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Mimiciii code

- SUBJECT_ID : 환자 ID (병원 자체적으로 생성)
- HADM_ID: 특정 환자가 여러 번 입원할 수 있기 때문에, 특정 환자의 입원 episode를 구분하기 위한 목적
- ICUSTAY_ID: 특정 환자가 한번 중환자실 내려왔다 회복되서 일반병실로 올라갔다, 다시 나빠져서 중환자실로 내려올 수 있음. 이걸 구분하기 위해 각 ICU stay를 episod로 구분

- 특정 환자가 상태가 악화되어 중환자실에 왔을때, 이 환자의 사망률(mortality) 또는 예후, 중환자실 재실기간 등을 예측하는 것은 중요한 문제임.

Mimiciii code

- 그래서, 환자가 중환자실에 입원했을 때

  - 입원 첫날 환자의 상태가 어떠했는지?
  - 이 환자가 어떠한 동반질환(comorbidities)을 가지고 있는지?

    동반질환을 여러 개, 또는 중증 동반질환을 가지고 있을 경우 예후가 안좋을 가능성이 높음

    따라서 공정한 비교를 위해서는 comorbidities index를 계산해서 보정을 해줘야 함.

    동등한 동반질환을 가졌다는 가정하에, 중환자실에 입원했을 때 상태가 어땠는지? 어떤 질환이 악화되어 왔는지에 따라 outcome을 예측하는 지표가 있는지를 보는게 목적일 것임.
  - 패혈증(sepsis)은 혈관 안에 균이 돌아다니는 상태로, 폐렴/요로감염 등 대부분 감염성 질환이 악회되는 과정에 동반

Mimiciii code

- Severityscores/sofa.sql

  - 이건 comorbidies와는 다른 개념임
  - comorbidities는 질병의 경과에 영향을 미치는 동반질환이 얼마나 많이 있는지?
  - severity score는 현재 패혈증(sepsis, 혈관에 균이 돌아다니는 상태) 상태가 얼마나 중증인지를 나타내는 지표임.

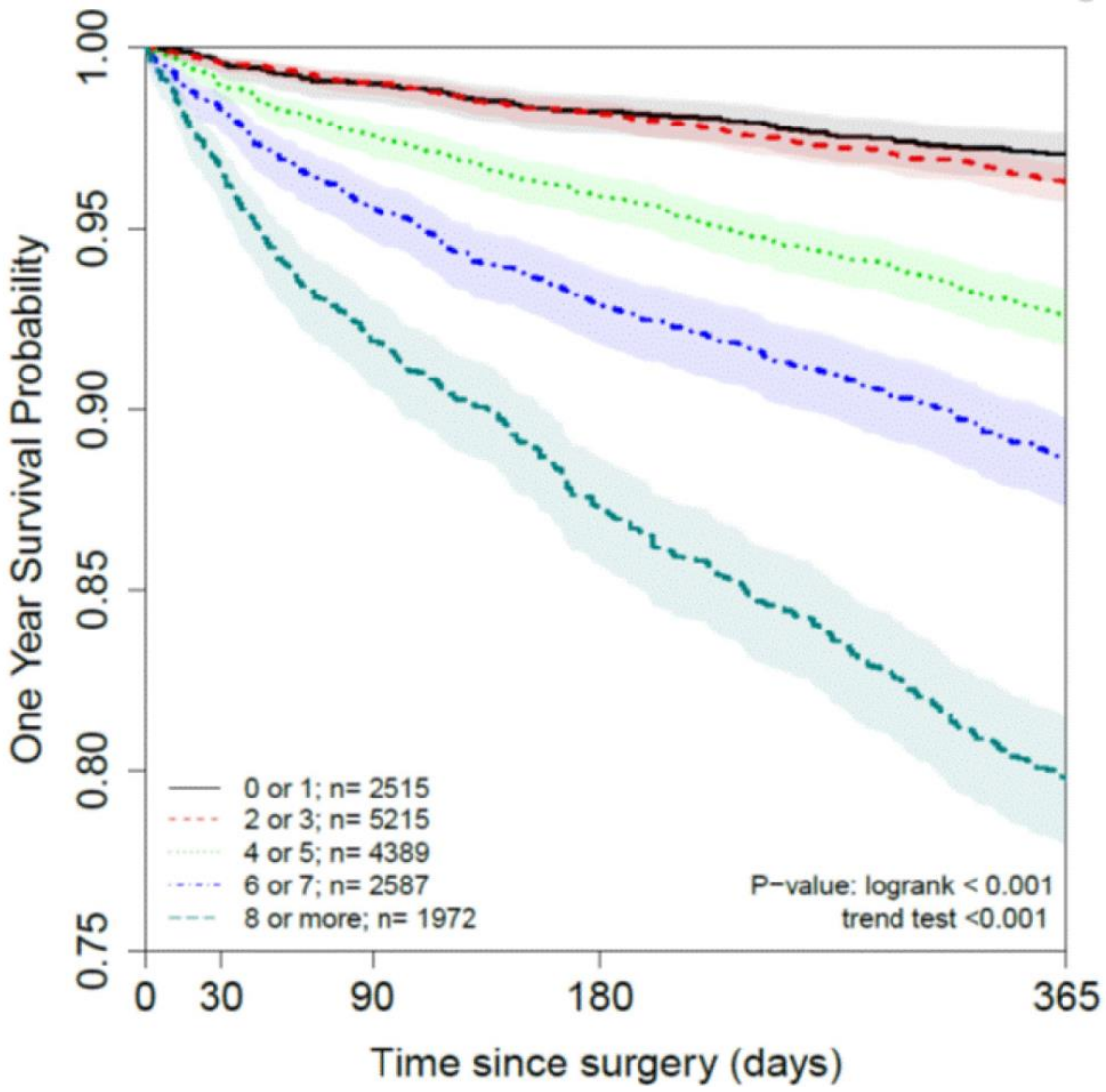
mild → severe

System	0	1	2	3	4
혈액 내 산소 분압 Respiration PaO2/FiO2, mmHg (kPa)	≥400 (53.3)	<400 (53.3)	<300 (40)	<200 (26.7) with respiratory support	<100 (13.3) with respiratory support
혈소판수치 Coagulation Platelets, x10³/uL	≥150	<150	<100	<50	<20
황달수치 Liver Bilirubin, mg/dL (umol/L)	<1.2 (20)	1.2 - 1.9 (20 - 32)	2.0 - 5.9 (33 - 101)	6.0 - 11.9 (102 - 204)	>12.0 (204)
혈압 Cardiovascular	MAP ≥70mmHg	MAP <70mmHg	Dopamine <5 or Dobutamine (any dose)	Dopamine 5.1 - 15 or Epinephrine ≤0.1 or Norepinephrine ≤0.1	Dopamine >15 or Epinephrine >0.1 or Norepinephrine >0.1
의식 CNS GCS Score	15	13 - 14	10 -12	6 - 9	<6
콩팥 Renal Creatinine, mg/dL (umol/L) Urine Output, mL/d	<1.2 (110)	1.2 - 1.9 (110 - 170)	2.0 - 3.4 (171 - 299)	3.5 - 4.9 (300 - 440) <500	>5.0 (440) <200
*Catecholamine Doses = ug/kg/min for at least 1hr					

Table 1. Classical and updated Charlson comorbidity index weights

Comorbid conditions[a,b]	cCCI weights	uCCI weights
Myocardial infarction	1	0
Congestive heart failure	1	2
Peripheral vascular disease	1	0
Cerebrovascular disease	1	0
Dementia	1	2
Chronic pulmonary disease	1	1
Rheumatic disease	1	1
Peptic ulcer disease	1	0
Mild liver disease	1	2
Diabetes without chronic complication	1	0
Diabetes with chronic complication	2	1
Hemiplegia or paraplegia	2	2
Renal disease	2	1
Any malignancy without metastasis	2	2[c]
Leukemia	2	
Lymphoma	2	
Moderate or severe liver disease	3	4
Metastatic solid tumour	6	6
AIDS (excluded asymptomatic infection)	6	4
Maximum comorbidity score	33	24

ASSOCIATION OF ELIXHAUSER COMORBIDITY INDEX TO 1-YEAR MORTALITY IN OLDER ADULTS AFTER PERMANENT PACEMAKER IMPLANTATION



Comorbidity	Codes
Congestive Heart Failure	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 425.4–425.9, 428.x
Cardiac Arrhythmia	426.0, 426.13, 426.7, 426.9, 426.10, 426.12, 427.0–427.4, 427.6–427.9, 785.0, 996.01, 996.04, V45.0, V53.3
Valvular Disease	093.2, 394.x–397.x, 424.x, 746.3–746.6, V42.2, V43.3
Pulmonary Circulation Disorders	415.0, 415.1, 416.x, 417.0, 417.8, 417.9
Peripheral Vascular Disorders	093.0, 437.3, 440.x, 441.x, 093.0, 437.3, 440.x, 441.x, 443.1–443.9, 447.1, 557.1, 557.9, V43.4
Hypertension (Uncomplicated)	401.x
Hypertension (Complicated)	402.x–405.x
Paralysis	334.1, 342.x, 343.x, 344.0–344.6, 344.9
Other Neurological Disorders	331.9, 332.0, 332.1, 333.4, 333.5, 333.92, 334.x–335.x, 336.2, 340.x, 341.x, 345.x, 348.1, 348.3, 780.3, 784.3
Chronic Pulmonary Disease	416.8, 416.9, 490.x – 505.x, 506.4, 508.1, 508.8
Diabetes (Uncomplicated)	250.0–250.3
Diabetes (Complicated)	250.4–250.9
Hypothyroidism	240.9, 243.x, 244.x, 246.1, 246.8
Renal Failure	403.01, 403.11, 403.91, 404.02, 404.03, 404.12, 404.13, 404.92, 404.93, 585.x, 586.x, except 585.6, 588.0, V42.0, V45.1, V56.x
End-stage renal disease	585.6
Liver Disease	070.22, 070.23, 070.32, 070.33, 070.44, 070.54, 070.6, 070.9, 456.0–456.2, 570.x, 571.x, 572.2–572.8, 573.3, 573.4, 573.8, 573.9, V42.7
Peptic Ulcer Disease (excluding bleeding)	531.7, 531.9, 532.7, 532.9, 533.7, 533.9, 534.7, 534.9
AIDS/HIV	042.x–044.x
Lymphoma	200.x–202.x, 203.0, 238.6
Metastatic Cancer	196.x–199.x
Solid Tumor without Metastasis	140.x–172.x, 174.x–195.x
Rheumatoid Arthritis Collagen	446.x, 701.0, 710.0–710.4, 710.8, 710.9, 711.2, 714.x, 719.3, 720.x, 725.x, 728.5, 728.89, 729.30
Coagulopathy	286.x, 287.1, 287.3–287.5
Obesity	278.0
Weight Loss	260.x–263.x, 783.2, 799.4
Fluid and Electrolyte Disorders	253.6, 276.x
Blood Loss Anemia	280.0
Deficiency Anemia	280.1–280.9, 281.x
Alcohol Abuse	265.2, 291.1–291.3, 291.5–291.9, 303.0, 303.9, 305.0, 357.5, 425.5, 535.3, 571.0–571.3, 980.x, V11.3
Drug Abuse	292.x, 304.x, 305.2–305.9, V65.42
Psychoses	293.8, 295.x, 296.04, 296.14, 296.44, 296.54, 297.x, 298.x
Depression	296.2, 296.3, 296.5, 300.4, 309.x, 311

Elixhauser Comorbidity Index*

Comorbidity	Description	Example	van Walraven Weight[a]
AIDS	Acquired immune deficiency syndrome	AIDS wasting disease	0
ALCOHOL	Alcohol abuse	Alcohol withdrawal syndrome	0
ANEMDEF	Deficiency anemia	Iron-deficiency anemia	−2
ARTH	Rheumatoid arthritis/collagen vascular diseases	Systemic lupus erythematosus	0
BLDLOSS	Blood-loss anemia	Menorrhagia	−2
CHF	Congestive heart failure	Left ventricular failure	7
CHRNLUNG	Chronic pulmonary disease	Emphysema	3
COAG	Coagulopathy	Hemophilia A	3
DEPRESS	Depression	Bipolar disorder	−3
DM	Diabetes, uncomplicated	Type 2 diabetes without complications	0
DMCX	Diabetes, complicated	Diabetes with peripheral neuropathy	0
DRUG	Drug abuse	Opioid addiction	−7
HTN_C	Hypertension with/without complications	Hypertension	0
HYPOTHY	Hypothyroidism	Thyroid goiter	0
LIVER	Liver disease	Cirrhosis	11
LYMPH	Lymphoma	Hodgkin's lymphoma	9
LYTES	Fluid and electrolyte disorders	Hyponatremia	5
METS	Metastatic cancer	Lung cancer with brain metastases	12
NEURO	Other neurological disorders	Seizure disorder	6
OBESE	Obesity	Morbid obesity	−4
PARA	Paralysis	Quadriplegia	7
PERIVASC	Peripheral vascular disorders	Claudication	2
PSYCH	Psychoses	Schizophrenia	0
PUMCIRC	Pulmonary circulation disorders	Pulmonary hypertension	4
RENLFAIL	Renal failure	Renal failure on dialysis	5
TUMOR	Solid tumor without metastasis	Malignant colon polyp	4
ULCER	Peptic ulcer disease excluding bleeding	Duodenal ulcer	0
VALVE	Valvular disease	Aortic stenosis	−1
WGHTLOSS	Weight loss	Protein calorie malnutrition	6
HTN[b]	Hypertension without complications	Benign essential hypertension	0
HTNCX[b]	Hypertension with complications	Hypertension with renal failure	0
ARRHYTH[c]	Cardiac arrhythmias	Atrial fibrillation	5

[a]The van Walraven index is calculated by summing the listed weights for each Elixhauser comorbidity that is present (ref. 7).

[b]HCUP combines the HTN and HTNCX comorbidities in its Severity files, as was done originally by Elixhauser et al. (ref. 1).

[c]HCUP excludes this comorbidity in its Severity files, although it was originally included by Elixhauser et al. (ref. 1)

Branch: master ▾ **mimic-code** / concepts / **comorbidity** /

alistairewj add ahrq comorbidity with no drg/icd-9 code filter

..

elixhauser-ahrq-v37-no-drg-all-icd.s...	add ahrq comorbidity with no drg/icd-9 code filter
elixhauser-ahrq-v37-no-drg.sql	add ahrq comorbid with no drg filter
elixhauser-ahrq-v37-with-drg.sql	Remove schema mimiciii prefix from table names in concept sql
elixhauser-quan.sql	Remove schema mimiciii prefix from table names in concept sql
elixhauser-score-ahrq.sql	now drops/creates mat view
elixhauser-score-quan.sql	removed subject_id

```
-- This code uses v37 of Elixhauser comorbidities provided by AHRQ
-- However
--   it does *not* filter based on diagnosis related groups (DRGs)
--   it does *not* filter based on priority of ICD-9 code
-- As such, "comorbidities" identified are more likely to be associated with the primar

-- The code proceeds in two stages
--  (1) convert ICD9_CODE from a VARCHAR to a CHAR(5)
--  (2) use AHRQ published rules to define comorbidities

-- note on (1), we *cannot* skip this step and use a varchar here
-- why? well, for example, VALVE is coded as BETWEEN '4240 ' and '42499'
-- if we used a varchar, then '4240' *is not* between this range
-- but if we use a char(5), then '4240' *is* between this range
-- and we would like the latter behavior
-- it's possible removing the whitespaces would fix this - but I didn't test it.
-- This method is also more consistent with the AHRQ SAS code.
```

```
19  DROP MATERIALIZED VIEW IF EXISTS elixhauser_ahrq_no_drg_all_icd CASCADE;
20  CREATE MATERIALIZED VIEW elixhauser_ahrq_no_drg_all_icd as
21  with
22  icd as
23  (
24    select hadm_id, seq_num
25      , cast(icd9_code as char(5)) as icd9_code
26    from diagnoses_ic
27  )
28  ,
29  eliflg as
30  (
31  select hadm_id, seq_num, icd9_code
32  -- note that these codes will seem incomplete at first
33  -- for example, CHF is missing a lot of codes referenced in the literature (402.11, 402.91, etc)
34  -- these codes are captured by hypertension flags instead
35  -- later there are some complicated rules which confirm/reject those codes as CHF
36  , CASE
37    when icd9_code = '39891' then 1
38    when icd9_code between '4280 ' and '4289 ' then 1
39                  end as CHF       /* Congestive heart failure */
40
```

Comorbidity	Codes
Congestive Heart Failure	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 425.4–425.9, 428.x

Comorbidity	Codes
Congestive Heart Failure	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 425.4–425.9, 428.x

398.91	Rheumatic heart failure (congestive)
402.01	Malignant hypertensive heart disease with heart failure
402.11	Benign hypertensive heart disease with heart failure
402.91	Unspecified hypertensive heart disease with heart failure
404.01	Hypertensive heart and chronic kidney disease, malignant, with heart failure and with chronic kidney disease stage I through stage IV, or unspecified
404.03	Hypertensive heart and chronic kidney disease, malignant, with heart failure and with chronic kidney disease stage V or end stage renal disease
404.11	Hypertensive heart and chronic kidney disease, benign, with heart failure and with chronic kidney disease stage I through stage IV, or unspecified
404.13	Hypertensive heart and chronic kidney disease, benign, with heart failure and chronic kidney disease stage V or end stage renal disease
404.91	Hypertensive heart and chronic kidney disease, unspecified, with heart failure and with chronic kidney disease stage I through stage IV, or unspecified
404.93	Hypertensive heart and chronic kidney disease, unspecified, with heart failure and chronic kidney disease stage V or end stage renal disease

Comorbidity	Codes
Congestive Heart Failure	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 425.4–425.9, 428.x

428.0	Congestive heart failure, unspecified icd9cm
428.30	Diastolic heart failure, unspecified icd9cm
428.22	Chronic systolic heart failure icd9cm
428.21	Acute systolic heart failure icd9cm
428.2	Systolic heart failure icd9cm
428.40	Combined systolic and diastolic heart failure, unspecified icd9cm
428.42	Chronic combined systolic and diastolic heart failure icd9cm
428.32	Chronic diastolic heart failure icd9cm
428.43	Acute on chronic combined systolic and diastolic heart failure icd9cm
428	Heart failure icd9cm

HeightWeightQuery

ITEMID

Identifier for a single measurement type in the database. Each row associated with one ITEMID (e.g. 212) corresponds to an instantiation of the same measurement (e.g. heart rate).

6.2.19 Respiration Rate

ITEMID	LABEL	CATEGORY
614	Resp Rate (Spont)	
615	Resp Rate (Total)	
618	Respiratory Rate (*)	
653	Spont. Resp. Rate	
1151	Respiratory Rate:	
1635	HIGH Resp Rate	
1884	Spont Resp rate	
2117	Low resp rate	
3603	Resp Rate	
3337	Breath Rate	

(*) indicates preferred ITEMID.