to do better?
 - Word2vec
 - Character-level CNNs
 - More interpretable embeddings with MIMIC
- Just using pre-trained word embeddings too simplistic, not too convincing

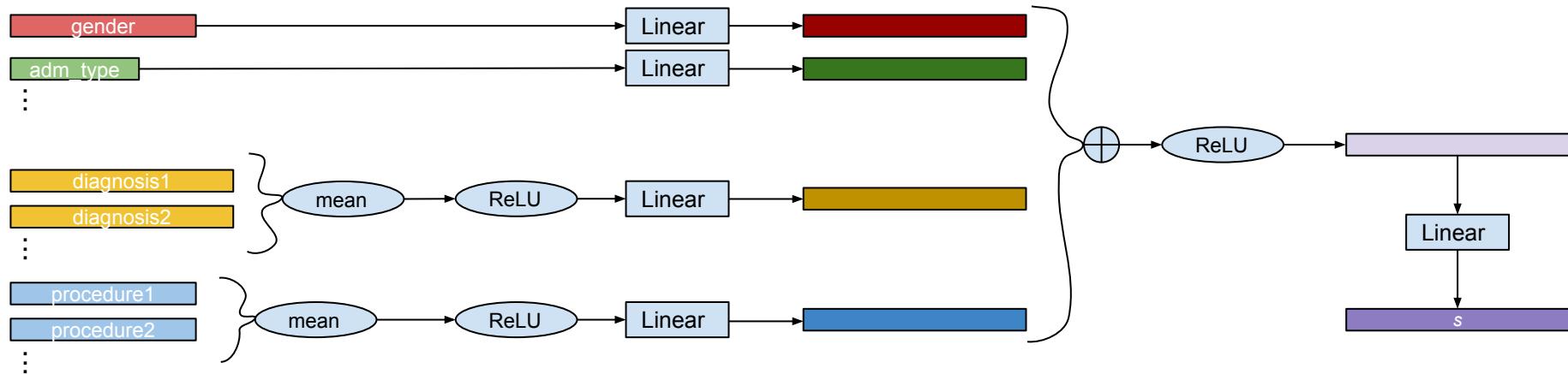
Background

- *Idea:* use additional (structured) information to make the task easier
- How to get the structured information?
 - SemEval data is a subset of MIMIC III, match notes from SemEval to MIMIC
- *More interesting question:* can using the structured information help us say something about the note text, compared to using only the text itself?
 - Conditional language modeling, conditioned on the structured information
 - Better mention detection, word sense disambiguation
 - Extract information from text
 - Summarization of structured information

Structured information

- Gender
 - Has DOD
 - Has ICU stay
 - Admission type
 - Procedures (ICD9 codes)
 - Diagnoses (ICD9 codes)
 - Lab orders
 - Prescriptions (NDC's)
-
- The diagram illustrates the structure of the listed information into two main categories. The first category, 'Fixed-length cardinality per admission', is represented by a green curly brace and includes the first four items: Gender, Has DOD, Has ICU stay, and Admission type. The second category, 'Variable-length cardinality per admission', is represented by a red curly brace and includes the remaining four items: Procedures (ICD9 codes), Diagnoses (ICD9 codes), Lab orders, and Prescriptions (NDC's).
- Fixed-length cardinality per admission
- Variable-length cardinality per admission

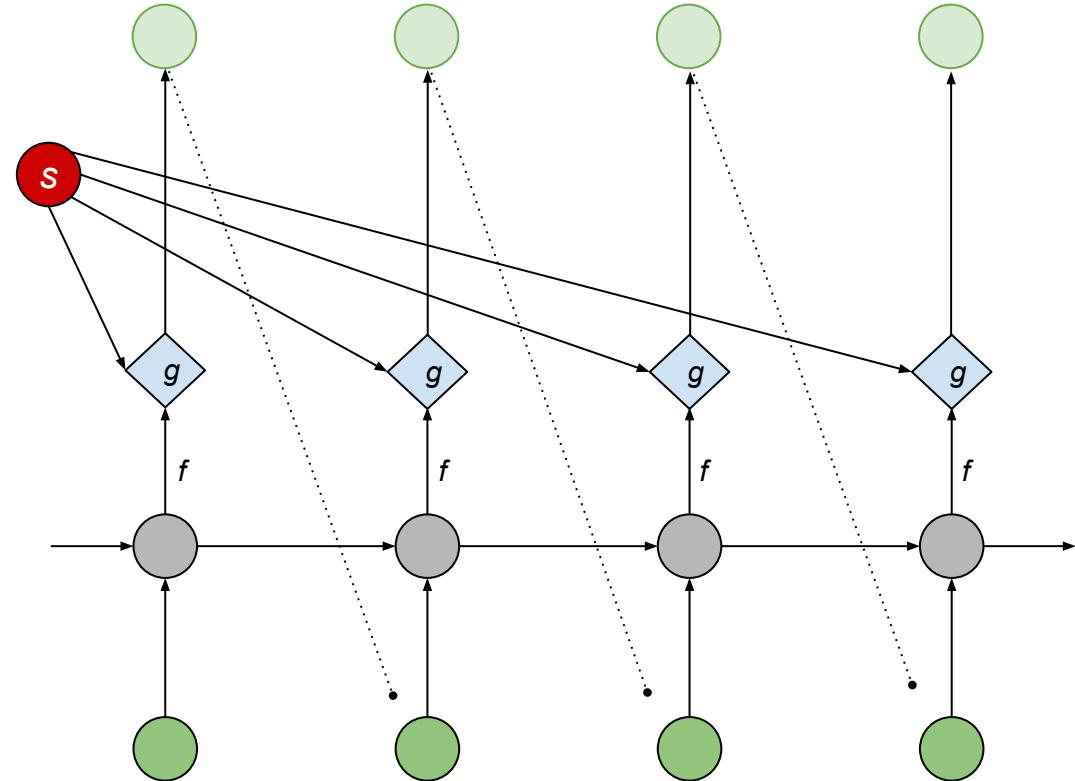
Structured information embeddings: first arch



Starting obvious

- LSTM recurrent language model
- Incorporating the structured information
 - Encode the structured information into a vector s
 - $p(w_{t+1} | w_t, \dots, w_1) \sim g(f(h_t), s)$
 - f is the LSTM cell output, g is a gate between f and s , based on the hidden state at time t
- Speed up the experiments
 - Smaller vocabulary (25,000 (out of ~400,000) most frequent words cover 99% of MIMIC)
 - Sampled softmax

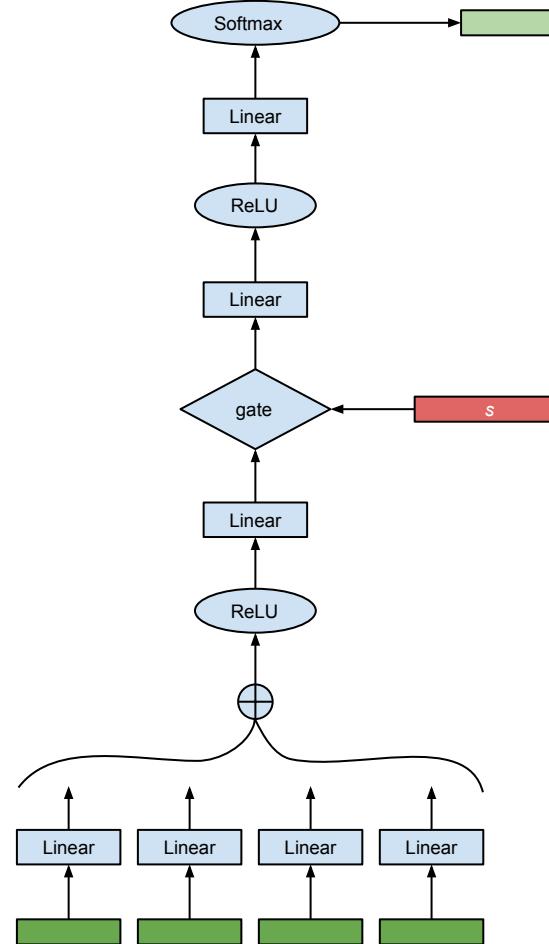
RNNLM model



Going simple

- Visualizations of how structured information helps with RNNLM weren't interpretable, higher perplexity of conditional model w.r.t unconditional
 - Too many unknowns, decided to go to something simpler
 - Better interpretability
 - Faster experiments
- Feedforward model
 - Look at a window of $N/2$ words to the left and $N/2$ words to the right
 - Predict the middle word

Feedforward model



Feedforward model results

	Train	Validation
Unconditional	29.18	61.631
Conditional	27.801	57.798

Context size 2 on either side

	Train	Validation
Unconditional	48.284	84.599
Conditional	45.963	80.702

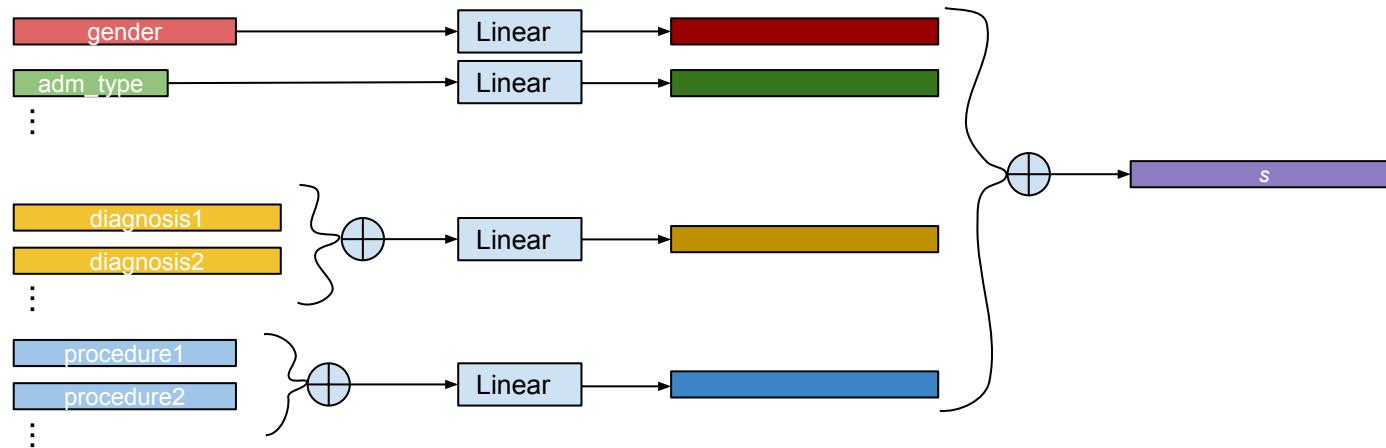
Context size 3 on either side

	Train	Validation
Struct-only	221.717	481.767

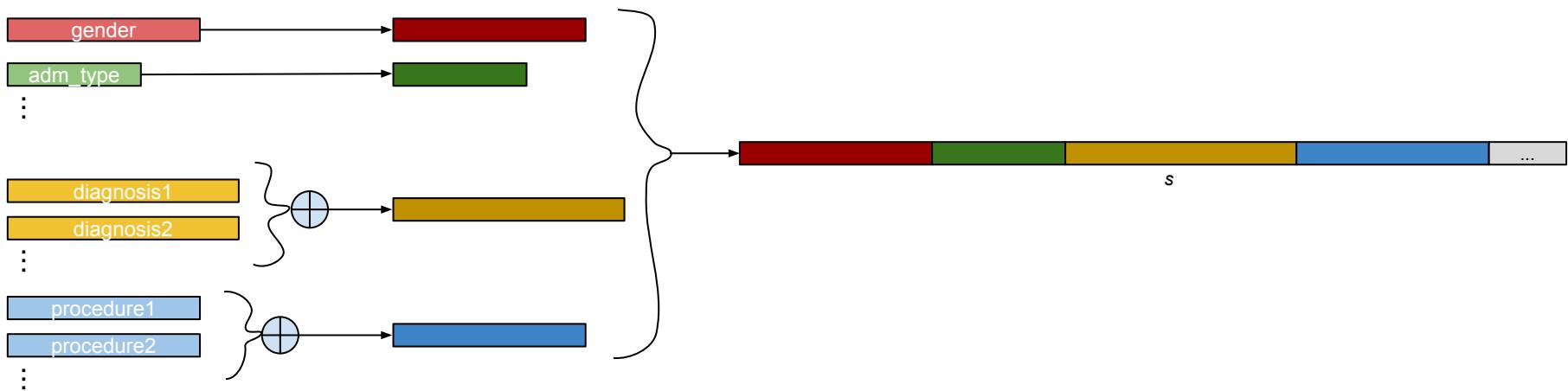
Improvements

- Infeasible to keep all MIMIC batches in memory, kept a buffer of N sequential windows, randomized within the buffer
 - Unless N is huge, can lead to overpopulation of a certain note, with the same structured info
 - Correlated inputs bad for optimization
 - Instead of taking all possible windows from a note, take k ($=20$) random windows
 - How to deal with this with RNNs?
 - Batches of the same note seen sequentially with the same structured information
- Further simplification makes the optimization easier, gives lower perplexities
 - Removed ReLU non-linearities
 - Still have non-linearities in the form of gating, softmax and embeddings

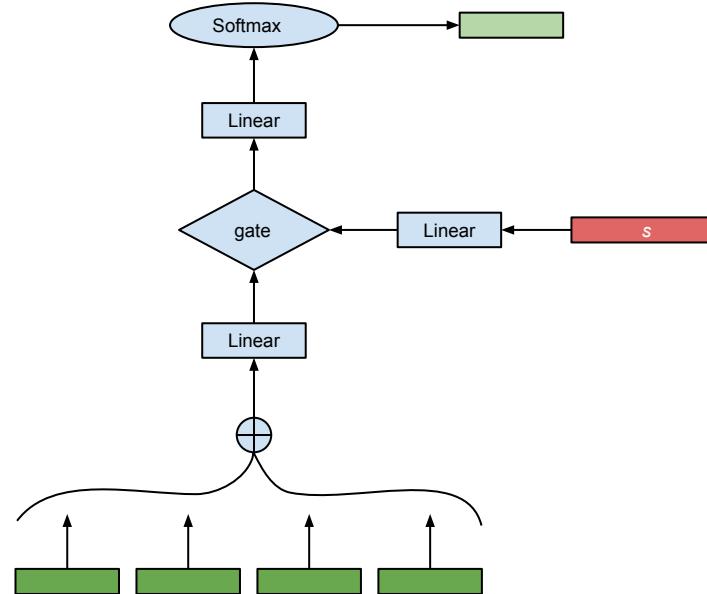
Simplified structured info embeddings: add



Simplified structured info embeddings: concat



Simplified model



Simplified model results

	Train	Validation
Unconditional	20.555	36.064
Conditional	19.894	33.573

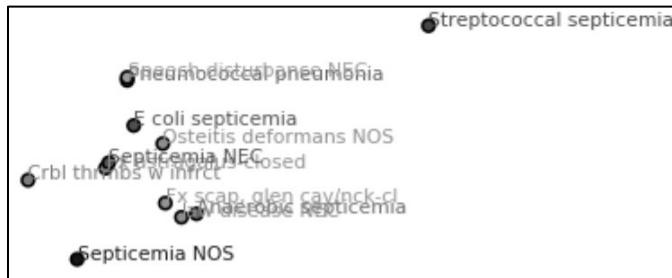
Context size 2 on either side

	Train	Validation
Unconditional	24.283	42.043
Conditional	24.158	40.853

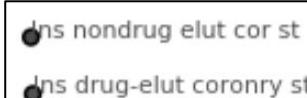
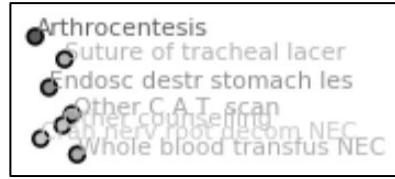
Context size 3 on either side

	Train	Validation
Struct-only	206.913	455.821

Diagnoses embeddings



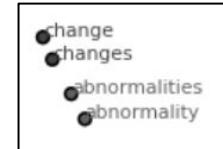
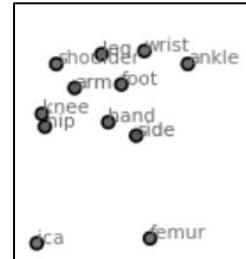
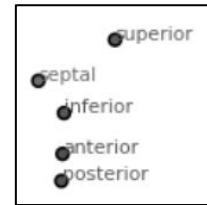
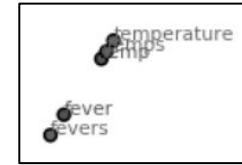
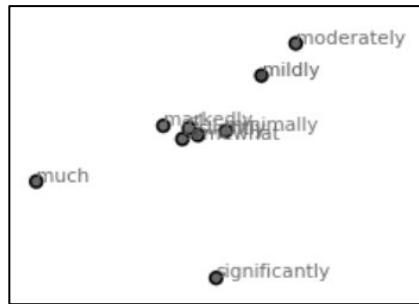
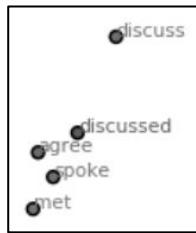
Procedures embeddings



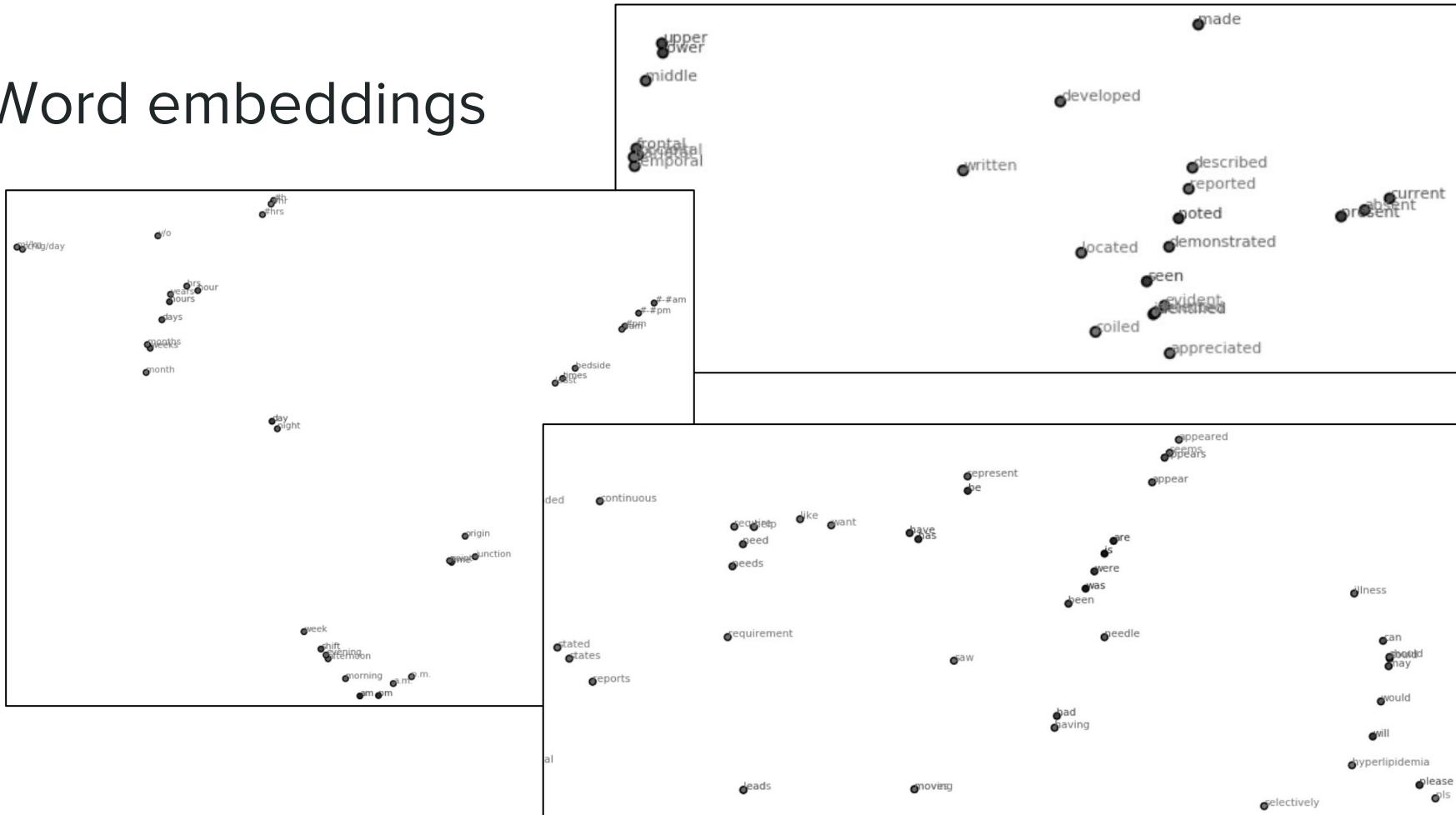
Labs embeddings



Word embeddings



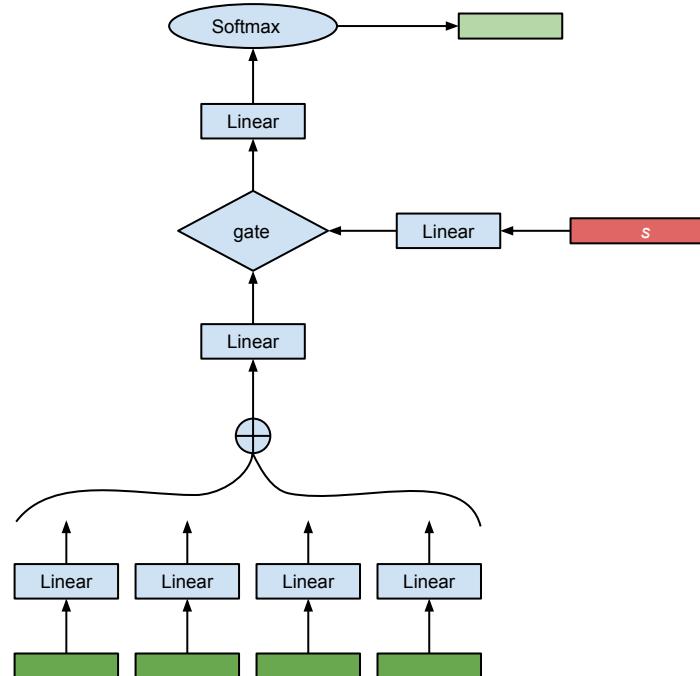
Word embeddings



Distance-dependent word embeddings

- With favorable results with the simplest model, aiming to reproduce in more complex models
- Brought back distance-dependent word embeddings
 - Apply a different transformation on word embeddings for each context position before sum

Distance-dependent CBOW model



Distance-dependent CBOW model results

	Train	Validation
Unconditional	9.899	13.102
Conditional	9.749	12.723

Context size 2 on either side

	Train	Validation
Unconditional	10.061	12.532
Conditional	9.721	12.113

Context size 3 on either side

Position matrix norms

	-3	-2	-1	+1	+2	+3
Unconditional	23.597	29.437	42.823	42.483	30.025	24.040
Conditional	23.837	28.851	41.281	41.104	29.377	24.394

	-2	-1	+1	+2
Unconditional	25.115	34.639	34.406	25.493

Frobenius norms of the position-dependent transformation matrices

Structured info utility visualizations

```
[ clear | two brady 's so far ] File photo by Getty Images
perp 16.31326, prob 0.06130: no_gender gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 16.39705, prob 0.06099: no_has_icu_stay After gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 16.42551, prob 0.06088: all because gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 16.98343, prob 0.05888: no_has_dod been in his leg. gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 18.14245, prob 0.05512: no_labs She said there gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 18.14548, prob 0.05511: no_prescriptions procedures gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 20.88490, prob 0.04788: no_procedures She gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 31.20081, prob 0.03205: no_diagnoses was probably due to his fall. gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 35.07683, prob 0.02851: unconditional gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000
perp 43.90149, prob 0.02278: no_admission_type gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 55.79390, prob 0.01792: only_admission_type gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 75.65621, prob 0.01322: only_diagnoses a youngster to gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 121.98753, prob 0.00820: only_procedures workers did gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 139.69431, prob 0.00716: only_prescriptions gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 157.20377, prob 0.00636: only_labs gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 160.56427, prob 0.00623: only_dod gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 167.28748, prob 0.00598: none The gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 167.40981, prob 0.00597: only_gender tip of his gate min 0.000000, max 1.000000, avg 0.554852, std 0.489183
perp 167.72511, prob 0.00596: only_has_icu_stay admitted to
diagnoses intensive care. The diagnosis: septic shock. Rory was fighting a system-wide infection that
Extreme immatur 750-999g, NB septicemia [sepsis], Respiratory distress syn, Neonatal bradycardia, Retrolental fibroplasia, Patent ductus arteriosus, Primary apnea of newborn, Anemia of prematurity, Single
lb in-hosp w/o cs, 25-26 comp wks gestation, Straig amin-acid met NEC, Neonat jaund preterm del
dove for the ball in gym class, Rory died.

has_icu_stay
1
prescriptions
771, 518, 1799, 909, 303, 1685, 3478, 3737, 922, 539, 3356, 1370, 3871, 1392, 2183, 3631, 2992, 694, 3386, 1248, 2882, 1865, 1357, 3407, 2709, 984, 1242, 4061, 990, 1888, 1514, 240, 1655, 2552, 125, 1535
has_dod
0
admission_type
NEWBORN
gender
FEMALE
labs
HEMATOLOGY | EOSINOPHILS, HEMATOLOGY | HYPOCHROMIA, CHEMISTRY | SODIUM, CHEMISTRY | TOTAL PROTEIN, CSF, CHEMISTRY | ALKALINE PHOSPHATASE, HEMATOLOGY | LYMPHS, CHEMISTRY | TRIGLYCERIDES, CHEMISTRY | ANION GAP, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, HEMATOLOGY | EOSINOPHILS, CHEMISTRY | UREA NITROGEN, HEMATOLOGY | ANISOCYTOSIS, HEMATOLOGY | MONOCYTES, CHEMISTRY | GLUCOSE, CSF, HEMATOLOGY | ATYPICAL LYMPHOCYTES, CHEMISTRY | BICARBONATE, CHEMISTRY | BILIRUBIN, DIRECT, CHEMISTRY | BILIRUBIN, INDIRECT, CHEMISTRY | BILIRUBIN, TOTAL, HEMATOLOGY | INR(PT), CHEMISTRY | VANCOMYCIN, HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | METAMYELOCYTES, CHEMISTRY | CHLORIDE, HEMATOLOGY | MONOCYTES, HEMATOLOGY | MYELOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | RBC, CSF, HEMATOLOGY | TARGET CELLS, HEMATOLOGY | OTHER CELLS, HEMATOLOGY | MICROCYTES, CHEMISTRY | CALCIUM, TOTAL, CHEMISTRY | CREATININE, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | WBC, CSF, HEMATOLOGY | POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, HEMATOLOGY | POLYS, HEMATOLOGY | PT, HEMATOLOGY | PTT, HEMATOLOGY | BANDS, HEMATOLOGY | RDW, CHEMISTRY | GENTAMICIN, HEMATOLOGY | RED BLOOD CELLS, BLOOD GAS | SPECIMEN TYPE, BLOOD GAS | ALVEOLAR-ARTERIAL GRADIENT, BLOOD GAS | BASE EXCESS, HEMATOLOGY | RETICULOCYTE COUNT, AUTOMATED, BLOOD GAS | CALCULATED TOTAL CO2, HEMATOLOGY | SCHISTOCYTES, HEMATOLOGY | BASOPHILS, BLOOD GAS | HEMATOCRIT, CALCULATED, BLOOD GAS | HEMOGLOBIN, BLOOD GAS | INTUBATED, HEMATOLOGY | NUCLEATED RED CELLS, HEMATOLOGY | PLATELET SMEAR, BLOOD GAS | O2 FLOW, BLOOD GAS | OXYGEN, HEMATOLOGY | ALCANTHOCYTES, BLOOD GAS | PCO2, BLOOD GAS | PEEP, BLOOD GAS | PH, BLOOD GAS | PO2, HEMATOLOGY | WHITE BLOOD CELLS, BLOOD GAS | REQUIRED O2, BLOOD GAS | TIDAL VOLUME, BLOOD GAS | VENTILATION RATE, BLOOD GAS | VENTILATOR, HEMATOLOGY | OVALOCYTES, HEMATOLOGY | PAPPENHEIMER BODIES, HEMATOLOGY | BURR CELLS, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM
procedures
Non-invasive mech vent, Insert endotracheal tube, Other phototherapy, Occlude thoracic ves NEC, Packed cell transfusion, Cont inv nec ven 96+ hrs
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3 The Syrian volunteers who rush to bombed buildings to save victims

4 Political Party Quiz

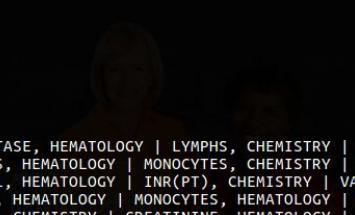
5 Column: Why we need to extend economic empowerment to military spouses



MONDAY, AUGUST 22, 2016

PBS NEWSHOUR AUG. 22, 2015

WATCH FULL BROADCASTS LISTEN FULL AUDIO PODCASTS



"It was frightening to think that something could kill my son so fast and it would be something that I had never

```
[ yellow nipple and infant fed well taking ] bests6.dat - dump results file and detailed results - print every 10
perf 9.17245, prob 0.10902: all
perf 9.22292, prob 0.10843: no_has_icu_stay
perf 9.38747, prob 0.10652: no_has_dod
perf 9.46346, prob 0.10567: no_gender
perf 12.33921, prob 0.08104: no_prescriptions
perf 13.39873, prob 0.07463: no_procedures
perf 13.98949, prob 0.07148: no_labs
perf 14.10615, prob 0.07089: no_diagnoses
perf 32.70679, prob 0.03057: unconditional
perf 52.19635, prob 0.01916: only_admission_type
perf 57.71685, prob 0.01733: no_admission_type
perf 217.62852, prob 0.00459: only_diagnoses
perf 243.67046, prob 0.00410: only_procedures
perf 249.87953, prob 0.00400: only_labs
perf 266.38275, prob 0.00375: only_prescriptions
perf 374.35349, prob 0.00267: only_gender
perf 378.02719, prob 0.00265: only_has_dod
perf 388.39978, prob 0.00257: only_has_icu_stay
perf 390.30576, prob 0.00256: none

diagnoses
NB obsrv suspct infect, Respiratory distress syn, Need prphyl vc vrl hepat, Preterm NEC 1000-1249g, Other apnea of newborn, 29-30 comp wks gestation, Anemia of prematurity, Single lb in-hosp w cs, Neonat
jaund preterm del

has_icu_stay
1

prescriptions
1282, 518, 1799, 909, 2709, 3478, 539, 3356, 240, 2350, 2992, 694, 3386, 2882, 3524, 984, 1370, 990, 2660, 1392, 2552, 4091

has_dod
0

admission_type
NEWBORN

gender
FEMALE

labs
HEMATOLOGY | EOSINOPHILS, CHEMISTRY | SODIUM, CHEMISTRY | BICARBONATE, CHEMISTRY | TRIGLYCERIDES, CHEMISTRY | ANION GAP, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, HEMATOLOGY | ANISOCYTOSIS, HEMATOLOGY | ATYPICAL LYMPHOCYTES, HEMATOLOGY | BANDS, CHEMISTRY | BILIRUBIN, DIRECT, HEMATOLOGY | BASOPHILS, CHEMISTRY | BILIRUBIN, TOTAL, HEMATOLOGY | BLASTS, HEMATOLOGY | BURR CELLS, HEMATOLOGY | LYMPHOCYTES
, HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | METAMYELOCYTES, HEMATOLOGY | MICROCYTES, HEMATOLOGY | MONOCYTES, HEMATOLOGY | MYELOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | NUCLEATED RED CELLS, HEMATOLOGY | OVALOCYTES, CHEMISTRY | CALCIUM, TOTAL, CHEMISTRY | CHLORIDE, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PLATELET SMEAR, HEMATOLOGY | POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, HEMATOLOGY | PROMYELOCYTES, HEMATOLOGY | HYPOCHROMIA, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, BLOOD GAS | BASE EXCESS, HEMATOLOGY | RETICULOCYTE COUNT, AUTOMATED, BLOOD GAS | CALCULATED TOTAL CO2, CHEMISTRY | BILIRUBIN, INDIRECT, CHEMISTRY | ALKALINE PHOSPHATASE, BLOOD GAS | INTUBATED, BLOOD GAS | OXYGEN, BLOOD GAS | PCO2, BLOOD GAS | PH, BLOOD GAS | P02, HEMATOLOGY | WHITE BLOOD CELLS, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM

procedures
Non-invasive mech vent, Dx ultrasound-head/neck, Parent infus nutrit sub, Other phototherapy, Vaccination NEC
```

| no fracture or spondylolisthesis of]

perp 6.18143, prob 0.16177: no_admission_type gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 6.20952, prob 0.16104: no_gender gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 6.24744, prob 0.16007: all_ Symptome gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 6.25384, prob 0.15990: no_has_icu_stay gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 6.29351, prob 0.15889: no_has_dod engis Treatment gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 7.22088, prob 0.13849: no_prescriptions gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 7.57564, prob 0.13200: no_labs Diagnosis Surgery gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 8.46901, prob 0.11808: no_procedures gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 12.58483, prob 0.07946: only_diagnoses Stenosis gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 22.11893, prob 0.04521: no_diagnoses gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 34.06748, prob 0.02935: only_procedures stenosis gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 40.70965, prob 0.02456: only_labs gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 43.10536, prob 0.02320: only_prescriptions gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 52.24287, prob 0.01914: only_has_dod gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 52.84097, prob 0.01892: only_has_icu_stay or gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 52.95142, prob 0.01889: none Advice gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 53.62762, prob 0.01865: only_gender gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 53.72090, prob 0.01861: only_admission_type gate min 0.00000, max 1.00000, avg 0.614835, std 0.478470

perp 85.78038, prob 0.01166: unconditional gate min 0.00000, max 0.00000, avg 0.00000, std 0.00000

diagnoses > Spinal Stenosis

Epilep NOS w/o intr pil, Fx distal radius NEC-cl, Fx metacarp base NEC-cl, Fx facial bone NEC-close, Nasal bone fx-closed, Fx malar/maxillary-close, Mandible fx NOS-closed, Hx of past noncompliance, Clos skull base fracture, Fall from ladder > Spinal Stenosis Videos

has_icu_stay 1

prescriptions > Related Topics

747, 518, 3209, 1623, 652, 2029, 344, 1091, 532, 2197, 1948, 669, 3998, 2474, 683, 2904, 819, 1848, 1466, 63, 1857, 67, 72, 1610, 1615, 720, 1877, 2007, 856, 2140, 4190, 3424, 2939, 1636, 2663, 1129, 363, 620, 877, 1147, 382

has_dod 0

admission_type EMERGENCY

gender MALE

labs HEMATOLOGY | EOSINOPHILS, CHEMISTRY | SALICYLATE, CHEMISTRY | SODIUM, HEMATOLOGY | FIBRINOGEN, FUNCTIONAL, CHEMISTRY | TRICYCLIC ANTIDEPRESSANT SCREEN, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, CHEMISTRY | VALPROIC ACID, HEMATOLOGY | INR(PT), HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | MONOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PT, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, CHEMISTRY | AMPHETAMINE SCREEN, URINE, CHEMISTRY | BARBITURATE SCREEN, URINE, CHEMISTRY | B ENZODIAZEPINE SCREEN, URINE, CHEMISTRY | COCAINE, URINE, HEMATOLOGY | WHITE BLOOD CELLS, CHEMISTRY | LENGTH OF URINE COLLECTION, CHEMISTRY | METHADONE, URINE, CHEMISTRY | OPIATE SCREEN, URINE, HEMATOLOGY | BASOPHILS, HEMATOLOGY | BLEEDING TIME, HEMATOLOGY | BACTERIA, HEMATOLOGY | BILIRUBIN, HEMATOLOGY | BLOOD, HEMATOLOGY | EPITHELIAL CELLS, HEMATOLOGY | GLUCOSE, HEMATOLOGY | GRANULAR CASTS, HEMATOLOGY | K ETONE, HEMATOLOGY | LEUKOCYTES, HEMATOLOGY | NITRITE, HEMATOLOGY | PH, HEMATOLOGY | PROTEIN, HEMATOLOGY | RBC, HEMATOLOGY | SPECIFIC GRAVITY, HEMATOLOGY | URINE APPEARANCE, HEMATOLOGY | URINE COLOR, HEMATOLOGY | UROBILINOGEN, HEMATOLOGY | WBC, HEMATOLOGY | YEAST, CHEMISTRY | GR HOLD, BLOOD GAS | SPECIMEN TYPE, BLOOD GAS | BASE EXCESS, BLOOD GAS | CALCULATED BICARBONATE, WHOLE BLOOD, BLOOD GAS | CALCULATED TOTAL CO₂, BLOOD GAS | CHLORIDE, WHOLE BLOOD, BLOOD GAS | FREE CALCIUM, BLOOD GAS | GLUCOSE, BLOOD GAS | HEMATOCRIT, BLOOD GAS | INTUBATED, BLOOD GAS | LACTATE, BLOOD GAS | OXYGEN, BLOOD GAS | OXYGEN SATURATION, BLOOD GAS | PCO₂, BLOOD GAS | PH, BLOOD GAS | PO₂, BLOOD GAS | POTASSIUM, WHOLE BLOOD, BLOOD GAS | SODIUM, WHOLE BLOOD, BLOOD GAS | TEMPERATURE, BLOOD GAS | VENTILATOR, CHEMISTRY | ACETAMINOPHEN, CHEMISTRY | ALANINE AMINOTRANSFERASE (ALT), CHEMISTRY | ALBUMIN, CHEMISTRY | ALKALINE PHOSPHATASE, CHEMISTRY | AMYLASE, CHEMISTRY | ANION GAP, CHEMISTRY | ASPARATE AMINOTRANSFERASE (AST), CHEMISTRY | BARBITURATE SCREEN, CHEMISTRY | BENZODIAZEPINE SCREEN, CHEMISTRY | BICARBONATE, CHEMISTRY | BILIRUBIN, TOTAL, CHEMISTRY | CALCIUM, TOTAL, CHEMISTRY | CHLORIDE, CHEMISTRY | CREATININE, CHEMISTRY | ETHANOL, CHEMISTRY | GLUCOSE, CHEMISTRY | HEPATITIS B SURFACE ANTIBODY, CHEMISTRY | HEPATITIS B SURFACE ANTIGEN, CHEMISTRY | HEPATITIS B VIRUS CORE ANTIBODY, CHEMISTRY | HEPATITIS C VIRUS ANTIBODY, CHEMISTRY | HIV ANTIBODY, CHEMISTRY | MAGNESIUM, CHEMISTRY | PHENYTOIN, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM

procedures Open reduct face fx NEC, Open reduct mandible fx, Entral infus nutrit sub, Open reduct maxillary fx, Open reduction nasal fx, Cl fx reduc-radius/ulna, Cl fx reduc-metacar/car, Op red-int fix rad/ulna, Ele vate skull fx fragmnt

While lumbar spinal stenosis most often occurs at the L4-L5 and L3-L4 levels, it can occur at any level in the spine. The degenerative cascade may eventually effect most of the vertebral elements of the lumbar spine.

> Cervical Vertebrae

> Cervical Spine Anatomy and Neck Pain

> Passive Exercise for Sciatica and Low Back Pain (Sponsored)

> When Neck Cracking Needs Medical Attention

> Neck Cracking and Grinding: What Does It Mean?

> Is My Hand Pain from Carpal Tunnel Syndrome or Something Else?



Physician/Surgeon (MD or DO)

ZIP or City, State

Search

> Find a Spine Center

```
[ | plan maintain vent support wean ps ]
perf 4.30271, prob 0.23241: no_has_dod
perf 4.38768, prob 0.22791: no_gender
perf 4.40374, prob 0.22708: no_has_icu_stay
perf 4.42442, prob 0.22602: all
perf 4.50456, prob 0.22200: no_admission_type
perf 4.58152, prob 0.21827: no_diagnoses
perf 5.10254, prob 0.19598: no_procedures
perf 7.45219, prob 0.13419: no_prescriptions
perf 7.93625, prob 0.12600: no_labs
perf 8.99391, prob 0.11119: only_labs
perf 9.37951, prob 0.10662: only_prescriptions
perf 12.12790, prob 0.08245: unconditional
perf 14.34364, prob 0.06972: only_procedures
perf 16.36307, prob 0.06111: only_diagnoses
perf 16.68432, prob 0.05994: only_admission_type
perf 17.08749, prob 0.05852: none
perf 17.17734, prob 0.05822: only_has_icu_stay
perf 17.23551, prob 0.05802: only_gender A VIRUS
perf 17.70992, prob 0.05647: only_has_dod

diagnoses
T1-t6 fx-cl/com cord les, c5-c7 fx-cl/cord inj NOS, Colles' fracture-closed, Bacteremia, Alcoh dep NEC/NOS-unspec, React-oth vasc dev/grft, Pneumo oth grm-neg bact, Fall from building, Traumatic shock, S eroma complicting proc, Ascariasis, Dislocat sternum-closed, Open wound of scalp, Ac alcoholic hepatitis, Joint pain-shlder, 3607, Visual field defect NOS, T7-t12 fx-cl/crd inj NOS

has_icu_stay
1

prescriptions
2, 491, 1541, 518, 1800, 1004, 3082, 652, 3213, 526, 1040, 856, 2371, 1300, 23, 1948, 2335, 4001, 2979, 548, 2481, 2012, 2474, 2221, 2095, 305, 521, 236, 999, 1080, 2548, 4029, 4162, 3267, 3361, 2248, 969 , 1610, 720, 3896, 3923, 2007, 2904, 1508, 2140, 400, 2488, 1636, 229, 2663, 1413, 747, 620, 2029, 3929, 2160, 626, 3987, 244, 382, 809, 771, 2939, 3068, 524

has_dod
0

admission_type
EMERGENCY

gender
MALE

labs
HEMATOLOGY | EOSINOPHILS, CHEMISTRY | SALICYLATE, CHEMISTRY | SODIUM, HEMATOLOGY | FIBRINOGEN, FUNCTIONAL, CHEMISTRY | TRICYCLIC ANTIDEPRESSANT SCREEN, CHEMISTRY | TROPONIN T, HEMATOLOGY | HEMOGLOBIN, CHE MISTRY | UREA NITROGEN, CHEMISTRY | VANCOMYCIN, HEMATOLOGY | INR(PT), HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | METAMYEOCYTES, HEMATOLOGY | MONOCYTES, HEMATOLOGY | MYELOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PT, HEMATOLOGY | PTT, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, CHEMISTRY | AMPHETAMINE SCREEN, URINE, CHEMISTRY | BARBITURATE SCREEN, URINE, CHEMISTRY | BENZODIAZEPINE SCREEN, URINE, CHEMISTRY | COCAINE, URINE, CHEMISTRY | CREATININE, URINE, HEMATOLOGY | WHITE BLOOD CELLS, CHEMISTRY | LENGTH OF URINE COLLEC TION, CHEMISTRY | METHADONE, URINE, CHEMISTRY | OPIATE SCREEN, URINE, CHEMISTRY | OSMOLALITY, URINE, CHEMISTRY | SODIUM, URINE, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | ATYPICAL LYMPHOCYTES, HEMATOLOGY | BAN DS, HEMATOLOGY | BASOPHILS, HEMATOLOGY | AMORPHOUS CRYSTALS, HEMATOLOGY | BACTERIA, HEMATOLOGY | BILIRUBIN, HEMATOLOGY | BLOOD, HEMATOLOGY | EPITHELIAL CELLS, HEMATOLOGY | GLUCOSE, HEMATOLOGY | KETONE, HE MATOLOGY | LEUKOCYTES, HEMATOLOGY | NITRITE, HEMATOLOGY | PH, HEMATOLOGY | PROTEIN, HEMATOLOGY | RBC, HEMATOLOGY | SPECIFIC GRAVITY, HEMATOLOGY | URINE APPEARANCE, HEMATOLOGY | URINE COLOR, HEMATOLOGY | U ROBILINOPEN, HEMATOLOGY | WBC, HEMATOLOGY | YEAST, BLOOD GAS | SPECIMEN TYPE, BLOOD GAS | ALVEOLAR-ARTERIAL GRADIENT, BLOOD GAS | BASE EXCESS, BLOOD GAS | CALCULATED BICARBONATE, WHOLE BLOOD, BLOOD GAS | CALCULATED TOTAL CO2, BLOOD GAS | CHLORIDE, WHOLE BLOOD, BLOOD GAS | FREE CALCIUM, BLOOD GAS | GLUCOSE, BLOOD GAS | HEMATOCRIT, CALCULATED, BLOOD GAS | HEMOGLOBIN, BLOOD GAS | INTUBATED, BLOOD GAS | LACTATE, BLOOD GAS | OXYGEN, BLOOD GAS | OXYGEN SATURATION, BLOOD GAS | PCO2, BLOOD GAS | PEEP, BLOOD GAS | PH, BLOOD GAS | PO2, BLOOD GAS | POTASSIUM, WHOLE BLOOD, BLOOD GAS | REQUIRED O2, BLOOD GAS | SODIUM, WHOLE BLOOD, BLOOD GAS | TEMPERATURE, BLOOD GAS | TIDAL VOLUME, BLOOD GAS | VENTILATOR, CHEMISTRY | ACETAMINOPHEN, CHEMISTRY | ALANINE AMINOTRANSFERASE (ALT), CHEMISTRY | ALBUMIN, CHEMISTRY | ALKALINE PHOSPHATASE, CHEMISTRY | AMYLASE, CHEMISTRY | ANION GAP, CHEMISTRY | ASPARATE AMINOTRANSFERASE (AST), CHEMISTRY | BARBITURATE SCREEN, CHEMISTRY | BENZODIAZEPINE SCREEN, CHEMIST RY | BICARBONATE, CHEMISTRY | BILIRUBIN, TOTAL, CHEMISTRY | BLUE TOP HOLD, CHEMISTRY | CALCIUM, TOTAL, CHEMISTRY | CHLORIDE, CHEMISTRY | CK-MB INDEX, CHEMISTRY | CREATINE KINASE (CK), CHEMISTRY | CREATINE KINASE, MB ISOENZYME, CHEMISTRY | CREATININE, CHEMISTRY | ETHANOL, CHEMISTRY | GLUCOSE, CHEMISTRY | HEPATITIS A VIRUS ANTIBODY, CHEMISTRY | HEPATITIS B VIRUS IGM ANTIBODY, CHEMISTRY | HEPATITIS B SURFACE ANTIBODY, CHEMISTRY | HEPATITIS B SURFACE ANTIGEN, CHEMISTRY | HEPATITIS B VIRUS CORE ANTIBODY, CHEMISTRY | HEPATITIS C VIRUS ANTIBODY, CHEMISTRY | HIV ANTIBODY, CHEMISTRY | LACTATE DEHYDROGENASE (LD), C HEMISTRY | LIPASE, CHEMISTRY | MAGNESIUM, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM

procedures
Spinal canal explor NEC, Drsl/dsmb fus post/post, Drsl/drslmb fus ant/ant, Ot cerv fusion post/post, Skin closure NEC, Arterial catheterization, Dx ultrasound-heart, Percu endosc gastrostomy, Infusion o f vasopressor, Enteral infus nutrit sub, Closed bronchial biopsy, Packed cell transfusion, Temporary tracheostomy, Soft tissue aspirat NEC, Excise bone for gft NEC, Interruption vena cava, Vertebral fx rep
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[ a stable | rds resolving | feeding ] vocab, losses, aux, and std dev
perf 30.50226, prob 0.03278: unconditional
perf 425.80066, prob 0.00235: all
perf 427.70615, prob 0.00234: no_icu_stay
perf 431.10303, prob 0.00232: no_gender
perf 432.45963, prob 0.00231: no_has_dod
perf 520.38361, prob 0.00192: no_prescriptions
perf 614.31415, prob 0.00163: no_procedures
perf 675.11176, prob 0.00148: no_labs
perf 875.54712, prob 0.00114: no_diagnoses
perf 1122.15796, prob 0.00089: no_admission_type
perf 2985.83740, prob 0.00033: only_admission_type
perf 3854.19702, prob 0.00026: only_diagnoses
perf 5610.43945, prob 0.00018: only_labs
perf 6168.35889, prob 0.00016: only_procedures
perf 7034.47070, prob 0.00014: only_prescriptions
perf 9360.69434, prob 0.00011: only_has_dod
perf 9504.08691, prob 0.00011: only_gender
perf 9561.70801, prob 0.00010: only_has_icu_stay
perf 9586.88086, prob 0.00010: none
d = {(v,k) : loss[v][k] for v,k in loss}
diagnoses if sort(d.items(), key=lambda x:x[1])[-1][0] == 'none' else None
NB obsrv suspect infect, Respiratory distress syn, Preterm NEC 2500+g, Need prphyl vc vrl hepatic, 35-36 comp wks gestation, Single lb in-hosp w cs, Hypospadias, Neonatal jaund preterm del
stdev = -stddev
has_icu_stay for k in ['unconditional', 'none']:
1 try:
    if d['all'] > d[k]:
        stdev = -stddev
prescriptions
4091, 3478, 518, 3830, 984, 539, 990
except KeyError:
has_dod pass
0 aux = [(k,v)] for k,v in aux.items()
aux_len_ = {k:v[t] for k,v in aux_len.items()}
admission_type ses_buffer.append(sidev, x, y, loss, aux_, aux_len_)
NEWBORN if buffer_size > 0 and len(losses_buffer) >= buffer_size:
    losses_buffer = sorted(losses_buffer, key=lambda x:x[0])
gender for s, x_, y_, loss_, aux_, aux_len_ in losses_buffer:
MALE inspect losses(x_, y_, config, vocab, loss_, aux_, aux_len_, dict)
labs losses_buffer = []
print 'Press enter to continue'
HEMATOLOGY | EOSINOPHILS, CHEMISTRY | SODIUM, CHEMISTRY | BICARBONATE, CHEMISTRY | ANION GAP, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, HEMATOLOGY | ANISOCYTOSIS, HEMATOLOGY | ATYPICAL LYMPHOCYTES, HEMATOLOGY | BANDS, CHEMISTRY | BILIRUBIN, DIRECT, HEMATOLOGY | BASOPHILS, CHEMISTRY | BILIRUBIN, TOTAL, HEMATOLOGY | BURR CELLS, HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | METAMYEOCYTES, HEMATOLOGY | MICROCYTES, HEMATOLOGY | MONOCYTES, HEMATOLOGY | MYELOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | NUCLEATED RED CELLS, CHEMISTRY | CHLORIDE, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PLATELET SMEAR, HEMATOLOGY | POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, HEMATOLOGY | HYPOCHROMIA, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, BLOOD GAS | SPECIMEN TYPE, BLOOD GAS | BASE EXCESS, BLOOD GAS | CALCULATED TOTAL CO2, CHEMISTRY | BILIRUBIN, INDIRECT, BLOOD GAS | INTUBATED, BLOOD GAS | OXYGEN, HEMATOLOGY | TEARDROP CELLS, BLOOD GAS | CO2, BLOOD GAS | PEEP, BLOOD GAS | PH, BLOOD GAS | PO2, HEMATOLOGY | WHITE BLOOD CELLS, BLOOD GAS | VENTILATION RATE, BLOOD GAS | VENTILATOR, CHEMISTRY | POTASSIUM
procedures superkey = labs
Non-invasive mech vent, Cont inv mec ven <96 hrs, Enteral infus nutrit sub, Insert endotracheal tube, Vaccination NEC

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[ current poc | pt | remains dnr/dni ]
perp 4.03901, prob 0.24759: unconditional
perp 7.52416, prob 0.13291: no_has_icu_stay
perp 7.54610, prob 0.13252: no_has_dod
perp 7.54756, prob 0.13249: no_gender
perp 7.55272, prob 0.13240: all
perp 7.77627, prob 0.12860: no_admission_type
perp 8.43826, prob 0.11851: no_prescriptions
perp 8.99613, prob 0.11116: no_procedures
perp 9.08324, prob 0.11009: no_diagnoses
perp 12.64566, prob 0.07908: only_labs
perp 13.71503, prob 0.07291: no_labs
perp 19.96709, prob 0.05008: only_diagnoses
perp 20.18536, prob 0.04954: only_procedures
perp 21.80154, prob 0.04587: only_prescriptions
perp 24.25385, prob 0.04123: only_admission_type
perp 25.11316, prob 0.03982: only_has_dod
perp 25.14407, prob 0.03977: none
perp 25.20944, prob 0.03967: only_gender
perp 25.25074, prob 0.03960: only_has_icu_stay
gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000
gate min 0.000000, max 1.000000, avg 0.548562, std 0.492774
gate min 0.000000, max 1.000000, avg 0.548562, std 0.492774
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gate min 0.000000, max 1.000000, avg 0.548562, std 0.492774
gate min 0.000000, max 1.000000, avg 0.548562, std 0.492774
gate min 0.000000, max 1.000000, avg 0.548562, std 0.492774
diagnoses
Atrial fibrillation, Other postop infection, Severe sepsis, DMII wo cmp nt st uncntr , Pleural effusion NOS, Int inf clstrdium dfcile, Late effect CV dis NEC, Anemia NOS, Hypothyroidism NOS, Septicemia NEC , Hyp kid NOS w cr kid V, Malign neopl prostate, Crnry ahrscl native vssl, Abn react-surg proc NEC, Abscess of liver, Inf mcr rst at drg nt ml, Periph vascular dis NOS, Gout NOS, Cellulitis of arm, Pressu re ulcer, site NEC, Septic shock
    if np.mean(loss) > max_minpert: continue
has_icu_stay tdev = np.std(ls / np.max(ls))
1
    d = {k:v for k,v in loss}
    if sort == 'none':
prescriptions if sort == 'neg':
1025, 3587, 3460, 518, 3207, 1674, 524, 3213, 398, 429, 2197, 3482, 27, 672, 3361, 3619, 1709, 2353, 819, 1080, 443, 63, 3776, 4162, 1091, 68, 839, 969, 3021, 720, 526, 2902, 2007, 2521, 2140, 3933, 2530, 867, 996, 999, 747, 236, 3568, 1636, 3698, 3955
try:
    if d['all'] > d[k]:
        stdev = tdev
        break
admission_type except KeyError:
EMERGENCY pass
gender aux_ = [k:v[l] for k,v in aux.items()]
aux_len_ = {(k:v[l]) for k,v in aux_len.items()}
MALE losses_buffer.append(stdev, x, y, loss, aux_, aux_len_)
    if buffer_size > 0 and len(losses_buffer) >= buffer_size:
labs losses_buffer = sort(losses_buffer, key=lambda x:x[0])
HEMATOLOGY | EOSINOPHILS, HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | HYPOCHROMIA, CHEMISTRY | SODIUM, CHEMISTRY | ALANINE AMINOTRANSFERASE (ALT), CHEMISTRY | ALBUMIN, HEMATOLOGY | FIBRINOGEN, FUNCTIONAL, CHEMISTRY | ALPHA-FETOPROTEIN, CHEMISTRY | AMYLASE, CHEMISTRY | ANION GAP, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, HEMATOLOGY | ANISOCYTOSIS, CHEMISTRY | VANCOMYCIN, CHEMISTRY | ASPARTATE AMINOTRANSFERASE (AST), HEMATOLOGY | ATYPICAL LYMPHOCYTES, CHEMISTRY | BICARBONATE, HEMATOLOGY | BASOPHILIC STIPPLING, HEMATOLOGY | BASOPHILS, CHEMISTRY | BILIRUBIN, TOTAL, HEMATOLOGY | IN R(PT), CHEMISTRY | BLUE TOP HOLD, HEMATOLOGY | HEPATITIS B VIRUS CORE ANTIBODY, CHEMISTRY | CALCIUM, TOTAL, HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | META MYELOCYTES, CHEMISTRY | CHLORIDE, HEMATOLOGY | MONOCYTES, HEMATOLOGY | MYELOCYTES, HEMATOLOGY | NEUTROPHILS, CHEMISTRY | CORTISOL, HEMATOLOGY | MICROCYTES, CHEMISTRY | HEPATITIS B SURFACE ANTIGEN, CHEMISTRY | CREATININE, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PLATELET SMEAR, HEMATOLOGY | POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, BLOOD GAS | OXYGEN SATURATION, HEMATOLOGY | PT, HEMATOLOGY | PTT, HEMATOLOGY | BANDS, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, BLOOD GAS | SPECIMEN TYPE, BLOOD GAS | BASE EXCESS, BLOOD GAS | CALCULATED TOTAL CO2, HEMATOLOGY | SCHISTOCYTES, CHEMISTRY | CARCINOEMBYRONIC ANTIGEN (CEA), CHEMISTRY | HEPATITIS B SURFACE ANTIBODY, CHEMISTRY | ALKALINE PHOSPHATASE, BLOOD GAS | INTUBATED, BLOOD GAS | LACTATE, BLOOD GAS | O2 FLOW, BLOOD GAS | OXYGEN, HEMATOLOGY | TEARDROP CELLS, BLOOD GAS | PCO2, BLOOD GAS | PH, BLOOD GAS | P02, HEMATOLOGY | WHITE BLOOD CELLS, CHEMISTRY | GLUCOSE, CHEMISTRY | LACTATE DEHYDROGENASE (LD), BLOOD GAS | TEMPERATURE, CHEMISTRY | LIPASE, BLOOD GAS | VE NTILATION RATE, CHEMISTRY | MAGNESIUM, HEMATOLOGY | OVALOCYTES, CHEMISTRY | TRIGLYCERIDES, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM, CHEMISTRY | HEPATITIS C VIRUS ANTIBODY
procedures superkey = 'Tabs'
Injection oxazolidinone, Arterial pressure monit, Hemodialysis
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[ a stable s/p trach | p v ented ]
perp 67.95420, prob 0.01472: no_diagnoses          gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 69.57915, prob 0.01437: no_gender            gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 73.70473, prob 0.01357: no_has_icu_stay       gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 73.75623, prob 0.01356: no_admission_type     gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 73.80215, prob 0.01355: all                   gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 73.80215, prob 0.01355: no_prescriptions      gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 74.75465, prob 0.01338: no_has_dod           gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 77.85586, prob 0.01284: only_procedures       gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 85.63297, prob 0.01168: no_labs              gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 209.26656, prob 0.00478: only_labs           gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 237.90250, prob 0.00420: no_procedures        gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 248.63974, prob 0.00402: only_has_dod         gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 252.10826, prob 0.00397: only_admission_type   gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 252.80357, prob 0.00396: only_has_icu_stay     gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 252.89629, prob 0.00395: only_prescriptions    gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 252.89641, prob 0.00395: none                 gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 264.14697, prob 0.00379: unconditional        gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000
perp 267.12256, prob 0.00374: only_diagnoses       gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222
perp 268.13965, prob 0.00373: only_gender          gate min 0.000000, max 1.000000, avg 0.526731, std 0.497222

diagnoses
loss = -0.01*(loss, key=lambda x:x[0])
Acute respiratory failure, Gastrointest hemorrh NOS, Acute bronchitis, Mth sus Stph aur els/NOS, Empysema NEC, Empyema with fistula, Malig neo main bronchus, Dysthymic disorder, Osteoporosis NOS

has_icu_stay
stdev = np.std(ls / np.max(ls))
d = [k:v for k,v in loss]
1           if sort_helpful == 'none':
1           if sort_helpful == 'neg':
prescriptions
stdev = -stdev
for k in ['unconditional', 'none']:
has_dod
try:
1           if d['only_procedures'] > d[k]:
stdev = -stdev
break
admission_type
EMERGENCY
except KeyError:
pass
EMERGENCY
gender
aux_ = {k:v[i] for k,v in aux.items()}
FEMALE
aux_len = [(k,v[i]) for k,v in aux.items()]
losses_buffer.append((stdev, x, y, loss, aux_, aux_len))
if buffer_size > 0 and len(losses_buffer) >= buffer_size:
labs
HEMATOLOGY | EOSINOPHILS, HEMATOLOGY | HYPOCHROMIA, CHEMISTRY | SODIUM, CHEMISTRY | GREEN TOP HOLD (PLASMA), CHEMISTRY | ALBUMIN, HEMATOLOGY | LYMPHOCYTES, CHEMISTRY | ANION GAP, CHEMISTRY | TROPONIN I, H
EMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, BLOOD GAS | POTASSIUM, WHOLE BLOOD, HEMATOLOGY | ANISOCYTOSIS, CHEMISTRY | VANCOMYCIN, CHEMISTRY | BICARBONATE, HEMATOLOGY | BAS
OPHILS, HEMATOLOGY | INR(PT), CHEMISTRY | CALCIUM, TOTAL, HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, CHEMISTRY | CHLORIDE, HEMATOLOGY | MONOCYTES, HEMATOLOGY | NEUTRO
PHILS, CHEMISTRY | CREATINE KINASE (CK), CHEMISTRY | CREATINE KINASE, MB ISOENZYME, CHEMISTRY | CREATININE, CHEMISTRY | CHLORIDE, URINE, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PLATELET SMEAR, HEMATOLOGY
| POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, HEMATOLOGY | PT, HEMATOLOGY | PTT, HEMATOLOGY | BANDS, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, CHEMISTRY | GLUCOSE, BLOOD GAS | BASE EXCESS, BLOOD GA
S | CALCULATED TOTAL CO2, BLOOD GAS | FREE CALCIUM, CHEMISTRY | CREATININE, URINE, BLOOD GAS | HEMATOCRIT, CALCULATED, BLOOD GAS | HEMOGLOBIN, BLOOD GAS | INTUBATED, BLOOD GAS | LACTATE, BLOOD GAS | O2 FL
OW, BLOOD GAS | OXYGEN, BLOOD GAS | OXYGEN SATURATION, BLOOD GAS | PCO2, BLOOD GAS | PEEP, BLOOD GAS | PH, BLOOD GAS | PO2, HEMATOLOGY | WHITE BLOOD CELLS, BLOOD GAS | SPECIMEN TYPE, CHEMISTRY | LENGTH OF
URINE COLLECTION, BLOOD GAS | TIDAL VOLUME, BLOOD GAS | VENTILATION RATE, BLOOD GAS | VENTILATOR, CHEMISTRY | MAGNESIUM, CHEMISTRY | OSMOLALITY, URINE, CHEMISTRY | POTASSIUM, URINE, CHEMISTRY | SODIUM, U
RINE, BLOOD GAS | TEMPERATURE, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM, HEMATOLOGY | MICROCYTES, BLOOD GAS | GLUCOSE
procedures
k, v in dicts.items():
Sm bowel endoscopy NEC, Insert endotracheal tube, Enteral infus nutrit sub, Venous cath NEC, Closed bronchial biopsy, Clos thoracic fistul NEC, Cont inv mrc ven 96+ hrs, Temporary tracheostomy

```

```
[ to have the dialysis line changed to ]
perf 128.78334, prob 0.06776: no_admission_type      gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 131.83156, prob 0.06759: all                   gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 136.56400, prob 0.06732: no_has_icu_stay       gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 138.06273, prob 0.06724: no_prescriptions     gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 138.50313, prob 0.06722: no_has_dod            gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 139.15506, prob 0.06719: no_gender             gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 163.37978, prob 0.06612: no_diagnoses_b_losses gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 217.97458, prob 0.06459: no_labs                gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 329.76111, prob 0.06303: only_procedures       gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 793.15503, prob 0.06126: no_procedures         gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 1179.14630, prob 0.00885: only_labs             gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 1660.77405, prob 0.00660: only_diagnoses       gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 1896.19958, prob 0.00553: only_prescriptions    gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 1960.86694, prob 0.00551: only_gender            gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 1966.46631, prob 0.00551: only_has_dod          gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 1990.94556, prob 0.00550: only_has_icu_stay      gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 2068.81104, prob 0.0048: none                  gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 2110.09253, prob 0.00047: only_admission_type    gate min 0.000000, max 1.000000, avg 0.514378, std 0.497434
perf 5627.73193, prob 0.00018: unconditional          gate min 0.000000, max 0.000000, std 0.000000

diagnoses
Nephritis NOS in oth dis, Severe sepsis, Accident in home, React-oth vasc dev/grft, Abn react-procedure NEC, Alkalosis, Diabetic retinopathy NOS, Neuropathy in diabetes, Hyp kid NOS w cr kid V, DMII oph ht nt st uncntrl, Cor ath unsp vsl ntv/gft, Aortocoronary bypass, Pulmonary collapse, Thrombocytopenia NOS, Abnrmal coagulton prfile, Meth susc Staph aur sept, DMII renl nt st uncntrld, DMII neuro nt st un cntrl, Septic shock, Inf mcrg rstm pnclns (in loss))

def diagnoses():
    if len(diagnoses) == 0:
        return []
    else:
        diagnoses = diagnoses[0]
        diagnoses.append('in loss'))
        return diagnoses

def has_icu_stay():
    if len(has_icu_stay) == 0:
        return []
    else:
        has_icu_stay = has_icu_stay[0]
        has_icu_stay.append('in loss'))
        return has_icu_stay

def prescriptions():
    if len(prescriptions) == 0:
        return []
    else:
        prescriptions = prescriptions[0]
        prescriptions.append('in loss'))
        return prescriptions

def has_dod():
    if len(has_dod) == 0:
        return []
    else:
        has_dod = has_dod[0]
        has_dod.append('in loss'))
        return has_dod

def admission_type():
    if len(admission_type) == 0:
        return []
    else:
        admission_type = admission_type[0]
        admission_type.append('in loss'))
        return admission_type

def emergency():
    if len(emergency) == 0:
        return []
    else:
        emergency = emergency[0]
        emergency.append('in loss'))
        return emergency

def gender():
    if len(gender) == 0:
        return []
    else:
        gender = gender[0]
        gender.append('in loss'))
        return gender

def male():
    if len(male) == 0:
        return []
    else:
        male = male[0]
        male.append('in loss'))
        return male

def losses():
    if len(losses) == 0:
        return []
    else:
        losses = losses[0]
        losses.append('in loss'))
        return losses

def aux():
    if len(aux) == 0:
        return []
    else:
        aux = aux[0]
        aux.append('in loss'))
        return aux

def aux_len():
    if len(aux_len) == 0:
        return []
    else:
        aux_len = aux_len[0]
        aux_len.append('in loss'))
        return aux_len

def losses_buffer():
    if len(losses_buffer) == 0:
        return []
    else:
        losses_buffer = losses_buffer[0]
        losses_buffer.append('in loss'))
        return losses_buffer

def losses_buffer_size():
    if len(losses_buffer_size) == 0:
        return []
    else:
        losses_buffer_size = losses_buffer_size[0]
        losses_buffer_size.append('in loss'))
        return losses_buffer_size

def losses_buffer_lambda():
    if len(losses_buffer_lambda) == 0:
        return []
    else:
        losses_buffer_lambda = losses_buffer_lambda[0]
        losses_buffer_lambda.append('in loss'))
        return losses_buffer_lambda

def chemistry():
    if len(chemistry) == 0:
        return []
    else:
        chemistry = chemistry[0]
        chemistry.append('in loss'))
        return chemistry

def haptoglobin():
    if len(haptoglobin) == 0:
        return []
    else:
        haptoglobin = haptoglobin[0]
        haptoglobin.append('in loss'))
        return haptoglobin

def hematology():
    if len(hematology) == 0:
        return []
    else:
        hematology = hematology[0]
        hematology.append('in loss'))
        return hematology

def blood():
    if len(blood) == 0:
        return []
    else:
        blood = blood[0]
        blood.append('in loss'))
        return blood

def thyroid():
    if len(thyroid) == 0:
        return []
    else:
        thyroid = thyroid[0]
        thyroid.append('in loss'))
        return thyroid

def stimulating_hormone():
    if len(stimulating_hormone) == 0:
        return []
    else:
        stimulating_hormone = stimulating_hormone[0]
        stimulating_hormone.append('in loss'))
        return stimulating_hormone

def alanine_aminotransferase():
    if len(alanine_aminotransferase) == 0:
        return []
    else:
        alanine_aminotransferase = alanine_aminotransferase[0]
        alanine_aminotransferase.append('in loss'))
        return alanine_aminotransferase

def chemistry1():
    if len(chemistry1) == 0:
        return []
    else:
        chemistry1 = chemistry1[0]
        chemistry1.append('in loss'))
        return chemistry1

def albumin():
    if len(albumin) == 0:
        return []
    else:
        albumin = albumin[0]
        albumin.append('in loss'))
        return albumin

def alkaline_phosphatase():
    if len(alkaline_phosphatase) == 0:
        return []
    else:
        alkaline_phosphatase = alkaline_phosphatase[0]
        alkaline_phosphatase.append('in loss'))
        return alkaline_phosphatase

def leukocytes():
    if len(leukocytes) == 0:
        return []
    else:
        leukocytes = leukocytes[0]
        leukocytes.append('in loss'))
        return leukocytes

def anion_gap():
    if len(anion_gap) == 0:
        return []
    else:
        anion_gap = anion_gap[0]
        anion_gap.append('in loss'))
        return anion_gap

def troponin_t():
    if len(troponin_t) == 0:
        return []
    else:
        troponin_t = troponin_t[0]
        troponin_t.append('in loss'))
        return troponin_t

def hematology1():
    if len(hematology1) == 0:
        return []
    else:
        hematology1 = hematology1[0]
        hematology1.append('in loss'))
        return hematology1

def hemoglobin():
    if len(hemoglobin) == 0:
        return []
    else:
        hemoglobin = hemoglobin[0]
        hemoglobin.append('in loss'))
        return hemoglobin

def urea_nitrogen():
    if len(urea_nitrogen) == 0:
        return []
    else:
        urea_nitrogen = urea_nitrogen[0]
        urea_nitrogen.append('in loss'))
        return urea_nitrogen

def hematoцит():
    if len(hematoцит) == 0:
        return []
    else:
        hematoцит = hematoцит[0]
        hematoцит.append('in loss'))
        return hematoцит

def urine():
    if len(urine) == 0:
        return []
    else:
        urine = urine[0]
        urine.append('in loss'))
        return urine

def hematology2():
    if len(hematology2) == 0:
        return []
    else:
        hematology2 = hematology2[0]
        hematology2.append('in loss'))
        return hematology2

def ketone():
    if len(ketone) == 0:
        return []
    else:
        ketone = ketone[0]
        ketone.append('in loss'))
        return ketone

def vitamin_b12():
    if len(vitamin_b12) == 0:
        return []
    else:
        vitamin_b12 = vitamin_b12[0]
        vitamin_b12.append('in loss'))
        return vitamin_b12

def aspartate_aminotransferase():
    if len(aspartate_aminotransferase) == 0:
        return []
    else:
        aspartate_aminotransferase = aspartate_aminotransferase[0]
        aspartate_aminotransferase.append('in loss'))
        return aspartate_aminotransferase

def hematology3():
    if len(hematology3) == 0:
        return []
    else:
        hematology3 = hematology3[0]
        hematology3.append('in loss'))
        return hematology3

def iron():
    if len(iron) == 0:
        return []
    else:
        iron = iron[0]
        iron.append('in loss'))
        return iron

def platelet_count():
    if len(platelet_count) == 0:
        return []
    else:
        platelet_count = platelet_count[0]
        platelet_count.append('in loss'))
        return platelet_count

def hematology4():
    if len(hematology4) == 0:
        return []
    else:
        hematology4 = hematology4[0]
        hematology4.append('in loss'))
        return hematology4

def ptt():
    if len(ptt) == 0:
        return []
    else:
        ptt = ptt[0]
        ptt.append('in loss'))
        return ptt

def hematology5():
    if len(hematology5) == 0:
        return []
    else:
        hematology5 = hematology5[0]
        hematology5.append('in loss'))
        return hematology5

def bands():
    if len(bands) == 0:
        return []
    else:
        bands = bands[0]
        bands.append('in loss'))
        return bands

def hematology6():
    if len(hematology6) == 0:
        return []
    else:
        hematology6 = hematology6[0]
        hematology6.append('in loss'))
        return hematology6

def rdw():
    if len(rdw) == 0:
        return []
    else:
        rdw = rdw[0]
        rdw.append('in loss'))
        return rdw

def hematology7():
    if len(hematology7) == 0:
        return []
    else:
        hematology7 = hematology7[0]
        hematology7.append('in loss'))
        return hematology7

def gentamicin():
    if len(gentamicin) == 0:
        return []
    else:
        gentamicin = gentamicin[0]
        gentamicin.append('in loss'))
        return gentamicin

def hematology8():
    if len(hematology8) == 0:
        return []
    else:
        hematology8 = hematology8[0]
        hematology8.append('in loss'))
        return hematology8

def red_blood_cells():
    if len(red_blood_cells) == 0:
        return []
    else:
        red_blood_cells = red_blood_cells[0]
        red_blood_cells.append('in loss'))
        return red_blood_cells

def hematology9():
    if len(hematology9) == 0:
        return []
    else:
        hematology9 = hematology9[0]
        hematology9.append('in loss'))
        return hematology9

def chemistry2():
    if len(chemistry2) == 0:
        return []
    else:
        chemistry2 = chemistry2[0]
        chemistry2.append('in loss'))
        return chemistry2

def glucose():
    if len(glucose) == 0:
        return []
    else:
        glucose = glucose[0]
        glucose.append('in loss'))
        return glucose

def blood_gas():
    if len(blood_gas) == 0:
        return []
    else:
        blood_gas = blood_gas[0]
        blood_gas.append('in loss'))
        return blood_gas

def protein():
    if len(protein) == 0:
        return []
    else:
        protein = protein[0]
        protein.append('in loss'))
        return protein

def blood_gas1():
    if len(blood_gas1) == 0:
        return []
    else:
        blood_gas1 = blood_gas1[0]
        blood_gas1.append('in loss'))
        return blood_gas1

def lactate():
    if len(lactate) == 0:
        return []
    else:
        lactate = lactate[0]
        lactate.append('in loss'))
        return lactate

def po2():
    if len(po2) == 0:
        return []
    else:
        po2 = po2[0]
        po2.append('in loss'))
        return po2

def blood_gas2():
    if len(blood_gas2) == 0:
        return []
    else:
        blood_gas2 = blood_gas2[0]
        blood_gas2.append('in loss'))
        return blood_gas2

def oxygen():
    if len(oxygen) == 0:
        return []
    else:
        oxygen = oxygen[0]
        oxygen.append('in loss'))
        return oxygen

def saturation():
    if len(saturation) == 0:
        return []
    else:
        saturation = saturation[0]
        saturation.append('in loss'))
        return saturation

def blood_gas3():
    if len(blood_gas3) == 0:
        return []
    else:
        blood_gas3 = blood_gas3[0]
        blood_gas3.append('in loss'))
        return blood_gas3

def co2():
    if len(co2) == 0:
        return []
    else:
        co2 = co2[0]
        co2.append('in loss'))
        return co2

def hematology10():
    if len(hematology10) == 0:
        return []
    else:
        hematology10 = hematology10[0]
        hematology10.append('in loss'))
        return hematology10

def urine_appearance():
    if len(urine_appearance) == 0:
        return []
    else:
        urine_appearance = urine_appearance[0]
        urine_appearance.append('in loss'))
        return urine_appearance

def magnesium():
    if len(magnesium) == 0:
        return []
    else:
        magnesium = magnesium[0]
        magnesium.append('in loss'))
        return magnesium

def creatinine():
    if len(creatinine) == 0:
        return []
    else:
        creatinine = creatinine[0]
        creatinine.append('in loss'))
        return creatinine

def urine():
    if len(urine) == 0:
        return []
    else:
        urine = urine[0]
        urine.append('in loss'))
        return urine

def hematology11():
    if len(hematology11) == 0:
        return []
    else:
        hematology11 = hematology11[0]
        hematology11.append('in loss'))
        return hematology11

def yeast():
    if len(yeast) == 0:
        return []
    else:
        yeast = yeast[0]
        yeast.append('in loss'))
        return yeast

def sodium():
    if len(sodium) == 0:
        return []
    else:
        sodium = sodium[0]
        sodium.append('in loss'))
        return sodium

def urine1():
    if len(urine1) == 0:
        return []
    else:
        urine1 = urine1[0]
        urine1.append('in loss'))
        return urine1

def hematology12():
    if len(hematology12) == 0:
        return []
    else:
        hematology12 = hematology12[0]
        hematology12.append('in loss'))
        return hematology12

def phosphorus():
    if len(phosphorus) == 0:
        return []
    else:
        phosphorus = phosphorus[0]
        phosphorus.append('in loss'))
        return phosphorus

def c_reactive_protein():
    if len(c_reactive_protein) == 0:
        return []
    else:
        c_reactive_protein = c_reactive_protein[0]
        c_reactive_protein.append('in loss'))
        return c_reactive_protein

def hematology13():
    if len(hematology13) == 0:
        return []
    else:
        hematology13 = hematology13[0]
        hematology13.append('in loss'))
        return hematology13

def rbc():
    if len(rbc) == 0:
        return []
    else:
        rbc = rbc[0]
        rbc.append('in loss'))
        return rbc

def hematology14():
    if len(hematology14) == 0:
        return []
    else:
        hematology14 = hematology14[0]
        hematology14.append('in loss'))
        return hematology14

def sedimentation_rate():
    if len(sedimentation_rate) == 0:
        return []
    else:
        sedimentation_rate = sedimentation_rate[0]
        sedimentation_rate.append('in loss'))
        return sedimentation_rate

def epithelial_cells():
    if len(epithelial_cells) == 0:
        return []
    else:
        epithelial_cells = epithelial_cells[0]
        epithelial_cells.append('in loss'))
        return epithelial_cells
```

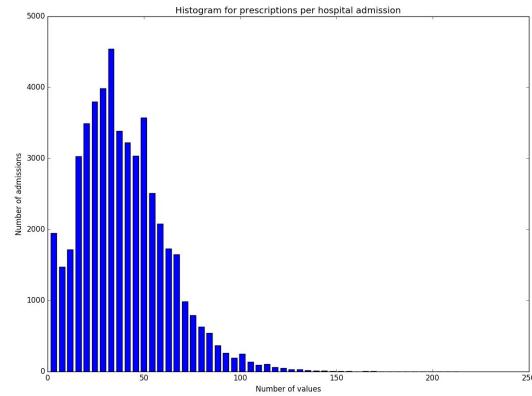
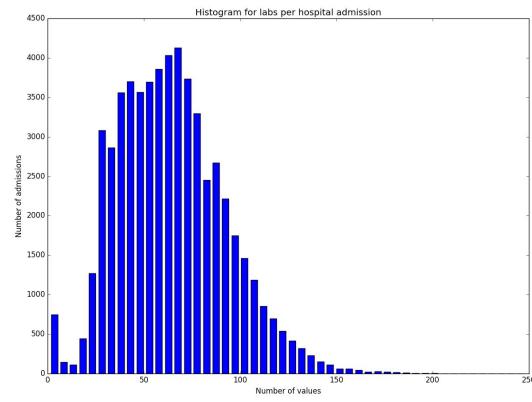
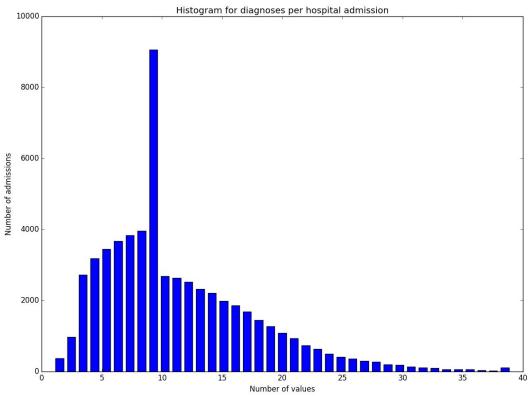
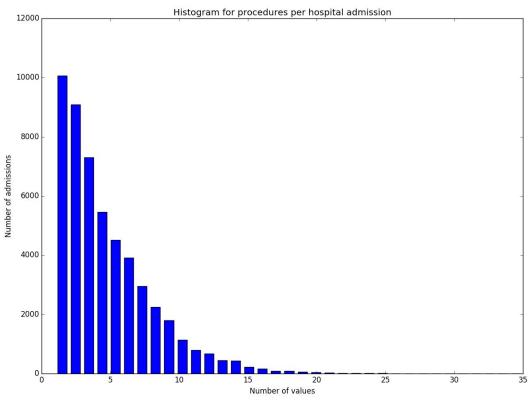
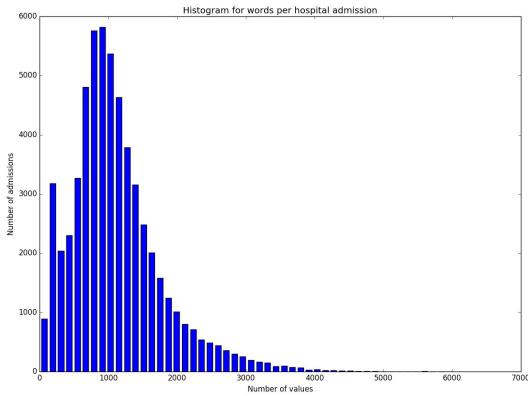
Next steps

- Conditional recurrent language model
 - Is it possible that the relevant structured information is already present in text, but not being used due to a limited context size in the feedforward models?
 - *Claim:* Recurrent networks aren't perfect, and learning to make sense of farther away unstructured context is possibly much harder than learning to use structured information
- Attention for structured information
 - Will also let us visualize what structured information is being focused on for predictions
- For better structured info embeddings, optimize s to be invertible
 - Infer structured info from raw text

Thank you!

Questions?

Variable cardinality features



```
[ refill | no murmur noted | a ] breakdown/parents-publicneed/knowledge  
perp 12.02005, prob 0.08319: no_labs gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 14.20628, prob 0.07039: no_gender gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 14.451547, prob 0.06889: no_has_icu_stay gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 14.57934, prob 0.06859: all gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 14.63771, prob 0.06832: no_has_dod gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 15.37998, prob 0.06502: no_procedures After gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 16.30209, prob 0.06134: unconditional gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000  
perp 16.67308, prob 0.05998: no_prescriptions before gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 18.74612, prob 0.05334: no_diagnoses When gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 19.68527, prob 0.05080: only_admission_type gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 57.57194, prob 0.01737: no_admission_type gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 60.19444, prob 0.01661: only_diagnoses gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 68.63065, prob 0.01457: only_prescriptions gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 80.88287, prob 0.01236: only_procedures Now gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 88.40672, prob 0.01131: only_has_dod gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 89.58038, prob 0.01116: none the gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 90.13241, prob 0.01109: only_has_icu_stay Some gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 92.75920, prob 0.01078: only_gender gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860  
perp 116.51493, prob 0.00858: only_labs gate min 0.000000, max 1.000000, avg 0.570229, std 0.491860
```

The next day Rory's pain and fever were worse. His skin was mottled and the tip of his

NB obsrv suspect infect, Retrorenal fibroplasia, Perinatal condition NEC, NB atelectasis NEC/NOS, Neonatal bradycardia, Anemia of prematurity, Neonatal conjunctivitis, Acidosis, 4973, Preterm NEC 1000-1249g, Other apnea of newborn, 27-28 comp wks gestation, Respiratory distress syn, Twin-mate lb-in hos w cs, 1883, Other lung disease NEC, Neonatal jaund preterm del intensive care. The diagnosis: septic shock. Rory was fighting a systemic wide infection that

has_icu_stay

1

prescriptions

771, 518, 1799, 1795, 3478, 3356, 1824, 1392, 1571, 2095, 1201, 694, 3386, 2882, 3267, 723, 1242, 4061, 990, 236, 240, 1655, 2552, 125

has_dod

0

admission_type

NEWBORN

She's not alone. Sepsis kills more than

gender

MALE

250,000 people every year. People at

labs

highest risk are those with weakened

immune systems: the very young and
HEMATOLOGY | EOSINOPHILS, HEMATOLOGY | HYPOCHROMIA, CHEMISTRY | SODIUM, HEMATOLOGY | BILIRUBIN, HEMATOLOGY | BLOOD, HEMATOLOGY | METAMYEOCYTES, CHEMISTRY | ALKALINE PHOSPHATASE, HEMATOLOGY | FRAGMENTED CELLS, CHEMISTRY | TRIGLYCERIDES, CHEMISTRY | ANION GAP, HEMATOLOGY | GLUCOSE, HEMATOLOGY | HEMOGLOBIN, HEMATOLOGY | ACANTHOCTYES, CHEMISTRY | UREA NITROGEN, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | ANISOCYTOSIS, HEMATOLOGY | KETONE, HEMATOLOGY | LEUKOCYTES, HEMATOLOGY | NITRITE, HEMATOLOGY | BASOPHILS, HEMATOLOGY | ATYPICAL LYMPHOCYTES, CHEMISTRY | BICARBONATE, CHEMISTRY | BILIRUBIN, DIRECT, CHEMISTRY | BILIRUBIN, INDIRITIVE, CHEMISTRY | BILIRUBIN, TOTAL, HEMATOLOGY | PH, HEMATOLOGY | SPECIFIC GRAVITY, HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEMATOLOGY | URINE APPEARANCE, HEMATOLOGY | MCV, HEMATOLOGY | URINE COLOR, CHEMISTRY | CHLORIDE, HEMATOLOGY | MONOCYTES, HEMATOLOGY | MYELOCYTES, HEMATOLOGY | UROBILINOGEN, HEMATOLOGY | NUCLEATED RED CELLS, HEMATOLOGY | OVALOCYTES, CHEMISTRY | CALCIUM, TOTAL, HEMATOLOGY | MICROCYTES, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PLATELET SMEAR, HEMATOLOGY | POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, HEMATOLOGY | BANDS, HEMATOLOGY | RDW, CHEMISTRY | GENTAMICIN, HEMATOLOGY | RED BLOOD CELLS, BLOOD GAS | SPECIMEN TYPE, BLOOD GAS | BASE EXCESS, HEMATOLOGY | RETICULOCYTE COUNT, AUTOMATED, BLOOD GAS | CALCULATED TOTAL CO₂, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | SCHISTOCYTES, HEMATOLOGY | PROTEIN, BLOOD GAS | INTUBATED, HEMATOLOGY | SPHEROCYTES, CHEMISTRY | VANCOMYCIN, HEMATOLOGY | TARGET CELLS, BLOOD GAS | OXYGEN, BLOOD GAS | FREE CALCIUM, BLOOD GAS | P CO₂, BLOOD GAS | PEEP, BLOOD GAS | PH, BLOOD GAS | PO₂, HEMATOLOGY | WHITE BLOOD CELLS, BLOOD GAS | VENTILATION RATE, BLOOD GAS | VENTILATOR, HEMATOLOGY | MCHC, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM, CHEMISTRY | CREATININE, BLOOD GAS | GLUCOSE, HEMATOLOGY | RETICULOCYTE COUNT, MANUAL

procedures

Sepsis is a body's overwhelming response to infection. It typically occurs when germs

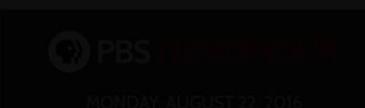
Non-invasive mech vent, Insert endotracheal tube, Other phototherapy, Enteral infus nutrit sub, Parent infus nutrit sub, Umbilical vein cath, Venous cath NEC, Arterial catheterization, Laryngoscopy/tracheo

scop, Packed cell transfusion, Cont inv mvc ven 96+ hrs, Dx ultrasound-heart screen and spread throughout the body. To fight the

3 The Syrian volunteers who rush to bombed buildings to save victims

4 Political Party Quiz

5 Column: Why we need to extend economic empowerment to military spouses



PBS NEWSHOUR AUG. 22, 2015

WATCH FULL BROADCASTS LISTEN FULL AUDIO PODCASTS

```
[ wks ga rds sepsis evaluation left shift ]
perf 71.46732, prob 0.01399: no_labs 4
perf 78.49266, prob 0.01274: no_procedures
perf 78.83366, prob 0.01268: no_prescriptions
perf 81.70174, prob 0.01224: no_has_dod
perf 82.11339, prob 0.01218: no_has_icu_stay
perf 83.03545, prob 0.01204: all
perf 86.39296, prob 0.01158: no_gender
perf 127.06477, prob 0.00787: only_admission_type
perf 133.63141, prob 0.00748: no_diagnoses
perf 134.06337, prob 0.00746: unconditional
perf 181.49518, prob 0.00551: only_diagnoses
perf 184.75249, prob 0.00541: no_admission_type
perf 321.07544, prob 0.00311: only_prescriptions
perf 334.93381, prob 0.00299: only_gender
perf 343.59503, prob 0.00291: only_procedures
perf 352.76508, prob 0.00283: none
perf 356.72784, prob 0.00280: only_has_dod
perf 357.86234, prob 0.00279: only_has_icu_stay
perf 385.12115, prob 0.00260: only_labs

diagnoses
NB obsrv suspct infect, Respiratory distress syn, Need prphyl vc vrl hepat, Preterm NEC 1000-1249g, Other apnea of newborn, 29-30 comp wks gestation, Anemia of prematurity, Single lb in-hosp w cs, Neonat jaund preterm del

has_icu_stay
1

prescriptions
1282, 518, 1799, 909, 2709, 3478, 539, 3356, 240, 2350, 2992, 694, 3386, 2882, 3524, 984, 1370, 990, 2660, 1392, 2552, 4091

has_dod
0

admission_type
NEWBORN

gender
FEMALE

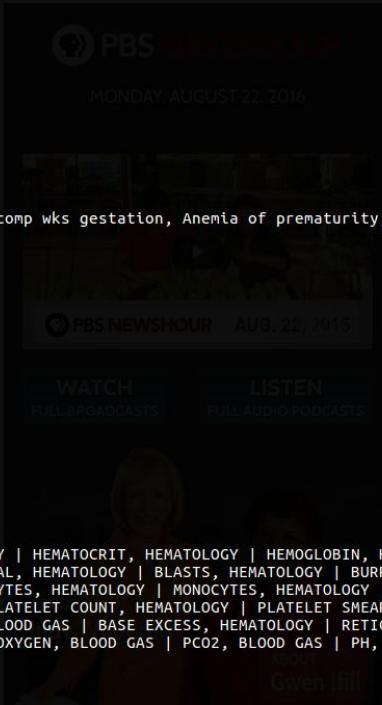
labs
HEMATOLOGY | EOSINOPHILS, CHEMISTRY | SODIUM, CHEMISTRY | BICARBONATE, CHEMISTRY | TRIGLYCERIDES, CHEMISTRY | ANION GAP, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, HEMATOLOGY | ANISOCYTOSIS, HEMATOLOGY | ATYPICAL LYMPHOCYTES, HEMATOLOGY | BANDS, CHEMISTRY | BILIRUBIN, DIRECT, HEMATOLOGY | BASOPHILS, CHEMISTRY | BILIRUBIN, TOTAL, HEMATOLOGY | BLASTS, HEMATOLOGY | BURR CELLS, HEMATOLOGY | LYMPHOCYTES , HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | METAMYELOCYTES, HEMATOLOGY | MICROCYTES, HEMATOLOGY | MONOCYTES, HEMATOLOGY | MYELOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | NUCLEATED RED CELLS, HEMATOLOGY | OVALOCYTES, CHEMISTRY | CALCIUM, TOTAL, CHEMISTRY | CHLORIDE, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PLATELET SMEAR, HEMATOLOGY | POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, HEMATOLOGY | PROMYELOCYTES, HEMATOLOGY | HYPOCHROMIA, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, BLOOD GAS | BASE EXCESS, HEMATOLOGY | RETICULOCYTE COUNT, AUTOMATED, BLOOD GAS | CALCULATED TOTAL CO2, CHEMISTRY | BILIRUBIN, INDIRECT, CHEMISTRY | ALKALINE PHOSPHATASE, BLOOD GAS | INTUBATED, BLOOD GAS | OXYGEN, BLOOD GAS | PCO2, BLOOD GAS | PH, BLOOD GAS | PO2, HEMATOLOGY | WHITE BLOOD CELLS, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM

procedures
Non-invasive mech vent, Dx ultrasound-head/neck, Parent infus nutrit sub, Other phototherapy, Vaccination NEC when germs
```

3 The Syrian volunteers who rush to bombed buildings to save victims

4 Political Party Quiz

5 Column: Why we need to extend economic empowerment to military spouses



"It was frightening to think that something could kill my son so fast and it would be something that I had never heard of," said Oriahnt Staunton.

She's not alone. Sepsis kills more than

250,000 people every year. People at highest risk are those with weakened immune systems, the very young and

elderly patients with chronic diseases.

Gwen Ifill

```
[ joints | no fractures or dislocations of ] bash history experiment.sh minio.py config.py util.py *Untitled Document 1
perp 29.44303, prob 0.03396: no_gender gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 29.88953, prob 0.03346: no_admission_type gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 30.68960, prob 0.03258: no_has_icu_stay gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 30.79815, prob 0.03247: all gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 30.79815, prob 0.03247: no_prescriptions gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 31.31652, prob 0.03193: no_has_dod gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 35.08675, prob 0.02850: no_labs gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 36.22325, prob 0.02761: no_procedures b, los gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 38.92448, prob 0.02569: only_diagnoses_at_hospital gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 47.26023, prob 0.02116: unconditional gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000
perp 54.48513, prob 0.01835: no_diagnoses gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 58.65000, prob 0.01705: only_procedures xs gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 60.30663, prob 0.01658: only_labs gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 68.13161, prob 0.01468: only_has_dod or # gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 69.28687, prob 0.01443: none or pvs_stopwords gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 69.28687, prob 0.01443: only_prescriptions gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 69.50007, prob 0.01439: only_has_icu_stay gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 71.38858, prob 0.01401: only_admission_type gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617
perp 72.51123, prob 0.01379: only_gender gate min 0.000000, max 1.000000, avg 0.561305, std 0.490617

diagnoses
3640, Opn skl vlt fx/menin hem, Pneumonia, organism NOS, Fall on stair/step NEC, Gram-neg septicemia NEC

has_icu_stay loss = softmax(loss, key= lambda x:x[0])
1
    la = np.exp(np.array([l[0] for l in loss]))
    if np.amin(la) > max_minperf: continue
prescriptions stdev = np.std(la) / np.amax(la)
    d = {k:v for v,k in loss}
    if sort_helpful != 'none':
        if sort_helpful == 'neg':
            stdev = -stdev
        for k in ['unconditional', 'none']:
            try:
                if d['only_diagnoses'] + d[k]:
                    stdev = -stdev
                    break
            except KeyError:
                pass
admission_type
EMERGENCY
gender
MALE
labs aux_ = [k:v[i] for k,v in aux.items()]
CHEMISTRY | RED TOP HOLD, CHEMISTRY | SALICYLATE, CHEMISTRY | SODIUM, HEMATOLOGY | EOSINOPHILS, CHEMISTRY | THYROID STIMULATING HORMONE, CHEMISTRY | TRICYCLIC ANTIDEPRESSANT SCREEN, CHEMISTRY | TROPONIN I, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, HEMATOLOGY | HYPOCHROMIA, HEMATOLOGY | INR(PT), HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | MICROCYTES, HEMATOLOGY | MONOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PLATELET SMEAR, HEMATOLOGY | POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, HEMATOLOGY | PT, HEMATOLOGY | PTT, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELL FRAGMENTS, HEMATOLOGY | RED BLOOD CELLS, CHEMISTRY | AMPHETAMINE SCREEN, URINE, CHEMISTRY | BARBITURATE SCREEN, URINE, CHEMISTRY | BENZODIAZEPINE SCREEN, URINE, CHEMISTRY | COCAINE, URINE, HEMATOLOGY | WHITE BLOOD CELLS, CHEMISTRY | LENGTH OF URINE COLLECTION, CHEMISTRY | METHADONE, URINE, CHEMISTRY | OPIATE SCREEN, URINE, CHEMISTRY | OSMOLALITY, URINE, CHEMISTRY | SODIUM, URINE, HEMATOLOGY | ANISOCYTOSIS, HEMATOLOGY | BANDS, HEMATOLOGY | BASOPHILS, HEMATOLOGY | BACTERIA, HEMATOLOGY | BILIRUBIN, HEMATOLOGY | BLOOD, HEMATOLOGY | EPITHELIAL CELLS, HEMATOLOGY | GLUCOSE, HEMATOLOGY | KETONE, HEMATOLOGY | LEUKOCYTES, HEMATOLOGY | NITRITE, HEMATOLOGY | PH, HEMATOLOGY | PROTEIN, HEMATOLOGY | RBC, HEMATOLOGY | SPECIFIC GRAVITY, HEMATOLOGY | URINE APPEARANCE, HEMATOLOGY | URINE COLOR, HEMATOLOGY | UROBILINOGEN, HEMATOLOGY | WBC, HEMATOLOGY | YEAST, BLOOD GAS | SPECIMEN TYPE, BLOOD GAS | ALVEOLAR-ARTERIAL GRADIENT, BLOOD GAS | BASE EXCESS, BLOOD GAS | CALCULATED BICARBONATE, WHOLE BLOOD, BLOOD GAS | CALCULATED TOTAL CO2, BLOOD GAS | CARBOXYHEMOGLOBIN, BLOOD GAS | CHLORIDE, WHOLE BLOOD, BLOOD GAS | FREE CALCIUM, BLOOD GAS | GLUCOSE, BLOOD GAS | HEMATOCRIT, CALCULATED, BLOOD GAS | HEMOGLOBIN, BLOOD GAS | INTUBATED, BLOOD GAS | LACTATE, BLOOD GAS | METHEMOGLOBIN, BLOOD GAS | OXYGEN, BLOOD GAS | OXYGEN SATURATION, BLOOD GAS | PCO2, BLOOD GAS | PEEP, BLOOD GAS | PH, BLOOD GAS | PO2, BLOOD GAS | POTASSIUM, WHOLE BLOOD, BLOOD GAS | REQUIRED O2, BLOOD GAS | SODIUM, WHOLE BLOOD, BLOOD GAS | TEMPERATURE, BLOOD GAS | TIDAL VOLUME, BLOOD GAS | VENTILATION RATE, BLOOD GAS | VENTILATOR, CHEMISTRY | ACETAMINOPHEN, CHEMISTRY | ALANINE AMINOTRANSFERASE (ALT), CHEMISTRY | ALKALINE PHOSPHATASE, CHEMISTRY | AMYLASE, CHEMISTRY | ANION GAP, CHEMISTRY | ASPARATIC AMINOTRANSFERASE (AST), CHEMISTRY | BARBITURATE SCREEN, CHEMISTRY | BENZODIAZEPINE SCREEN, CHEMISTRY | BICARBONATE, CHEMISTRY | BILIRUBIN, TOTAL, CHEMISTRY | CALCIUM, TOTAL, CHEMISTRY | CHLORIDE, CHEMISTRY | CREATINE KINASE (CK), CHEMISTRY | CREATINE KINASE, MB ISOZYME, CHEMISTRY | CREATININE, CHEMISTRY | ETHANOL, CHEMISTRY | GLUCOSE, CHEMISTRY | GREEN TOP HOLD (PLASMA), CHEMISTRY | LIPOASE, CHEMISTRY | MAGNESIUM, CHEMISTRY | OSMOLALITY, MEASURED, CHEMISTRY | PHENYTOIN, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM
procedures superkey = 'labs'
key = 'ITFMHD'
Percu endosc gastrostomy, Insert endotracheal tube, 1294, Venous cath NEC, Cont inv nec ven 96+ hrs, Temporary tracheostomy
```

```

[ sent to newborn nursery in stable condition ] passes, aux, aux_len_dicts, max_mindeps_per_label
perf 5.66314, prob 0.17658: no_gender gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 5.75385, prob 0.17380: all gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 5.75385, prob 0.17380: no_prescriptions gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 5.78418, prob 0.17289: no_has_icu_stay (X5) gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 5.80251, prob 0.17234: no_has_dod gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 7.63829, prob 0.13092: no_admission_type # gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 9.67788, prob 0.10333: no_labs plus_stopwords gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 10.88866, prob 0.09252: no_procedures gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 28.63095, prob 0.03493: only_diagnoses gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 38.96813, prob 0.02566: unconditional gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000
perf 41.85144, prob 0.02389: no_diagnoses gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 119.44978, prob 0.00837: only_procedures gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 139.18353, prob 0.00718: only_labs gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 176.51724, prob 0.00567: only_admission_type gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 264.42233, prob 0.00378: only_has_dod gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 267.57101, prob 0.00374: only_has_icu_stay() gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 269.19565, prob 0.00371: none () for l in losses_buffer gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 269.19565, prob 0.00371: only_prescriptions gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234
perf 274.54263, prob 0.00364: only_genders() gate min 0.000000, max 1.000000, avg 0.517154, std 0.497234

d = {k:v for k,v in d.items() if k != 'losses'}
diagnoses = if sort_helpful is 'none' :
NB obsrv suspect infect, Need prophyl vc vrl hepat, Single lb in-hosp w/o cs, Routine circumcision
for k in diagnoses:
    if k == 'only_diagnoses':
        pass
    else:
        if k == 'only_prescriptions':
            pass
        else:
            if k == 'only_genders':
                pass
            else:
                if k == 'only_labs':
                    pass
                else:
                    if k == 'only_has_dod':
                        pass
                    else:
                        if k == 'only_has_icu_stay':
                            pass
                        else:
                            if k == 'only_procedures':
                                pass
                            else:
                                if k == 'only_admission_type':
                                    pass
                                else:
                                    if k == 'only_has_icu_stay':
                                        pass
                                    else:
                                        if k == 'only_has_dod':
                                            pass
                                        else:
                                            if k == 'only_prescriptions':
                                                pass
                                            else:
                                                if k == 'only_genders':
                                                    pass
                                                else:
                                                    if k == 'only_labs':
                                                        pass
                                                    else:
                                                        if k == 'only_has_icu_stay':
                                                            pass
                                                        else:
                                                            if k == 'only_procedures':
                                                                pass
                                                            else:
                                                                if k == 'only_admission_type':
                                                                    pass
                                                                else:
                                                                    if k == 'only_has_dod':
                                                                        pass
                                                                    else:
                                                                        if k == 'only_prescriptions':
                                                                            pass
                                                                        else:
                                                                            if k == 'only_genders':
                                                                                pass
                                                                            else:
                                                                                if k == 'only_labs':
                                                                                    pass
                                                                                else:
                                                                                    if k == 'only_has_icu_stay':
                                                                                        pass
                                                                                    else:
                                                                                        if k == 'only_procedures':
                                                                                            pass
                                                                                        else:
                                                                                            if k == 'only_admission_type':
                                                                                                pass
                                                                                            else:
                                                                                                if k == 'only_has_dod':
                                                                                                    pass
                                                                                                else:
                                                                                                    if k == 'only_prescriptions':
                                                                                                        pass
                                                                                                    else:
                                                                                                        if k == 'only_genders':
                                                                                                            pass
................................................................
has_icu_stay = for k in ['Unconditional', 'None']:
    if d[k] > 0:
        break
    else:
        try:
            if d['only_diagnoses'] > d[k]:
                stdev = -stdev
            break
        except KeyError:
            pass
has_dod = pass
0
aux = {k:v[l] for k,v in aux.items()}
aux_len = {k:v[l] for k,v in aux_len.items()}
admission_type = losses_buffer.append((stdev, x, y, loss, aux, aux_len))
NEWBORN = if buffer_size > 0 and len(losses_buffer) >= buffer_size:
            losses_buffer = sorted(losses_buffer, key=lambda x:x[0])
gender = for s, x, y, loss, aux, aux_len in losses_buffer:
    if s == 'Male':
        inspect_losses(x, y, config, vocab, loss, aux, aux_len, dicts)
MALE = losses_buffer = []
labs = print 'Press enter to continue...'
HEMATOLOGY | EOSINOPHILS, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, HEMATOLOGY | ANISOCYTOSIS, HEMATOLOGY | ATYPICAL LYMPHOCYTES, HEMATOLOGY | BANDS, HEMATOLOGY | BASOPHILS, HEMATOLOGY | BURR CELLS, HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | METAMYELOCYTES, HEMATOLOGY | MICROCYTES, HEMATOLOGY | MONOCYTES, HEMATOLOGY | MYELOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | NUCLEATED RED CELLS, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, HEMATOLOGY | HYPOCHROMIA, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, HEMATOLOGY | SCHISTOCYTES, HEMATOLOGY | TEARDROP CELLS, HEMATOLOGY | WHITE BLOOD CELLS
procedures = {}
Circumcision, Vaccination NEC = NS_DATA_TABLE.CSV'

```

[aortic stenosis and aortic regurgitation | mild]
perp 11.43405, prob 0.08746: no_has_dod loss_symptom gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 11.45716, prob 0.08728: all gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 11.47288, prob 0.08710: no_has_icu_stay gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 11.61438, prob 0.08610: no_admission_type gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 11.84948, prob 0.08439: no_gender gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 13.44073, prob 0.07440: no_prescriptions gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 14.10272, prob 0.07091: no_labs gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 14.59117, prob 0.06853: no_diagnoses gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 15.95143, prob 0.06269: no_procedures Stenosis gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 22.65045, prob 0.04415: only_procedures gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 25.21132, prob 0.03966: only_diagnoses gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 25.73256, prob 0.03886: only_labs gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 26.35220, prob 0.03795: only_prescriptions gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 31.07703, prob 0.03218: only_gender gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 31.65558, prob 0.03159: only_admission_type gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 32.09690, prob 0.03116: only_has_icu_stay gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 32.16884, prob 0.03109: only_has_dod gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 32.17304, prob 0.03108: none > Scoliosis Stenosis gate min 0.000000, max 1.000000, avg 0.563303, std 0.492640
perp 33.93722, prob 0.02947: unconditional gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000

diagnoses > Spinal Stenosis Videos Some people are born with a congenital form, but most develop spinal stenosis as part of the degenerative cascade. A few do not feel any effects of the narrowing, but as part of the aging process, the narrowing may lead to numbness or tingling in the legs and/or back pain. This is called **lumbar stenosis** or **cervical stenosis**. Other symptoms include pain, stiffness, and/or muscle weakness. These symptoms are often worse when you stand or walk, and may improve when you sit down or lean forward. In some cases, the narrowing may affect the spinal cord itself, causing problems with coordination and balance. This is called **myelopathy**.

Acute respiratory failure, CHF NOS, Diastolic heart failure NOS, Chronic pulmonary heart disease NEC, Cyst of kidney, acquired, Hypoxemia, End stage renal disease, Hypertension NOS w cr kid V, Chronic atrial fibrillation native vssl, Aortic valve disorder, Diaphragmatic hernia, Status post cardiac pacemaker, AMI NEC, subsequent, Dvtrectomy colon w/o hmrhg

Related Topics

> See Radiculopathy, Radiculitis and Radicular Pain

prescriptions While the narrowing may occur at different parts of the spine, the symptoms of nerve compression may vary depending on the location of the narrowing.

518, 652, 411, 2460, 3231, 929, 2979, 4004, 2213, 166, 2128, 2861, 2222, 305, 819, 1848, 1594, 1857, 3394, 1091, 2756, 839, 969, 1615, 3152, 3665, 2902, 1753, 2140, 720, 98, 1766, 999, 361, 363, 236, 3571

, 244, 505

Spondylolisthesis Center

All Pain Topics A - Z

admission_type

EMERGENCY

gender

MALE

labs

HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | EOSINOPHILS, HEMATOLOGY | LYMPHOCYTES, CHEMISTRY | SODIUM, HEMATOLOGY | AMORPHOUS CRYSTALS, HEMATOLOGY | BACTERIA, HEMATOLOGY | BILIRUBIN, HEMATOLOGY | BLOOD, CHEMISTRY | ALANINE AMINOTRANSFERASE (ALT), CHEMISTRY | ALBUMIN, CHEMISTRY | ALKALINE PHOSPHATASE, CHEMISTRY | ANION GAP, HEMATOLOGY | GLUCOSE, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | KETONE, HEMATOLOGY | LEUKOCYTES, HEMATOLOGY | NITRITE, CHEMISTRY | BICARBONATE, HEMATOLOGY | PH, HEMATOLOGY | PROTEIN, HEMATOLOGY | RBC, HEMATOLOGY | INR(PT), HEMATOLOGY | SPECIFIC GRAVITY, CHEMISTRY | CALCIUM, TOTAL, HEMATOLOGY | MCH, HEMATOLOGY | URINE APPEARANCE, HEMATOLOGY | MCV, HEMATOLOGY | URINE COLOR, CHEMISTRY | ASPARTATE AMINOTRANSFERASE (AST), HEMATOLOGY | MONOCYTES, HEMATOLOGY | UROBILINOGEN, HEMATOLOGY | WBC, CHEMISTRY | CORTISOL, CHEMISTRY | CREATINE KINASE (CK), HEMATOLOGY | YEAST, CHEMISTRY | CHLORIDE, HEMATOLOGY | PLATELET COUNT, CHEMISTRY | ESTIMATED GFR (MDRD EQUATION), HEMATOLOGY | PT, HEMATOLOGY | PTT, HEMATOLOGY | HYPOCHROMIA, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, CHEMISTRY | GLUCOSE, CHEMISTRY | TROPONIN T, BLOOD GAS | CALCULATED TOTAL CO2, CHEMISTRY | POTASSIUM, HEMATOLOGY | BASOPHILS, BLOOD GAS | INTUBATED, CHEMISTRY | BILIRUBIN, TOTAL, BLOOD GAS | OXYGEN, BLOOD GAS | PCO2, HEMATOLOGY | MCHC, BLOOD GAS | PH, BLOOD GAS | PO2, HEMATOLOGY | WHITE BLOOD CELLS, BLOOD GAS | SPECIMEN TYPE, CHEMISTRY | LACTATE DEHYDROGENASE (LD), BLOOD GAS | TEMPERATURE, CHEMISTRY | MAGNESIUM, CHEMISTRY | CREATININE, URINE, CHEMISTRY | PH, CHEMISTRY | NTProBNP, BLOOD GAS | BASE EXCESS, CHEMISTRY | CREATINE KINASE, MB ISOENZYME, CHEMISTRY | LENGTH OF URINE COLLECTION, CHEMISTRY | PHOSPHATE, HEMATOLOGY | EPITHELIAL CELLS, CHEMISTRY | CREATININE, CHEMISTRY | URINE VOLUME, CHEMISTRY | 24 HR CREATININE

procedures
Non-invasive mech vent, Dx ultrasound-heart

> Cervical Vertebrae

> Cervical Spine Anatomy and Neck Pain

> Passive Exercise for Sciatica and Low Back Pain (Sponsored)

> When Neck Cracking Needs Medical Attention

> Neck Cracking and Grinding: What Does it Mean?

> Is My Hand Pain from Carpal Tunnel Syndrome or Something Else?

> Find a Doctor

ZIP or City, State

Search

> Find a Spine Center

advertisement

Stretcher. Many will also describe increased tolerance to walking when leaning forward, such as when walking while leaning forward on a shopping cart.

While lumbar spinal stenosis most often occurs at the L4-L5 and L3-L4 levels, it can occur

```

[ + weekend | mom aware that i ]
perf 81.90526, prob 0.01221: unconditional
perf 140.18922, prob 0.00713: no_labs
perf 143.62737, prob 0.00696: no_procedures
perf 160.46217, prob 0.00623: no_has_icu_stay
perf 161.72763, prob 0.00618: no_gender
perf 162.12822, prob 0.00617: all
perf 162.12822, prob 0.00617: no_prescriptions
perf 172.28973, prob 0.00580: no_has_dod
perf 190.35866, prob 0.00525: only_admission_types
perf 236.97748, prob 0.00422: no_diagnoses
perf 953.18994, prob 0.00105: only_diagnoses
perf 1216.97742, prob 0.00082: no_admission_type
perf 1384.25952, prob 0.00072: only_has_dod
perf 1473.69189, prob 0.00068: none
perf 1473.69189, prob 0.00068: only_prescriptions
perf 1482.37549, prob 0.00067: only_gender
perf 1490.39587, prob 0.00067: only_has_icu_stay
perf 1638.47583, prob 0.00061: only_procedures
perf 1796.02979, prob 0.00056: only_labs

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gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000
gate min 0.000000, max 1.000000, avg 0.498363, std 0.495638
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gate min 0.000000, max 1.000000, avg 0.498363, std 0.495638

diagnoses

Extreme immatur 750-999g, Respiratory distress syn, Neonatal bradycardia, Cellulitis of arm, 33-34 comp wks gestation, Common truncus, Single lb in-hosp w cs, Neonatal hypoglycemia, Fx humerus NOS-closed

```

has_icu_stay
1      loss = sorted(loss, key=lambda x:x[0])
        la = np.exp(np.array([l[0] for l in loss]))
prescriptions if np.amin(la) > max_minperf: continue
                stdev = np.std(la / np.amax(la))
                d = [k:v, for v,k, in loss]
has_dod    if sort_helpful != 'none':
0        if sort_helpful == 'neg':
            stdev = -stdev
admission_type for k in ['unconditional', 'none']:
NEWBORN   try:
                    if d['all'] > d[k]:
gender        stdev = -stdev
MALE         break
                except KeyError:
labs          pass
HEMATOLOGY | EOSINOPHILS, CHEMISTRY | SODIUM, CHEMISTRY | RED TOP HOLD, CHEMISTRY | THYROID STIMULATING HORMONE, CHEMISTRY | THYROXINE (T4), HEMATOLOGY | FIBRINOGEN, FUNCTIONAL, CHEMISTRY | TRIGLYCERIDES, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, CHEMISTRY | URIC ACID, CHEMISTRY | VANCOMYCIN, CHEMISTRY | GLUCOSE, CSF, HEMATOLOGY | HYPOCHROMIA, CHEMISTRY | TOTAL PROTEIN, CSF, HEMATOLOGY | INR(PT), HEMATOLOGY | LARGE PLATELETS, HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | METAMYEOCYTES, HEMATOLOGY | MICROCYTES, HEMATOLOGY | MONOCYTES, HEMATOLOGY | MYELOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | NUCLEATED RED CELLS, HEMATOLOGY | OTHER CELLS, HEMATOLOGY | OVALOCYTES, HEMATOLOGY | PLATELET CLUMPS, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PLATELET SMEAR, HEMATOLOGY | POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, HEMATOLOGY | PROMYELOCYTES, HEMATOLOGY | PT, HEMATOLOGY | PTT, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, HEMATOLOGY | RETICULOCYTE COUNT, MANUAL, HEMATOLOGY | SCHISTOCYTES, HEMATOLOGY | SPHEROCYTES, HEMATOLOGY | TARGET CELLS, HEMATOLOGY | TEARDROP CELLS, HEMATOLOGY | WHITE BLOOD CELLS, C HEMISTRY | LENGTH OF URINE COLLECTION, CHEMISTRY | MYOGLOBIN, URINE, HEMATOLOGY | Acanthocytes, HEMATOLOGY | MACROPHAGE, HEMATOLOGY | ANISOCYTOSIS, HEMATOLOGY | MONOCYTES, HEMATOLOGY | ATYPICAL LYMPHOCYTES, HEMATOLOGY | BANDS, HEMATOLOGY | BASOPHILIC STIPPLING, HEMATOLOGY | BASOPHILS, HEMATOLOGY | BLASTS, HEMATOLOGY | BURR CELLS, HEMATOLOGY | BACTERIA, HEMATOLOGY | BILIRUBIN, HEMATOLOGY | BLOOD, HEMATOLOGY | CALCIUM, OXALATE CRYSTALS, HEMATOLOGY | EPITHELIAL CELLS, HEMATOLOGY | GLUCOSE, HEMATOLOGY | KETONE, HEMATOLOGY | LEUKOCYTES, HEMATOLOGY | NITRITE, HEMATOLOGY | PH, HEMATOLOGY | PROTEIN, HEMATOLOGY | RBC, HEMATOLOGY | SPECIFIC GRAVITY, HEMATOLOGY | URINE APPEARANCE, HEMATOLOGY | URINE COLOR, HEMATOLOGY | UROBILINOGEN, HEMATOLOGY | WBC, HEMATOLOGY | YEAST, BLOOD GAS | SPECIMEN TYPE, BLOOD GAS | BASE EXCESS, BLOOD GAS | CALCULATED TOTAL CO2, BLOOD GAS | CHLORIDE, WHOLE BLOOD, BLOOD GAS | FREE CALCIUM, BLOOD GAS | GLUCOSE, BLOOD GAS | INTUBATED, BLOOD GAS | LACTATE, BLOOD GAS | O2 FLOW, BLOOD GAS | OXYGEN , BLOOD GAS | PCO2, BLOOD GAS | PEEP, BLOOD GAS | PH, BLOOD GAS | PO2, BLOOD GAS | POTASSIUM, WHOLE BLOOD, BLOOD GAS | SODIUM, WHOLE BLOOD, BLOOD GAS | VENTILATION RATE, BLOOD GAS | VENTILATOR, CHEMISTRY | ALANINE AMINOTRANSFERASE (ALT), CHEMISTRY | ALBUMIN, CHEMISTRY | ALKALINE PHOSPHATASE, HEMATOLOGY | LYMPHS, CHEMISTRY | AMMONIA, CHEMISTRY | AMYLASE, CHEMISTRY | ANION GAP, CHEMISTRY | ASPARTATE AMINOTRANSFERASE (AST), CHEMISTRY | BICARBONATE, CHEMISTRY | BILIRUBIN, DIRECT, CHEMISTRY | BILIRUBIN, INDIRECT, CHEMISTRY | BILIRUBIN, TOTAL, CHEMISTRY | CALCIUM, TOTAL, CHEMISTRY | CHLORIDE, CHEMISTRY | CHOLESTEROL, TOTAL, CHEMISTRY | CORTISOL, CHEMISTRY | CREATINE KINASE (CK), CHEMISTRY | CREATININE, CHEMISTRY | EDTA HOLD, HEMATOLOGY | POLYS, CHEMISTRY | FERRITIN, CHEMISTRY | GAMMA GLUTAMYLTRANSFERASE, CHEMISTRY | GENTAMICIN, CHEMISTRY | GLUCOSE, HEMATOLOGY | RBC, CSF, CHEMISTRY | HEPATITIS A VIRUS ANTIBODY, CHEMISTRY | HEPATITIS A VIRUS IgM ANTIBODY, HEMATOLOGY | WBC, CSF, CHEMISTRY | HEPATITIS B VIRUS CORE ANTIBODY, CHEMISTRY | HEPATITIS C VIRUS ANTIBODY, CHEMISTRY | IRON, CHEMISTRY | LIPASE, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM
procedures value = ['CATEGORY', 'LABEL']
Cont inv mec ven <96 hrs, Insert endotracheal tube, Other skin & subq i & d

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[ | # | hypertension | m.d | ]
perp 96.77924, prob 0.01033: only_prescriptions    gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 121.84551, prob 0.00821: only_gender        gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 128.37801, prob 0.00779: only_has_icu_stay   gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 128.89754, prob 0.00776: none               gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 129.45351, prob 0.00772: only_has_dod_by_losses  gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 133.01741, prob 0.00752: only_labs_sort_helpful  gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 140.57996, prob 0.00711: only_diagnoses      gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 172.43619, prob 0.00580: no_procedures       gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 214.41824, prob 0.00466: only_admission_type  gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 269.59503, prob 0.00371: no_admission_type   gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 321.82681, prob 0.00311: only_procedures     gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 462.96411, prob 0.00216: no_diagnoses        gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 502.42731, prob 0.00199: unconditional       gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000
perp 544.68317, prob 0.00184: no_has_dod         gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 554.39679, prob 0.00180: all                gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 558.10138, prob 0.00179: no_has_icu_stay    gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 575.32587, prob 0.00174: no_labs            gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 584.18756, prob 0.00171: no_gender          gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984
perp 699.25732, prob 0.00143: no_prescriptions   gate min 0.000000, max 1.000000, avg 0.604163, std 0.487984

diagnoses losses = sorted(loss, key=lambda x:x[0])
Renal dysplasia, NB obsrv suspect infect, Cong obstrc ureteroves jnc, Kidney anomaly NEC, Single lb in-hosp w cs, Ben hy kid w cr kid I-IV, Obst def ren plv&urt NEC
if np.isnan(la) > max_minper: continue
has_icu_stay tdev = np.std(la / np.amax(la))
1
d = {k:v for v,k in losses}
if sort_helpful != 'none':
prescriptions if sort_helpful == 'neg':
3100, 2452, 518, 166 tdev = -stddev
for k in ['unconditional', 'none']:
has_dod try:
0
if d['only_prescriptions'] > d[k]:
stddev = -stddev
break
admission_type
NEWBORN except KeyError:
pass
gender aux_ = [k:v[:] for k,v in aux.items()]
FEMALE aux_ten_ = [k:v[:] for k,v in aux_ten.items()]
losses buffer.append((tdev, x, y, loss, aux, aux_ten))
labs if buffer_size > 3 and len(losses.buffer) > buffer_size:
HEMATOLOGY | EOSINOPHILS, CHEMISTRY | SODIUM, CHEMISTRY | BICARBONATE, CHEMISTRY | ANION GAP, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, HEMATOLOGY | ANISOCYTOSIS, HEMATOLOGY | ATYPICAL LYMPHOCYTES, HEMATOLOGY | BANDS, CHEMISTRY | BILIRUBIN, DIRECT, HEMATOLOGY | BASOPHILS, CHEMISTRY | BILIRUBIN, TOTAL, HEMATOLOGY | BURR CELLS, HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | METAMYELOCYTES, HEMATOLOGY | MICROCYTES, HEMATOLOGY | MONOCYTES, HEMATOLOGY | MYELOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | NUCLEATED RED CELLS, HEMATOLOGY | OVALOCYTES, CHEMISTRY | CALCIUM, TOTAL, CHEMISTRY | CHLORIDE, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, HEMATOLOGY | HYPOCHROMIA, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, CHEMISTRY | GLUCOSE, CHEMISTRY | BILIRUBIN, INDIRECT, HEMATOLOGY | WHITE BLOOD CELLS, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM, CHEMISTRY | CREATININE
procedures
Retrogr cystourethrogram nos(dicts):

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[ npo for cardiac cath | if intervention ]
perp 30.26498, prob 0.03304: all
perp 30.31256, prob 0.03299: no_gender
perp 30.66171, prob 0.03261: no_has_icu_stay
perp 30.71703, prob 0.03256: no_has_dod
perp 31.12299, prob 0.03213: no_admission_type
perp 44.52315, prob 0.02246: no_diagnoses
perp 46.61987, prob 0.02145: no_prescriptions
perp 47.74015, prob 0.02095: unconditional
perp 50.18459, prob 0.01993: no_labs
perp 67.00774, prob 0.01492: no_procedures
perp 128.42593, prob 0.00779: only_procedures
perp 171.12366, prob 0.00584: only_labs
perp 185.96301, prob 0.00538: only_prescriptions
perp 195.34113, prob 0.00512: only_diagnoses
perp 291.97235, prob 0.00342: only_admission_type
perp 296.95020, prob 0.00337: only_has_dod
perp 297.37811, prob 0.00336: only_has_icu_stay
perp 300.71799, prob 0.00333: only_gender
perp 301.75421, prob 0.00331: none

The next day Rory's pain was even worse. He had a fever and he had turned blue and the tip of his nose turned blue. The Stauntons raced back to the hospital, where he was admitted to DMII w/ cmp nt st uncntr, Ocl mlt bl art wo infrct, CHF NOS, Long-term use of insulin, Stricture of artery, Crnry athrsl native vssl, Systolic hrt failure NOS, Late effect CV dis NOS, Mitral valve disorder, Comp-oth cardiac device, Subendo infarct, initial care. The diagnosis: septic shock. Rory was fighting a system-wide infection that was turning his skin black and shutting down his organs. On Sunday, four days after he dove for the ball in gym class, Rory died.

diagnoses
DMII w/ cmp nt st uncntr, Ocl mlt bl art wo infrct, CHF NOS, Long-term use of insulin, Stricture of artery, Crnry athrsl native vssl, Systolic hrt failure NOS, Late effect CV dis NOS, Mitral valve disorder, Comp-oth cardiac device, Subendo infarct, initial care. The diagnosis: septic shock. Rory was fighting a system-wide infection that

has_icu_stay
1

prescriptions
2691, 1926, 648, 393, 1347, 1419, 1040, 1091, 2926, 4169, 2459, 2460, 1184, 2213, 802, 2979, 1828, 518, 1321, 839, 556, 3632, 3209, 2360, 3248, 4162, 2115, 1478, 71, 969, 77, 463, 720, 3665, 2902, 4056, 3551, 67, 1766, 620, 366, 3826, 2835, 244, 3831

has_dod
1

admission_type
EMERGENCY

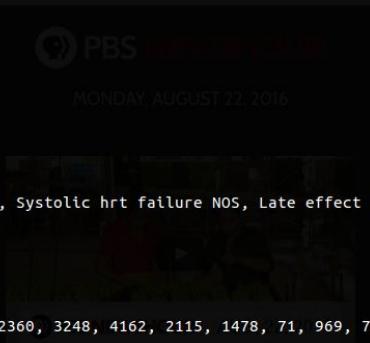
gender
FEMALE

labs
HEMATOLOGY | EOSINOPHILS, CHEMISTRY | % HEMOGLOBIN A1C, CHEMISTRY | SODIUM, CHEMISTRY | ABSOLUTE A1C, HEMATOLOGY | BACTERIA, HEMATOLOGY | IRON, HEMATOLOGY | BLOOD, CHEMISTRY | ALBUMIN, URINE, CHEMISTRY | ALANINE AMINOTRANSFERASE (ALT), CHEMISTRY | ALBUMIN, CHEMISTRY | ALKALINE PHOSPHATASE, CHEMISTRY | TRANSFERRIN, HEMATOLOGY | LEUKOCYTES, CHEMISTRY | AMYLASE, CHEMISTRY | ANION GAP, CHEMISTRY | TROPONIN T, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | KETONE, CHEMISTRY | ASPARATE AMINOTRANSFERASE (AST), HEMATOLOGY | NITRITE, CHEMISTRY | BICARBONATE, CHEMISTRY | BILIRUBIN, DIRECT, HEMATOLOGY | BASOPHILS, HEMATOLOGY | RBC, HEMATOLOGY | INR(PT), CHEMISTRY | TOTAL PROTEIN, URINE, HEMATOLOGY | SPECIFIC GRAVITY, HEMATOLOGY | GLUCOSE, HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | URINE COLOR, CHEMISTRY | CHLORIDE, HEMATOLOGY | MONOCYTES, HEMATOLOGY | NEUTROPHILS, CHEMISTRY | CK-MB INDEX, CHEMISTRY | CREATINE KINASE (CK), CHEMISTRY | CREATINE KINASE, MB ISOENZYME, CHEMISTRY | CREATININE, CHEMISTRY | GR HOLD, HEMATOLOGY | PLATELET COUNT, BLOOD GAS | SPECIMEN TYPE, BLOOD GAS | PH, CHEMISTRY | FERRITIN, HEMATOLOGY | PT, HEMATOLOGY | PTT, HEMATOLOGY | RDW, CHEMISTRY | PROTEIN/CREATININE RATIO, HEMATOLOGY | RED BLOOD CELLS, CHEMISTRY | GLUCOSE, HEMATOLOGY | PH, CHEMISTRY | [A1c], HEMATOLOGY | UROBILINOGEN, CHEMISTRY | ALBUMIN/CREATININE, URINE, HEMATOLOGY | PROTEIN, BLOOD GAS | FREE CALCIUM, HEMATOLOGY | WBC, CHEMISTRY | ABSOLUTE HEMOGLOBIN, CHEMISTRY | CALCIUM, TOTAL, HEMATOLOGY | WHITE BLOOD CELLS, CHEMISTRY | IRON BINDING CAPACITY, TOTAL, CHEMISTRY | LENGTH OF URINE COLLECTION, HEMATOLOGY | URINE APPEARANCE, CHEMISTRY | MAGNESIUM, CHEMISTRY | CREATININE, URINE, HEMATOLOGY | YEAST, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM, HEMATOLOGY | EPITHELIAL CELLS | body's overwhelming response to infection. It typically occurs when germs procedures
from an infection get into the bloodstream and spread throughout the body. To fight the Coronar arteriogr-2 cath, Inj/inf platelet inhibit, 900, Ins drug-elut coronary st, Left heart cardiac cath
```

3 The Syrian volunteers who rush to bombed buildings to save victims

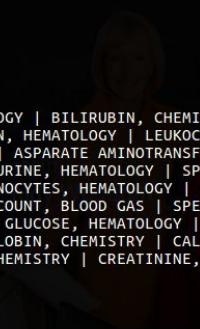
4 Political Party Quiz

5 Column: Why we need to extend economic empowerment to military spouses



WATCH
FULL BROADCASTS

LISTEN
FULL AUDIO PODCASTS



```

[ negative will increase cals to # and ]
perp 33.36734, prob 0.02997: no_labs
perp 36.31247, prob 0.02754: no_has_dod
perp 36.57948, prob 0.02734: no_gender
perp 36.84278, prob 0.02714: all
perp 36.96326, prob 0.02705: no_has_icu_stay
perp 41.15614, prob 0.02430: no_procedures
perp 49.16418, prob 0.02034: no_prescriptions loss
perp 71.49017, prob 0.01399: no_diagnoses
perp 82.90529, prob 0.01206: unconditional
perp 87.68427, prob 0.01140: no_admission_type
perp 102.01124, prob 0.00980: only_admission_type
perp 121.33084, prob 0.00824: only_diagnoses
perp 189.67384, prob 0.00527: only_prescriptions loss
perp 228.26923, prob 0.00438: only_procedures loss
perp 274.12183, prob 0.00365: only_has_icu_stay
perp 274.50467, prob 0.00364: none
perp 275.87634, prob 0.00362: only_gender
perp 277.08792, prob 0.00361: only_has_dod
perp 331.74088, prob 0.00301: only_labs

diagnoses
Retrolental fibroplasia, Perinatal chr resp dis, NB septicemia [sepsis], Respiratory distress syn, Acidosis, Extreme immatur 500-749g, NB intraven hem,grade i, Anemia of prematurity, Neonat jaund preterm
del
    loss = sort(d['loss'], key=lambda x:x[0])
    la = np.exp(np.array([l[0] for l in loss]))
has_icu_stay f np.amin(la) > max_minperp: continue
1
    stdev = np.std(la / np.max(la))
    d = [(k,v for v,k,_ in loss)
prescriptions f sort(helpful):='none':
1, 515, 518, 1416, 2709, 3478, 539, 3356, 1824, 240, 40, 3804, 694, 2489, 2882, 2503, 2127, 723, 984, 1370, 2140, 4061, 990, 2416, 1655, 3452, 125
has_dod
    for k in ['unconditional', 'none']:
        try:
            if d['all'] > d[k]:
                stdev = stdev
            break
        except KeyError:
            pass
admission_type
NEWBORN
    stdev = -stdev
    break
except KeyError:
    pass
gender
FEMALE
    aux_ = [k:v[t] for k,v in aux.items()]
    aux_len_ = {k:v[t] for k,v in aux_len.items()}
labs
    loss = buffer.append(stdev * v).loss
    aux = aux[aux_len]
HEMATOLOGY | EOSINOPHILS, HEMATOLOGY | HYPOCHROMIA, CHEMISTRY | SODIUM, CHEMISTRY | TOTAL PROTEIN, CSF, CHEMISTRY | ALKALINE PHOSPHATASE, BLOOD GAS | FREE CALCIUM, CHEMISTRY | TRIGLYCERIDES, CHEMISTRY | A
NION GAP, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, HEMATOLOGY | LYMPHS, CHEMISTRY | UREA NITROGEN, BLOOD GAS | POTASSIUM, WHOLE BLOOD, HEMATOLOGY | ANISOCYTOSIS, HEMATOLOGY | MONOCYTES, CHEMISTRY
| GLUCOSE, CSF, HEMATOLOGY | ATYPICAL LYMPHOCYTES, CHEMISTRY | BICARBONATE, CHEMISTRY | BILIRUBIN, DIRECT, CHEMISTRY | BILIRUBIN, INDIRECT, CHEMISTRY | BILIRUBIN, TOTAL, HEMATOLOGY | BURR CELLS, HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MACROCYTES, HEMATOLOGY | RBC, CSF, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | METAMYEOCYTES, CHEMISTRY | CHLORIDE, HEMATOLOGY | MONOCYTES, HEMATOLOGY | MYEOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | NUCLEATED RED CELLS, HEMATOLOGY | OVALOCYTES, CHEMISTRY | CALCIUM, TOTAL, HEMATOLOGY | MICROCYTES, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PLATELET S
MERM, HEMATOLOGY | POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, HEMATOLOGY | POLYS, HEMATOLOGY | BANDS, HEMATOLOGY | RDW, CHEMISTRY | GENTAMICIN, HEMATOLOGY | RED BLOOD CELLS, BLOOD GAS | SPECIMEN TYPE, BLOOD GAS | BASE EXCESS, BLOOD GAS | CALCULATED BICARBONATE, WHOLE BLOOD, BLOOD GAS | CALCULATED TOTAL CO2, HEMATOLOGY | WBC, CSF, BLOOD GAS | CHLORIDE, WHOLE BLOOD, HEMATOLOGY | SCHISTOCYTES, HEMATOLOGY | BASOPHILS, BLOOD GAS | HEMATOCRIT, CALCULATED, BLOOD GAS | HEMOGLOBIN, BLOOD GAS | INTUBATED, HEMATOLOGY | SPHEROCYTES, HEMATOLOGY | TARGET CELLS, BLOOD GAS | OXYGEN, BLOOD GAS | PCO2, BLOOD GAS | PEEP
, BLOOD GAS | PH, BLOOD GAS | PO2, HEMATOLOGY | WHITE BLOOD CELLS, BLOOD GAS | SODIUM, WHOLE BLOOD, BLOOD GAS | VENTILATION RATE, BLOOD GAS | VENTILATOR, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM, CHEMISTRY | CREATININE, BLOOD GAS | GLUCOSE, HEMATOLOGY | RETICULOCYTE COUNT, MANUAL
procedures
Cont inv mec ven 96+ hrs, Insert endotracheal tube, Parent infus nutrit sub, Other phototherapy, Spinal tap

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[ infant with feeding immaturity continue to await ]
perp 1.31230, prob 0.76202: no_has_icu_stay      gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 1.31305, prob 0.76159: all_lamng, vocab, los    gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 1.31866, prob 0.75834: no_gender 0, soft_hel    gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 1.32011, prob 0.75751: no_has_dod            gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 1.37836, prob 0.72550: no_labs                gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 1.40241, prob 0.71306: no_prescriptions 0x5    gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 1.45759, prob 0.68666: no_procedures          gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 1.61939, prob 0.61752: no_diagnoses or '#'    gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 1.61946, prob 0.61749: no_admission_type rus   gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 1.83265, prob 0.54566: unconditional           gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000
perp 2.59720, prob 0.38503: only_diagnoses         gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 2.61391, prob 0.38257: only_admission_type    gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 3.24659, prob 0.30802: only_procedures        gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 3.59460, prob 0.27819: only_prescriptions     gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 3.88741, prob 0.25724: only_labs              gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 4.45970, prob 0.22423: only_has_dod          gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 4.48850, prob 0.22279: only_gender            gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 4.55930, prob 0.21933: none                   gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
perp 4.57649, prob 0.21851: only_has_icu_stay n    gate min 0.000000, max 1.000000, avg 0.526043, std 0.494803
    if np.isnan(la) > max_minperp: continue
diagnoses  stdev = np.std(la) / np.sqrt(max(la))
NB obsrv suspect infect, Neonatal bradycardia, Preterm NEC 2500+g, 4973, 35-36 comp wks gestation, Primary apnea of newborn, Twin-mate lb-in hos w cs, Neonat jaund preterm del
    if sort_helpful == 'none':
has_icu_stay  if sort_helpful == 'neg':
1             stdev = -stdev
        for k in ['unconditional', 'none']:
prescriptions try:
3478, 518, 909, 3830, 1655 d['all'] > d[k]:
                    stdev = -stdev
has_dod        break
0             except KeyError:
                pass
admission_type_ = [k:v[l] for k,v in aux.items()]
NEWBORN       aux_len_ = {k:v[t] for k,v in aux_len.items()}
            losses_buffer.append((stdev, x, y, loss, aux, aux_len, aux_len_))
gender        if buffer_size > 9 and len(losses_buffer) >= buffer_size:
FEMALE        losses_buffer = sorted(losses_buffer, key=lambda x:x[0])
            for s, x, y, loss, aux, aux_len, aux_len_ in losses_buffer:
labs          inspect丢失(x, y, config.vocab.loss, aux, aux_len, dict)
HEMATOLOGY | EOSINOPHILS, CHEMISTRY | SODIUM, CHEMISTRY | BICARBONATE, CHEMISTRY | ANION GAP, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, HEMATOLOGY | ANISOCYTOSIS, HEMATOLOGY | ATYPICAL LYMPHOCYTES
, HEMATOLOGY | BANDS, CHEMISTRY | BILIRUBIN, DIRECT, HEMATOLOGY | BASOPHILS, CHEMISTRY | BILIRUBIN, TOTAL, HEMATOLOGY | BURR CELLS, HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEM
ATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | METAMYELOCYTES, HEMATOLOGY | MICROCYTES, HEMATOLOGY | MONOCYTES, HEMATOLOGY | MYELOCYTES, HEMATOLOGY | NEUTROPHILS, CHEMISTRY | CHLORIDE, HEMATOLOGY | PLATE
LET COUNT, HEMATOLOGY | POIKILOCYTOSIS, HEMATOLOGY | POLYCHROMASIA, HEMATOLOGY | HYPOCHROMIA, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, CHEMISTRY | BILIRUBIN, INDIRECT, HEMATOLOGY | TARGET CELLS, HEM
ATOLOGY | WHITE BLOOD CELLS, CHEMISTRY | POTASSIUM
    def make_struct(dictionaries):
procedures = ()
other phototherapy dict.items():

```

```
[ for trache and peg this week | ]
perf 19.03561, prob 0.05253: no_labs
perf 19.61709, prob 0.05098: no_diagnoses
perf 21.59234, prob 0.04631: no_has_dod
perf 21.88515, prob 0.04569: no_admission_type
perf 22.07504, prob 0.04530: no_has_icu_stay
perf 22.11813, prob 0.04521: all
perf 22.66674, prob 0.04412: no_gender
perf 28.14731, prob 0.03553: only_procedures
perf 30.31086, prob 0.03299: only_prescriptions
perf 36.90025, prob 0.0710: no_prescriptions
perf 40.52349, prob 0.02468: no_procedures
perf 49.86377, prob 0.02005: unconditional
perf 51.34362, prob 0.01948: only_gender
perf 52.00374, prob 0.01901: none
perf 52.68124, prob 0.01898: only_has_icu_stay
perf 53.07985, prob 0.01884: only_admission_type
perf 54.08409, prob 0.01849: only_has_dod
perf 59.92260, prob 0.01669: only_diagnoses
perf 60.07435, prob 0.01665: only_labs

diagnoses
Late ef-hemplga side NOS, Heart valve replac NEC, Inf mcrg rstn pncllins, Hypertension NOS, Coagulat defect NEC/NOS, Rheumatic heart dis NOS, Meth sus pneum d/t Staph, Aortocoronary bypass, Intracerebral hemorrhage, Acute & chronc resp fail, Hepatitis NOS

has_icu_stay loss = sorted(loss, key=lambda x:x[0])
1
    if np.isnan(la) > max_minnperp: continue
prescriptions
stddev = np.std(la) / np.sqrt(len(la))
652, 771, 518, 2823, 648, 524, 3213, 526, 418, 3406, 2326, 2327, 539, 2460, 1565, 3232, 1185, 802, 1051, 166, 813, 4189, 1073, 3768, 1850, 63, 4162, 1347, 2629, 1478, 1224, 969, 4173, 2766, 77, 720, 3923, 2389, 2904, 1241, 2140, 2781, 1889, 1634, 1766, 1769, 236, 3061, 3831, 2812, 1534
has_dod
stddev = -stddev
0
for k in ['unconditional', 'none']:
    try:
admission_type
if d['all'] > d[k]:
    stddev = -stddev
    break
except KeyError:
    pass
gender
MALE
aux_ = [(k,v)] for k,v in aux.items()
labs
aux_len = [(k,v)] for k,v in aux_len.items()
HEMATOLOGY | EOSINOPHILS, CHEMISTRY | SODIUM, HEMATOLOGY | FIBRINOGEN, FUNCTIONAL, CHEMISTRY | TRIGLYCERIDES, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, CHEMISTRY | VANCO MYCIN, CHEMISTRY | GLUCOSE, CSF, CHEMISTRY | TOTAL PROTEIN, CSF, HEMATOLOGY | INR(PT), HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | MONOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PT, HEMATOLOGY | PTT, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, HEMATOLOGY | WHITE BLOOD CELLS, HEMATOLOGY | EOSINOPHILS, HEMATOLOGY | LYMPHS, HEMATOLOGY | MACROPHAGE, HEMATOLOGY | MONOCYTES, HEMATOLOGY | NRBC, HEMATOLOGY | POLYS, HEMATOLOGY | BANDS, HEMATOLOGY | RBC, CSF, HEMATOLOGY | BASOPHILS, HEMATOLOGY | BACTERIA, HEMATOLOGY | BILIRUBIN, HEMATOLOGY | BLOOD, HEMATOLOGY | EPITHELIAL CELLS, HEMATOLOGY | GLUCOSE, HEMATOLOGY | KETONE, HEMATOLOGY | LEUKOCYTES, HEMATOLOGY | NITRITE, HEMATOLOGY | PH, HEMATOLOGY | PROTEIN, HEMATOLOGY | RBC, HEMATOLOGY | SPECIFIC GRAVITY, HEMATOLOGY | TRANSITIONAL EPITHELIAL CELLS, HEMATOLOGY | URINE APPEARANCE, HEMATOLOGY | URINE COLOR, HEMATOLOGY | UROBILINOGEN, HEMATOLOGY | WBC, HEMATOLOGY | YEAST, BLOOD GAS | BASE EXCESS, BLOOD GAS | CALCULATED TOTAL CO2, BLOOD GAS | CHLORIDE, WHOLE BLOOD, BLOOD GAS | FREE CALCIUM, BLOOD GAS | GLUCOSE, BLOOD GAS | HEMATOCRIT, CALCULATED, BLOOD GAS | HEMOGLOBIN, BLOOD GAS | LACTATE, BLOOD GAS | OXYGEN, BLOOD GAS | PCO2, BLOOD GAS | PEEP, BLOOD GAS | PH, BLOOD GAS | PO2, BLOOD GAS | POTASSIUM, WHOLE BLOOD, BLOOD GAS | SODIUM, WHOLE BLOOD, BLOOD GAS | TEMPERATURE, BLOOD GAS | TIDAL VOLUME, CHEMISTRY | ALANINE AMINOTRANSFERASE (ALT), CHEMISTRY | ALBUMIN, CHEMISTRY | ALKALINE PHOSPHATASE, CHEMISTRY | AMYLASE, CHEMISTRY | ANION GAP, CHEMISTRY | ASPARATE AMINOTRANSFERASE (AST), CHEMISTRY | BICARBONATE, CHEMISTRY | BILIRUBIN, TOTAL, CHEMISTRY | CALCIUM, TOTAL, CHEMISTRY | CHLORIDE, CHEMISTRY | CHOLESTEROL RATIO (TOTAL/HDL), CHEMISTRY | CHOLESTEROL, HDL, CHEMISTRY | CHOLESTEROL, LDL, CALCULATED, CHEMISTRY | CHOLESTEROL, TOTAL, CHEMISTRY | CREATINE KINASE (CK), CHEMISTRY | CREATINE KINASE, MB ISOENZYME, CHEMISTRY | CREATININE, CHEMISTRY | GLUCOSE, HEMATOLOGY | WBC, CSF, CHEMISTRY | LACTATE DEHYDROGENASE (LD), CHEMISTRY | LIPASE, CHEMISTRY | MAGNESIUM, CHEMISTRY | PHENYTOIN, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM
procedures
if k == '0': LABTESTS DATA TABLES.CSV
Percu endosc gastrostomy, Enteral infus nutrit sub, Other craniotomy, Spinal tap, Venous cath NEC, Coag factor transfusion, Serum transfusion NEC, Packed cell transfusion, Cont inv mec ven 96+ hrs, Tempora ry tracheostomy
```

```

[ can come off neo | monitor closely ] vocab, losses, aux, aux_len, dicts, max_stdevs
perf 52.50237, prob 0.01905: no_gender, sort_had gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 52.97738, prob 0.01888: no_has_dod gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 52.99703, prob 0.01887: all gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 52.99703, prob 0.01887: no_prescriptions s gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 53.23084, prob 0.01879: no_has_icu_stay gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 58.93887, prob 0.01697: no_admission_type gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 76.27872, prob 0.01311: no_diagnoses gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 99.50504, prob 0.01005: no_labs gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 136.12444, prob 0.00735: no_procedures gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 161.88210, prob 0.00618: only_procedures gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 221.68396, prob 0.00451: only_labs gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 291.51093, prob 0.00343: only_diagnoses gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 378.95663, prob 0.00264: only_admission_type gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 426.13254, prob 0.00235: only_has_icu_stay gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 427.80792, prob 0.00234: only_has_dod gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 428.39114, prob 0.00233: none | lambda x: x[0] gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 428.39114, prob 0.00233: only_prescriptions o gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 432.52069, prob 0.00231: only_gender_continue gate min 0.000000, max 1.000000, avg 0.485209, std 0.497006
perf 1152.61438, prob 0.00087: unconditional gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000
d = {k:v for k,v in losses.items() if k != 'loss'}
diagnoses = 'None' if sort_helpful else 'None'
Aortocoronary bypass, Pure hypercholesterolem, Bronchitis NOS, Crn ath atlg vn bps grft
stdev = -stdev
has_icu_stay = True if k in ['unconditional', 'none'] else False
prescriptions = True if d['all'] > d[k] else False
try:
    if d['all'] > d[k]:
        stdev = -stdev
        break
except KeyError:
    pass
has_dod = True
aux_ = [k:v[i] for k,v in aux.items()]
aux_len_ = [k:v[i] for k,v in aux_len.items()]
admission_type = sorted(buffer.append((stdev, x, y, loss, aux_, aux_len_)))
ELECTIVE = True if buffer_size > 0 and len(losses_buffer) >= buffer_size:
    losses_buffer = sorted(losses_buffer, key=lambda x:x[0])
gender = True if s, x, y, loss, aux, aux_len in losses_buffer:
MALE = True if inspect.losses(x, y, config, vocab, loss, aux, aux_len, dicts)
labs = losses_buffer = []
print 'Press enter to continue...'
BLOOD GAS | VENTILATION RATE, CHEMISTRY | SODIUM, CHEMISTRY | ANION GAP, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, BLOOD GAS | POTASSIUM, WHOLE BLOOD, CHEMISTRY | BICARBONATE, CHEMISTRY | CALCIUM, TOTAL, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, CHEMISTRY | CHLORIDE, CHEMISTRY | CREATININE, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, BLOOD GAS | SPECIMEN TYPE, BLOOD GAS | ALVEOLAR-ARTERIAL GRADIENT, BLOOD GAS | BASE EXCESS, BLOOD GAS | CALCULATED TOTAL CO2, BLOOD GAS | FREE CALCIUM, BLOOD GAS | GLUCOSE, BLOOD GAS | HEMATOCRIT, BLOOD GAS | CALCULATED, BLOOD GAS | HEMOGLOBIN, BLOOD GAS | INTUBATED, BLOOD GAS | OXYGEN, BLOOD GAS | OXYGEN SATURATION, BLOOD GAS | PCO2, BLOOD GAS | PH, BLOOD GAS | PO2, HEMATOLOGY | WHITE BLOOD CELLS, CHEMISTRY | GLUCOSE, BLOOD GAS | SODIUM, WHOLE BLOOD, BLOOD GAS | TIDAL VOLUME, BLOOD GAS | REQUIRED O2, BLOOD GAS | VENTILATOR, CHEMISTRY | MAGNESIUM, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM
for k, v in dicts.items():
procedures = 'D:\LABITEMS_DATA_TABLE.csv'
Aortocor bypass-3 cor art = 'labs'

```

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[ white secretions plan rsbt in am wean ]
perp 38.67754, prob 0.02585: all gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 39.21922, prob 0.02550: no_has_icu_stay gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 39.86412, prob 0.02509: no_gender gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 39.98132, prob 0.02501: no_admision_type gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 40.23985, prob 0.02485: no_has_dod gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 43.52306, prob 0.02298: no_procedures gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 54.36246, prob 0.01840: no_diagnoses gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 55.25238, prob 0.01810: unconditional, los gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000
perp 92.85598, prob 0.01677: no_prescriptions_had_gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 95.39716, prob 0.01048: no_labs gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 173.86331, prob 0.00575: only_labs gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 178.31680, prob 0.00561: only_prescriptions_vs_gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 311.94485, prob 0.00321: only_diagnoses gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 395.08530, prob 0.00253: only_procedures "# in gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 437.66583, prob 0.00228: only_has_dod_procedures gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 439.74835, prob 0.00227: only_admission_type gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 443.57092, prob 0.00225: only_gender gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 449.80502, prob 0.00222: only_has_icu_stay gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462
perp 456.88364, prob 0.00219: none gate min 0.000000, max 1.000000, avg 0.522396, std 0.494462

diagnoses
Acute respiratory failure, Subdural hemorrhage, Acidosis, Fx clavicl, acrom end-cl, Pulmonary collapse, Fracture three ribs-clos, Lung contusion-closed, Traum hemothorax-closed, 1948

has_icu_stay
loss = sorted(loss, key=lambda x:x[0])
1
    ta = np.exp(np.array([l[0] for l in loss]))
    if np.amax(ta) > max_minperp: continue
prescriptions
stdev = np.std(la / np.amax(la))
3204, 518, 2193, 532, 2460, 669, 32, 166, 2474, 2222, 2353, 1972, 3253, 1974, 1080, 2234, 3521, 66, 4039, 1224, 203, 3916, 77, 720, 2900, 856, 2140, 3038, 4192, 1634, 1766, 3818, 620, 2287, 3453, 1535
        if sort_helpful == 'none':
            stdev = np.std(la)
has_dod
    if sort_helpful == 'neg':
        stdev = -stdev
1
        for k in ['unconditional', 'none']:
admission_type
try:
    if d['all'] > d[k]:
        stdev = -stdev
        break
EMERGENCY
gender
FEMALE
    except KeyError:
        pass
labs
    aux = [(k,v) for k,v in aux.items()]
CHEMISTRY | SALICYLATE, CHEMISTRY | SODIUM, CHEMISTRY | THYROID STIMULATING HORMONE, HEMATOLOGY | FIBRINOGEN, FUNCTIONAL, CHEMISTRY | TRICYCLIC ANTIDEPRESSANT SCREEN, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, HEMATOLOGY | INR(PT), HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PLATELET SMEAR, HEMATOLOGY | PT, HEMATOLOGY | PTT, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, CHEMISTRY | AMPHETAMINE SCREEN, URINE, CHEMISTRY | BARBITURATE SCREEN, URINE, CHEMISTRY | BENZODIAZEPINE SCREEN, URINE, CHEMISTRY | COCAINE, URINE, CHEMISTRY | WHITE BLOOD CELLS, CHEMISTRY | LENGTH OF URINE COLLECTION, CHEMISTRY | METHADONE, URINE, CHEMISTRY | OPIATE SCREEN, URINE, CHEMISTRY | TROPONIN T, HEMATOLOGY | BACTERIA, HEMATOLOGY | BILIRUBIN, HEMATOLOGY | BLOOD, HEMATOLOGY | EPITHELIAL CELLS, HEMATOLOGY | GLUCOSE, HEMATOLOGY | KETONE, HEMATOLOGY | LEUKOCYTES, HEMATOLOGY | NITRITE, HEMATOLOGY | PH, HEMATOLOGY | PROTEIN, HEMATOLOGY | RBC, HEMATOLOGY | SPECIFIC GRAVITY, HEMATOLOGY | URINE APPEARANCE, HEMATOLOGY | URINE COLOR, HEMATOLOGY | UROBILINOGEN, HEMATOLOGY | WBC, HEMATOLOGY | YEAST, CHEMISTRY | GR HOLD, BLOOD GAS | SPECIMEN TYPE, BLOOD GA S | ALVEOLAR-ARTERIAL GRADIENT, BLOOD GAS | BASE EXCESS, BLOOD GAS | CALCULATED BICARBONATE, WHOLE BLOOD, BLOOD GAS | CALCULATED TOTAL CO2, BLOOD GAS | CARBOXYHEMOGLOBIN, BLOOD GAS | CHLORIDE, WHOLE BLOOD, BLOOD GAS | FREE CALCIUM, BLOOD GAS | GLUCOSE, BLOOD GAS | HEMATOCRIT, CALCULATED, BLOOD GAS | HEMOGLOBIN, BLOOD GAS | INTUBATED, BLOOD GAS | LACTATE, BLOOD GAS | METHEMOGLOBIN, BLOOD GAS | OXYGEN, BLOOD GAS | OXYGEN SATURATION, BLOOD GAS | PCO2, BLOOD GAS | PEEP, BLOOD GAS | PH, BLOOD GAS | PO2, BLOOD GAS | POTASSIUM, WHOLE BLOOD, BLOOD GAS | REQUIRED O2, BLOOD GAS | SODIUM, WHOLE BLOOD, BLOOD GAS | TEMPERATURE, BLOOD GAS | TIDAL VOLUME, BLOOD GAS | VENTILATION RATE, BLOOD GAS | VENTILATOR, CHEMISTRY | ACETAMINOPHEN, CHEMISTRY | ALANINE AMINOTRANSFERASE (ALT), CHEMISTRY | ALBUMIN, CHEMISTRY | ALKALINE PHOSPHATASE, CHEMISTRY | AMYLASE, CHEMISTRY | ANION GAP, CHEMISTRY | ASPARATE AMINOTRANSFERASE (AST), CHEMISTRY | BARBITURATE SCREEN, CHEMISTRY | BENZODIAZEPINE SCREEN, CHEMISTRY | BICARBONATE, CHEMISTRY | BILIRUBIN, TOTAL, CHEMISTRY | CALCIUM, TOTAL, CHEMISTRY | CHLORIDE, CHEMISTRY | CK-MB INDEX, CHEMISTRY | CREATINE KINASE (CK), CHEMISTRY | CREATINE KINASE, MB ISOENZYME, CHEMISTRY | CREATININE, CHEMISTRY | ETHANOL, CHEMISTRY | GLUCOSE, CHEMISTRY | GREEN TOP HOLD (PLASMA), CHEMISTRY | LIPASE, CHEMISTRY | MAGNESIUM, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM
procedures
    if k == 'PDR' or items[0].table == 'DATA_TABLE_CSY':
Exploratory laparotomy, Percu endosc gastrostomy, Pulmon art wedge monitor, Insert intercostal cath, Arterial catheterization, Packed cell transfusion, Cont inv mc ven 96+ hrs, Anesth injec periph nerv, Temporary tracheostomy, Dx ultrasound-heart

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[ of event | response swelling improving | ]
perp 25.00193, prob 0.04000: no_procedures gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 28.54798, prob 0.03503: no_admission_type gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 28.77570, prob 0.03475: no_has_icu_stay gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 28.93741, prob 0.03456: no_has_dod <lab, los> gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 29.10768, prob 0.03436: all <lab, sort_helpful> gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 29.40351, prob 0.03401: no_gender gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 33.53156, prob 0.02982: no_labs gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 51.36522, prob 0.01947: no_diagnoses <lab, los> gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 52.46326, prob 0.01906: only_prescriptions gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 157.58862, prob 0.00635: no_prescriptions <lab, los> gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 167.11272, prob 0.00598: only_diagnoses <lab, los> gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 186.60861, prob 0.00536: unconditional gate min 0.000000, max 0.000000, avg 0.000000, std 0.000000
perp 241.30521, prob 0.00414: only_labs gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 311.58316, prob 0.00321: only_gender gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 315.13684, prob 0.00317: none gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 316.25366, prob 0.00316: only_has_dod gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 318.21637, prob 0.00314: only_has_icu_stay gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 320.22363, prob 0.00312: only_admission_type gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055
perp 359.37897, prob 0.00278: only_procedures gate min 0.000000, max 1.000000, avg 0.543410, std 0.493055

losses = np.array([lambda x,y:[l for l in loss] for l in losses])
diagnoses = la = np.exp(np.array([l[0] for l in loss]))
Dysthymic disorder, Anemia in chr kidney dis, Pericardial disease NOS, End stage renal disease, Mal hyp kid w cr kid V, 3662, Abdmnal pain oth spcf st, Abn react-artif implant, Hx-ven thrombosis/embols, Obstructive sleep apnea, Comp-periton dialys cath, Syst lupus erythematosus, 3895, Long-term use steroids, Adv eff antihyperten agt, Long-term use anticoagul, Angioneurotic edema
has_icu_stay = [l[0] for l in loss]
d = [l[0] for l in loss]
has_icu_stay if sort_helpful != 'none':
    1
        if sort_helpful == 'neg':
            stdev = -stdev
    presc = [l[0] for l in loss]
prescriptions = for k in ['unconditional', 'none']:
3073, 2564, 261, 518, 3336, 524, 2349, 784, 145, 3858, 3395, 2839, 2206, 675, 292, 1701, 934, 4135, 2216, 2524, 1835, 3629, 305, 1848, 2873, 3009, 1091, 1736, 2128, 2360, 2262, 1753, 3162, 4060, 592, 3687
, 1267, 884, 2641, 3241, 2553 all[l] > d[k]:
    stdev = -stdev
has_dod
break
1
except KeyError:
    pass
admission_type = [k:v[l] for k,v in aux.items()]
EMERGENCY aux_len = [k:v[t] for k,v in aux.items()]
losses_buffer.append(sidev, x, y, loss, aux, aux_len)
gender if buffer_size > 0 and len(losses_buffer) >= buffer_size:
FEMALE losses_buffer = sorted(losses_buffer, key=lambda x:x[0])
for s,x,y,loss,aux,aux_len in losses_buffer:
labs inspect losses[x][y], config.vocab.loss, aux, aux_len, diets)
HEMATOLOGY | EOSINOPHILS, BLOOD GAS | POTASSIUM, WHOLE BLOOD, CHEMISTRY | SODIUM, CHEMISTRY | ALANINE AMINOTRANSFERASE (ALT), CHEMISTRY | ALBUMIN, CHEMISTRY | ALKALINE PHOSPHATASE, CHEMISTRY | ANION GAP, CHEMISTRY | TROPONIN T, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, HEMATOLOGY | HEMATOCRIT, CHEMISTRY | ASPARATE AMINOTRANSFERASE (AST), CHEMISTRY | BICARBONATE, HEMATOLOGY | PH, HEMATOLOGY | BASE OPHILS, CHEMISTRY | BILIRUBIN, TOTAL, HEMATOLOGY | INR(PT), CHEMISTRY | C-REACTIVE PROTEIN, CHEMISTRY | C3, CHEMISTRY | C4, HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, CHEMISTRY | CHLORIDE, HEMATOLOGY | MONOCYTES, HEMATOLOGY | NEUTROPHILS, CHEMISTRY | CREATINE KINASE (CK), HEMATOLOGY | YEAST, CHEMISTRY | CREATININE, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PROTEIN, HE MATOLOGY | PT, HEMATOLOGY | PTT, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, CHEMISTRY | GLUCOSE, BLOOD GAS | BASE EXCESS, BLOOD GAS | CALCULATED TOTAL CO2, BLOOD GAS | CHLORIDE, WHOLE BLOOD, BLOOD GAS | GLUCOSE, BLOOD GAS | LACTATE, BLOOD GAS | PCO2, BLOOD GAS | PH, BLOOD GAS | PO2, HEMATOLOGY | WHITE BLOOD CELLS, BLOOD GAS | SODIUM, WHOLE BLOOD, CHEMISTRY | LIPOASE, CHEMISTRY | MAGNESIUM, HEMATOLOGY | SEDIMENTATION RATE, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM, CHEMISTRY | CALCIUM, TOTAL, HEMATOLOGY | SPECIFIC GRAVITY, HEMATOLOGY | EPITHELIAL CELLS
procedures for k, v in dict.items():
    if k == 'DANTENES DATA-TABLE-CONTINUATION':
Non-invasive mech vent, Remov peritoneal drain, Peritoneal incision, Hemodialysis, Ven cath renal dialysis
    break

```

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[ not significantly changed compared to a study ]
perp 5.97274, prob 0.16743: no_procedures
perp 6.07291, prob 0.16467: no_has_dod
perp 6.13177, prob 0.16389: no_gender
perp 6.23184, prob 0.16047: all
perp 6.35124, prob 0.15745: no_has_icu_stay
perp 6.35474, prob 0.15736: no_admission_type
perp 6.70496, prob 0.14914: no_diagnoses
perp 7.18476, prob 0.13918: no_prescriptions
perp 7.42946, prob 0.13460: only_labs
perp 9.56894, prob 0.10450: unconditional
perp 14.28578, prob 0.07000: no_labs
perp 14.74679, prob 0.06781: only_prescriptions
perp 15.99398, prob 0.06252: only_diagnoses
perp 17.04951, prob 0.05865: only_admission_type
perp 17.05611, prob 0.05863: only_has_icu_stay
perp 17.45286, prob 0.05730: none
perp 17.77367, prob 0.05626: only_gender
perp 17.97276, prob 0.05564: only_has_dod
perp 18.29463, prob 0.05466: only_procedures

diagnoses
Joint replaced knee, Atrial fibrillation, Sleep apnea NOS, Urin tract infection NOS, Hypotension NOS, Hypertension NOS, Ac diastolic hrt failure, Crnry athrscl native vssl, 2451, Acute kidney failure NOS, Status-post ptcx = sorted(loss, key=lamda x: x[0])
    = np.exp(np.array([l[0] for l in loss]))
has_icu_stay = np.amin(la) > max_minperp: continue
1
    stdev = np.std(la) / np.amax(la)
    d = {(k: v for v, k in loss)}
prescriptionsF sort helpful if 'none'
for l in ['unconditional', 'none']:
    try:
        if d['all'] > d[k]:
            stdev = -stdev
            break
    except KeyError:
        pass
has_dod
0
admission_type
EMERGENCY
gender
aux_ = {k:v[i] for k,v in aux.items()}
aux_len = {k:v[i] for k,v in aux_len.items()}
losses_buffer.append((stdev, x, y, loss, aux_, aux_len_))
labs
if buffer_size > 0 and len(losses buffer) >= buffer_size:
HEMATOLOGY | EOSINOPHILS, CHEMISTRY | SODIUM, CHEMISTRY | THYROID STIMULATING HORMONE, CHEMISTRY | TRANSFERRIN, HEMATOLOGY | HEMATOCRIT, HEMATOLOGY | HEMOGLOBIN, CHEMISTRY | UREA NITROGEN, CHEMISTRY | URIC ACID, CHEMISTRY | VITAMIN B12, HEMATOLOGY | INR(PT), HEMATOLOGY | LYMPHOCYTES, HEMATOLOGY | MACROCYTES, HEMATOLOGY | MCH, HEMATOLOGY | MCHC, HEMATOLOGY | MCV, HEMATOLOGY | MONOCYTES, HEMATOLOGY | NEUTROPHILS, HEMATOLOGY | PLATELET COUNT, HEMATOLOGY | PT, HEMATOLOGY | PTT, HEMATOLOGY | RDW, HEMATOLOGY | RED BLOOD CELLS, CHEMISTRY | CREATININE, URINE, HEMATOLOGY | WHITE BLOOD CELLS, CHEMISTRY | IMMUNOFIXATION, URINE, CHEMISTRY | LENGTH OF URINE COLLECTION, CHEMISTRY | OSMOLALITY, URINE, CHEMISTRY | PROT. ELECTROPHORESIS, URINE, CHEMISTRY | PROTEIN/CREATININE RATIO, CHEMISTRY | SODIUM, URINE, CHEMISTRY | TOTAL PROTEIN, URINE, CHEMISTRY | UREA NITROGEN, URINE, CHEMISTRY | TROPONIN T, HEMATOLOGY | BASOPHILS, HEMATOLOGY | BACTERIA, HEMATOLOGY | BILIRUBIN, HEMATOLOGY | BLOOD, HEMATOLOGY | EPITHELIAL CELLS, HEMATOLOGY | GLUCOSE, HEMATOLOGY | KETONE, HEMATOLOGY | LEUKOCYTES, HEMATOLOGY | NITRITE, HEMATOLOGY | PH, HEMATOLOGY | PROTEIN, HEMATOLOGY | RBC, HEMATOLOGY | SPECIFIC GRAVITY, HEMATOLOGY | URINE APPEARANCE, HEMATOLOGY | URINE COLOR, HEMATOLOGY | UROBILINOGEN, HEMATOLOGY | WBC, HEMATOLOGY | YEAST, BLOOD GAS | SPECIMEN TYPE, BLOOD GAS | BASE EXCESS, BLOOD GAS | CALCULATED TOTAL CO2, BLOOD GAS | FREE CALCIUM, BLOOD GAS | INTUBATED, BLOOD GAS | LACTATE, BLOOD GAS | OXYGEN SATURATION, BLOOD GAS | PCO2, BLOOD GAS | PH, BLOOD GAS | PO2, CHEMISTRY | ALANINE AMINOTRANSFERASE (ALT), CHEMISTRY | ALBUMIN, CHEMISTRY | ALKALINE PHOSPHATASE, CHEMISTRY | ANION GAP, CHEMISTRY | ASPARATE AMINOTRANSFERASE (AST), CHEMISTRY | BICARBONATE, CHEMISTRY | BILIRUBIN, TOTAL, CHEMISTRY | CALCIUM, TOTAL, CHEMISTRY | CHLORIDE, CHEMISTRY | CORTISOL, CHEMISTRY | CREATINE KINASE (CK), CHEMISTRY | CREATINE KINASE, MB ISOENZYME, CHEMISTRY | CREATININE, CHEMISTRY | FERRITIN, CHEMISTRY | FOLATE, CHEMISTRY | GLUCOSE, CHEMISTRY | IRON, CHEMISTRY | IRON BINDING CAPACITY, TOTAL, CHEMISTRY | LACTATE DEHYDROGENASE (LD), CHEMISTRY | MAGNESIUM, CHEMISTRY | NTROBNP, CHEMISTRY | PHOSPHATE, CHEMISTRY | POTASSIUM, CHEMISTRY | PROTEIN ELECTROPHORESIS, CHEMISTRY | PROTEIN, TOTAL
    superkey = 'lab'
procedures
key = 'ITEMID'
Non-invasive mech vent, Heart countershock NEC, Inject/infus nesiritide

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