(a) Clinical notes admission date discharge date date of birth sex m service surgery allergies no drug allergy information on file attending first name3 lf chief complaint fall from bike major surgical or invasive procedure n a history of present illness 71m who was brought to the hospital1 ed after a fall from his bike past medical history seizure disorder bph spinal stenosis sleep apnea social history n a family history n a physical exam no brainstem reflexes pertinent results n a brief hospital course mr known lastname was admitted after a fall from his bicycle he was seen getting up from the accident and then collapsed shortly thereafter he then was noted to be in asystole when ems arrived the total amount of time the patient was in asystole is not known upon arrival to the ed he had regained a pulse a neuro exam was performed and he had no brainstem reflexes an mri confirmed a c2 level spinal cord injury and changes consistent with an anoxic brain injury the neob was contact name ni but due to unknown circumstances surrounding his cardiac arrest he did not meet donation criteria the family elected to withdraw care he was extubated and expired shortly thereafter medications on admission n a discharge medications n a discharge disposition expired discharge diagnosis odontoid fracture spinal cord injury respiratory failure discharge condition n a discharge instructions n a followup instructions n a
Baseline: 327.23 345.90 348.1 518.81 E826.1
Proposed: 327.23 33.24 345.90 348.1 401.9 518.81 600.00 780.39 780.57 806.01 96.04 96.6 96.71 96.72 E826.1
Ground truth: 288.50 345.90 348.1 356.9 427.5 518.81 600.00 780.57 806.01 807.01 96.04 96.71 E826.1
(b) Clinical notes admission date discharge date date of birth sex f service neurosurgery allergies wellbutrin lipitor flagyl levaquin attending first name3 lf chief complaint decline in mental status major surgical or invasive procedure angiogram with embolization of aneurysm history of present illness 63f who began to have mental staus decline dysarthria at home brought to needhan hospital1 where had head ct showing large l parietal hemorrhage was transferred to hospital1 for further treatment upon arrival there was concern for airway safety and she was intubated was reportedly moving all extremities prior to intubation past medical history ccy multiple ercp for biliary strictures benign breast tumor l aneurysm clip no deficit chronic autoimmune hepatitis on steroids osteoporosis social history married she smokes to cigarettes a day does not drink any alcohol she is a retired hospital3 manager she watches her grandson a couple times a week participates in book clubs walks and traveling family history thyroid disease is positive in the family as is rheumatoid arthritis her sister died at years of age of liver disease of unknown cause it is not known whether that also was autoimmune hepatitis there is also cirrhosis in the family physical exam hunt and doctor last name doctor last name gcs 6t e v 1t motor o t afeb bp hr r16 o2sats intubated sedated examined in ed just after intubated heent pupils 4mm reactive neck supple extrem warm and well perfused no c c e neuro no eye opening all to nox pertinent results cta redemonstrated ip ic sah worsened mass effect with 10mm rightward mls and effacement of the basal cisterns there is downward herniation aneurysms ruptured left mca partially calcified right m1 origin aneurysm the latter is amenable to coiling possible third small left mca trifurcation aneurysm await reformations brief hospital course pt was admitted to the icu for close neurological observation in the afternoon of admission the patient s mental status declined including loss of cough and gag brain test testing was initiated by the icu and concluded that she was brain dead preparations were made for organ donation per the families request medications on admission all flagyl levaquin statins wellbutrin discharge medications n a discharge disposition expired discharge diagnosis n a discharge condition deceased discharge instructions n a followup instructions n a name6 md name8 md md md number completed by
Baseline: 571.5 733.00 96.04 96.72
Proposed: 305.1 38.91 38.93 39.72 401.9 431 518.81 571.42 571.5 733.00 733.09 88.41 96.04 96.6 96.72
Ground truth: 276.3 276.8 348.4 348.89 38.93 39.72 430 571.42 733.00 88.41 96.04 96.71 V49.86 V58.65
(c) Clinical notes admission date discharge date service medicine allergies no known allergies adverse drug reactions attending first name3 lf chief complaint small bowel obstruction major surgical or invasive procedure none history of present illness mr known lastname is an year old male with a h o parkinsons disease who presented to hospital3 hospital today with a small bowel obstruction with pneumatosis coli indicative of bowel necrosis and respiratory failure requiring intubation who was transferred to hospital1 for surgical evaluation upon surgical evaluation his overall condition was poor and he was deemed to be a very high risk surgical candidate his ph at the outside hospital had been his family reached a decision of dnr but several family members were to arrive prior to initiating comfort measures only past medical history parkinson disease recurrent utis frequent falls with old c1 fractures shoulder injury and prior left hip fracutre prostate cancer s p prostectomy social history patient lives at home with his wife does not drink smoke use iv drugs family history non contributory physical exam vitals hr rr saturation general sedated intubated unresponsive to verbal stimuli cardio tachycardic without murmurs pulmonary ctab anteriorly abdominal exam extremely rigid extremities no edema pulses radial carotids bilaterally pertinent results 24pm type art temp po2 pco2 ph total co2 base xs intubated intubated comments green top 24pm glucose lactate k 48pm lactate 41pm urea n creat 41pm estgfr using this 41pm lipase 41pm asa neg ethanol neg acetmnphn neg bnzodzpn neg barbitrt neg tricyclic neg 41pm asa neg ethanol neg acetmnphn neg bnzodzpn neg barbitrt neg tricyclic neg 41pm wbc rbc hgb hct mcv mch mchc rdw 41pm pt ptt inr pt 41pm plt count 41pm plt count 41pm fibrinoge imaging from outside hospital includes ct abdomen and pelvis marked gaseous distension of colon with prominent fecal density pneumatosis of the ascending colon with gas extending into the smv and reaching the peripheral portal vein branches in the liver worrisome for necrotic bowel brief hospital course year old male presents with severe acidemia respiratory failure small bowel obstruction and pneumatosis coli indicative of visceral necrosis as the patient was not a surgical candidate medical prognosis was poor following visits from concerned family members and following discussion with patients wife first name8 namepattern2 name ni patient care was transistioned to focus care on comfort patient expired quietly at am on with many family members at the bedside location un organ bank notified attending notified pcp name initial pre admitting and medical examiner notified medications on admission expired discharge medications expired discharge disposition expired discharge diagnosis expired discharge condition expired discharge instructions expired followup instructions expired first name8 namepattern2 last name namepattern1 md md number completed by
Baseline: 332.0 401.9 518.81 96.71 99.15 V10.46 V49.86 V66.7
Proposed: 008.45 276.2 332.0 518.81 557.0 560.81 560.89 560.9 569.83 96.71 99.15 V10.46 V15.88 V49.86
Ground truth: 038.9 276.2 294.10 311 331.82 401.9 518.81 557.0 560.9 569.89 785.52 96.71 995.92 V10.46 V49.86

Table 4: The case study from MIMIC3-Full using CAML with and without average meta-labels.

(d) Clinical notes

admission date discharge date date of birth sex m service surgery allergies no known allergies adverse drug reactions attending first name3 lf chief complaint infrarenal abdominal aortic aneurysm major surgical or invasive procedure endovascular repair of infrarenal abdominal aortic aneurysm history of present illness mr known lastname is a year old male with a history of htn and smoking history presenting with a abdominal aortic aneurysm he reports that he was using a at work on and since then has had abdominal pain located in the mid lower abdomen and lower back the pain is constant does not radiate and is not improved with anything he denies nausea vomiting chest pain shortness of breath fevers chills dysuria or problems with bowel movements past medical history htn copd hypercholesterolemia appendectomy years of age exploratory laparotomy partial small bowel resection social history etoh use denies tobacco use packs per day previous smoker packs per day for years pack year recreational drugs marijuana heroin crack pills or other denies marital status lives in location with his wife name ni four children boy girl family history denies aaa hx physical exam afebrile vital signs normal and stable gen nad aaox3 lungs ctab card regular rate rhythm abd soft non distended bs nontender no rebound guarding pulses bilateral palpable femoral popliteal dp and pt pulses ext no edema full rom bilat groin puncture sites c d i pertinent results 05am blood wbc rbc hgb hct mcv mch mchc rdw plt ct 30am blood pt ptt inr pt 05am blood glucose urean creat na k cl hco3 angap cta chest abd pelvis study date of pm impression status post evar no evidence of endoleak moderate retroperitoneal hematoma extending along the left extraperitoneal tissues in the pelvis diminished enhancement of the accessory left renal artery with likely infarct less likely delayed perfusion of the inferior pole of the left kidney the superior portion of the stent transverses the origin of the sma and both renal arteries severe stenosis of the celiac artery at its origin abdomen supine erect study date of pm no dilated loops of bowel or air fluid levels no evidence of ileus or obstruction 15am blood wbc rbc hgb hct mcv mch mchc rdw plt ct 15am blood glucose urean creat na k cl hco3 angap 15am blood calcium phos mg brief hospital course mr known lastname was admitted from the ed on and went for evar that evening he tolerated the procedure well and he was recovered in the pacu where he was monitored closely he remained stable and was transfered to the vicu where he was monitored closely on pod he complained of back pain which he had previously complained about for weeks prior neurosurgery was consulted and felt an mri would be worthwhile but the pt was not a candidate for this given his stent placement he was recommended to work with pt and to f u in the outpatient neurosurgery clinic if needed he continued to have back pain and on at cta abd pelvis was done to eval his evar stent and r o endoleak the scan was negative for endoleak and showed a normal post op appearance of the stent on mr known lastname had some abdominal pain and distention with decreased bowel sounds a kub showed an ileus he had an ngt placed and was successfully decompressed on another kub showed significant improvement a f u kub on showed complete resolution of the ileus on he tolerated a regular diet and ambulated independently he initially had difficulty voiding after his foley was removed but flomax was started and a second voiding trial was successful by he was completely independent walking with a cane for support he was feeling well and his labs were stable he was discharged home with family medications on admission amlodipine mg daily enalapril mg daily simvastatin mg daily discharge medications oxycodone acetaminophen mg tablet sig tablets po q6h every hours as needed for pain disp tablet s refills docusate sodium mg ml liquid sig ten ml po bid times a day as needed for constipation disp ml refills simvastatin mg tablet sig three tablet po daily daily metoprolol tartrate mg tablet sig one tablet po bid times a day hold for hr sbp disp tablet s refills aspirin mg tablet chewable sig one tablet chewable po daily daily amlodipine mg tablet sig one tablet po once a day enalapril maleate mg tablet sig one tablet po once a day tamsulosin mg capsule ext release hr sig one capsule ext release hr po hs at bedtime disp capsule ext release hr s refills discharge disposition home discharge diagnosis infrarenal abdominal aortic aneurysm post operative ileus discharge condition mental status clear and coherent level of consciousness alert and interactive activity status ambulatory independent discharge instructions medications take aspirin mg enteric coated once daily do not stop aspirin unless your vascular surgeon instructs you to do so continue all other medications you were taking before surgery we have added a few new medications to your regimen these are metoprolol 25mg twice dailiy for blood pressure and tamsulosin 4mg daily which was started because you had difficult urinating after your foley catheter was removed you should follow up with your pcp regarding these new medicaitons you make take tylenol or prescribed pain medications for any post procedure pain or discomfort what to expect when you go home it is normal to have slight swelling of the legs elevate your leg above the level of your heart use pillows or a recliner every hours throughout the day and at night avoid prolonged periods of standing or sitting without your legs elevated it is normal to feel tired and have a decreased appetite your appetite will return with time drink plenty of fluids and eat small frequent meals it is important to eat nutritious food options high fiber lean meats vegetables fruits low fat low cholesterol to maintain your strength and assist in wound healing to avoid constipation eat a high fiber diet and use stool softener while taking pain medication what activities you can and cannot do when you go home you may walk and go up and down stairs you may shower let the soapy water run over groin incision rinse and pat dry do not take a bath or soak in a hot tub pool for days your incision may be left uncovered unless you have small amounts of drainage from the wound then place a dry dressing or band aid over the area that is draining as needed no heavy lifting pushing or pulling greater than lbs for weeks after week you may resume sexual activity after week gradually increase your activities and distance walked as you can tolerate no driving for weeks and until you are no longer taking pain medications keep your follow up appointment for post procedure check and cta what to report to office numbness coldness or pain in lower extremities temperature greater than 5f for hours new or increased drainage from incision or white yellow or green drainage from incisions bleeding from groin puncture site sudden severe bleeding or swelling groin puncture site or incision lie down keep leg straight and have someone apply firm pressure to area for minutes if bleeding stops call vascular office if bleeding does not stop call for transfer to closest emergency room followup instructions provider name10 nameis scan phone telephone fax date time provider first name11 name pattern1 last name namepattern4 md phone telephone fax date time please call and make an appt with your pcp last name namepattern4 weeks be sure to bring your list of medications as you should discuss the new perscriptions you were started on completed by

Baseline: 305.1 39.71 401.9 441.4 496 560.1 788.20 88.42 997.4
Proposed: 272.0 272.4 305.1 39.71 401.9 441.4 496 560.1 788.20 88.42 88.47 96.07 997.4
Ground truth: 272.0 305.1 39.5 39.71 39.9 401.9 41.0 44.0 441.4 48.0 496 560.1 724.2 88.47 997.4 E879.8

Table 5: The case study from MIMIC3-Full using CAML with and without average meta-labels.