[研究議題：Assessing the Relationship Between the Variability of Diagnostic Measures and the Risk of Diabetic Complications]

**研究目的** :各項檢測項目變異程度(穩定性) 對應各項糖尿病併發症的關係

參考論文: Predictions of diabetes complications and mortality using hba1c variability: a 10‑year observational cohort study

**資料區間** : 2015-2019三院糖尿病患者與相關

**目標病患** : 糖尿病併發症患者

* ICD CODE:

1. Eye\_complications = "362.01","362.02","362.55", "362.11",

"365.44","369","361","369.60"

1. Cardiovascular\_disease = "414.9","413.9","411.1","412", "428", "425", "402"
2. Cerebrovascular\_disease = "435.9", "434.91", "432.9", "437.1"
3. Peripheral vascular disease = "440.2","440.20","440.21", "440.22", "440.23", "440.24"
4. Nephropathy = "583", "585", "V451"
5. Diabetic neuropathy = "357.2", "337.1","353"

**Outcome:**

**ToDO: ICD9, 10一起給**

**Index date: 第一次確診後第365天(1y 觀察期)**

|  |  |  |
| --- | --- | --- |
| 糖尿病相關併發症 | ICD CODE | 操作定義 |
| Eye complications  EyeComp | ICD9: 362.01、362.02、362.55、362.11、365.44、369、361、369.60 | 一年內 2次門診 或 1 次住院。 |
| Cardiovascular disease  CardioDisease | ICD9: 414.9、413.9、411.1、412、428、425、402 |
| Cerebrovascular disease  CerebroDisease | ICD9: 435.9、434.91、432.9、432.9、437.1 |
| Peripheral vascular disease  PeripheralVascDisease | ICD9: 440.2、440.20、440.21、440.22、440.23、440.24 |
| Nephropathy  Nephropathy | ICD9: 583、585、V451 |
| Diabetic neuropathy  DiabeticNeuro | ICD9: 357.2、337.1、353 |
| Diabetes | ICD10: E08, E09, E10, E11, E12 |

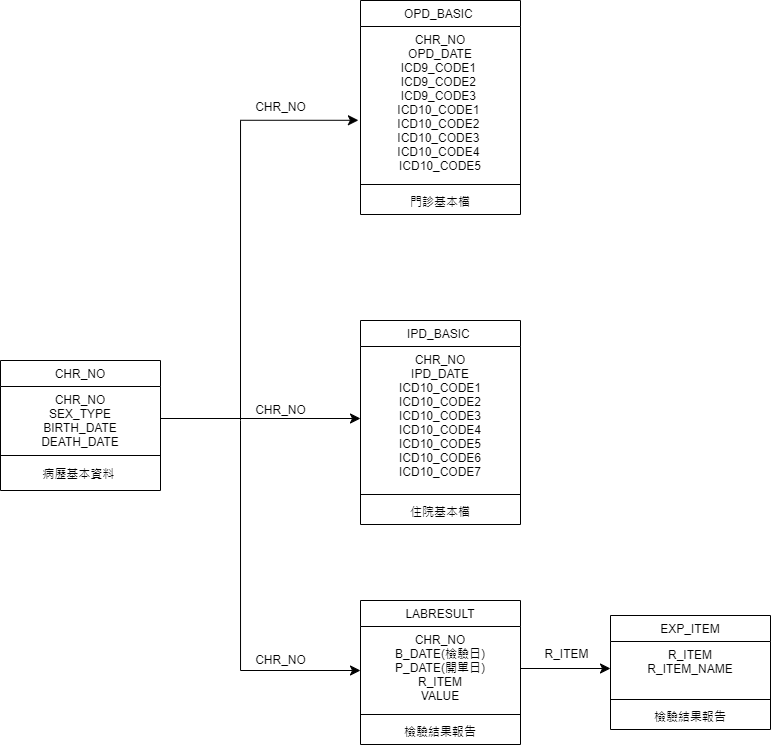
**Exclude**

* 病歷號對應多組性別年齡
* 小於OR 大於 K歲患者
* 檢驗至少三次
* 追蹤至少一年
* **Index Date (發病後+365) 前一年是否有下列疾病**
* **觀察期: 發病前 t-1**
* 使用下列變數
  + 性別
  + 年齡(檢驗日-出生日)
  + HbA1C\_baseline(index date value)
  + HbA1C\_mean
  + HbA1C\_SD
  + HbA1C\_CV
  + HbA1C\_variability score = HVS
    - 排序日期
    - VALUE = 檢驗數值前後差異大於0.5%的次數 / 檢驗總次數
  + Index Date 前一年是否有下列疾病疾病史(病歷資料)
  + (To do: refractor fetch data)
  + Index Date year
  + HbA1C\_test 的ID

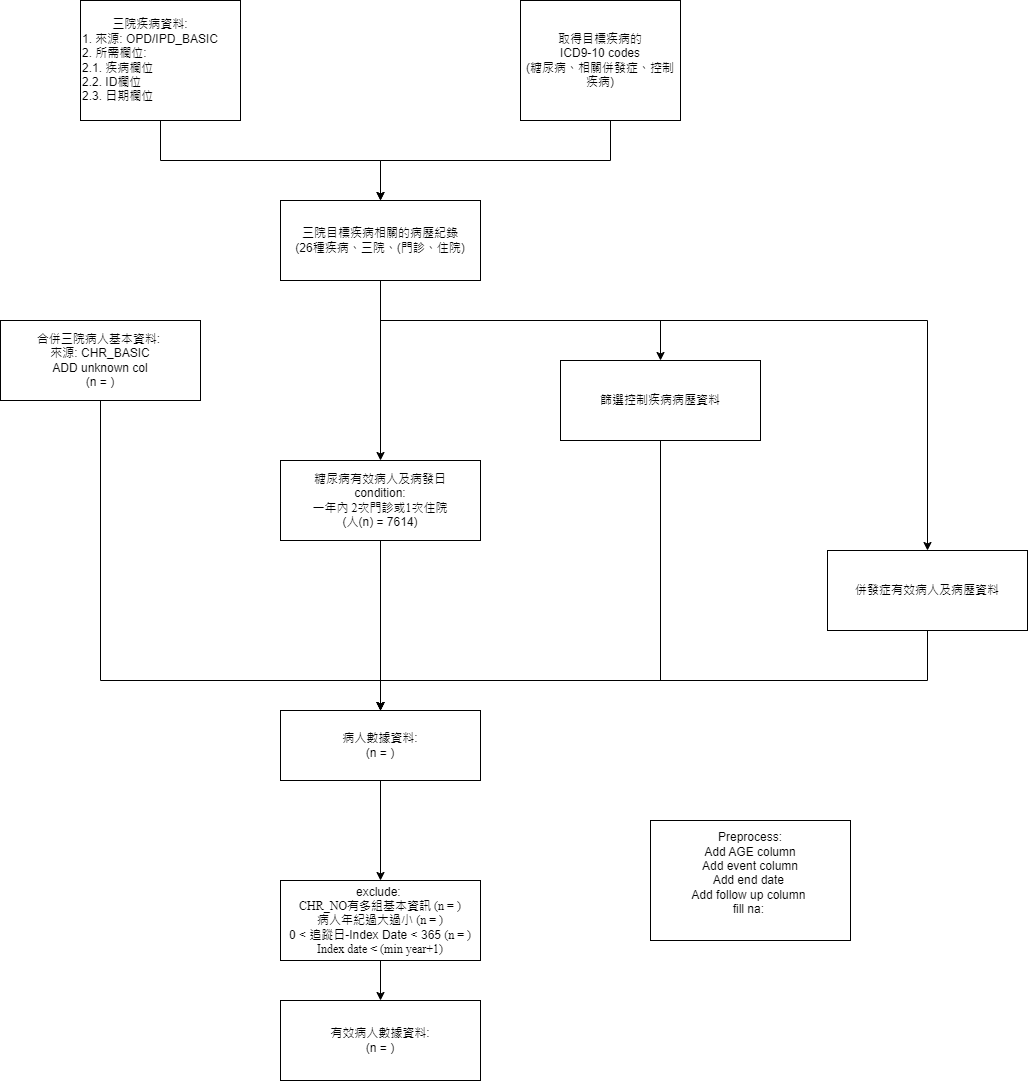
|  |  |  |  |
| --- | --- | --- | --- |
| 疾病名稱 | ICD9 CODE | ICD10 CODE | 操作定義 |
| Essential hypertension | 401 |  | Index Date 前一年有發生  一年內 2次門診 或 1 次住院。  另外寫一個邏輯  這邊條件一致 |
| Peripheral enthesopathies and allied syndromes | 726 |  |
| Other ill-defined and unknown causes of morbidity and mortality | 799 |  |
| Disorders of lipoid metabolism | 272 |  |
| Acute upper respiratory infections of multiple or unspecified sites | 465 |  |
| Other symptoms involving abdomen and pelvis | 724 |  |
| Other symptoms involving abdomen and pelvis | 789 |  |
| Dermatophytosis | 110 |  |
| General symptoms | 780 |  |
| Symptoms involving respiratory system and other chest symptoms | 786 |  |
| Symptoms involving head and neck | 784 |  |
| Contact dermatitis and other eczema | 692 |  |
| Viral infection in conditions classified elsewhere and of unspecified site | 79 |  |
| Overweight, obesity and other hyperalimentation | 278 |  |
| Other and unspecified disorders of joint | 719 |  |
| Acute bronchitis and bronchiolitis | 466 |  |
| Other disorders of soft tissues | 729 |  |
| Nonspecific findings on examination of blood | 790 |  |
| Disorders of refraction and accommodation | 367 |  |
| Disorders of conjunctiva | 372 |  |

**三院資料庫關聯性: Todo: 資料表缺失**

**Matching: 病例基本檔找出對應病人疾病資料 => (病人資料, 檢驗結果 => 檢驗名稱)**

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**Figure 1. 資料串接**

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**Figure 2. 流程圖**

**Note:**

**DATE:**

**民國年 < 100**

**只記錄到月份**

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**Tb1: 抓出三院DM Index Date = [CHR\_NO, DATE] done**

**Tb2: 抓出所有outcome的疾病紀錄 [CHR\_NO, DATE]**

**Tb3: 抓出對應病人的基本屬性[CHR\_NO, SEX, ]**

Todo:

1. 資料串接圖 done
2. 撈病done
3. Data = [病人基本屬性, 糖尿病發病日(end date), 併發症歷史紀錄] done
4. Exclude: (併發症歷史紀錄 - 糖尿病發病日) < 365 done
5. 流程拆開
6. Data summary:

Table1:

性別類別人數

年齡類別人數:

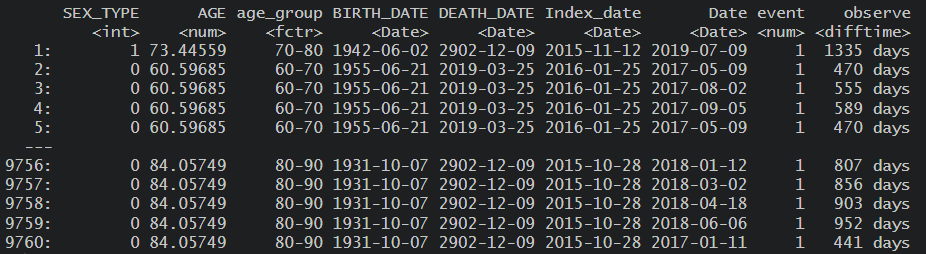
各糖尿病疾病確診資料數

Table2:

outcome

**Function:**

1. **Refactor fetch data (done)**
   1. **Input: disease\_codes vector => list**
   2. **Output: dt => dt\_list = (“disease ID”= dt, … )**
2. **Refactor standardized date:**
   1. **Input: date\_col str => list**
   2. **考慮民國年<100**

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HBa1c代號: 避免有多組代號

R\_ITEM: 14710

ITEM\_NO: 147

Paper:

1. Adverse Outcomes after Major Surgeries in Patients with Diabetes: A Multicenter Matched Study
   1. propensity score matching: 避免資料量不平衡、ratio要考慮嗎?
   2. age, sex, low-income status, hospital volume, coexisting medical conditions, emergency of operation, duration of surgery, type of surgery, and type of anesthesia.
2. A novel prediction model of the risk of pancreatic cancer among diabetes patients using multiple clinical data and machine learning
   1. Outcome: The index date for this study was characterized as the date when antidiabetic medications were prescribed. The study's aim was to define any occurrence of pancreatic cancer within 4 years following this index date.22 Patients with pancreatic cancer were identified using data from the TMUCRD with the ICD-O-3 code C25. The participants were amended at a loss to follow-up, mortality date, or at the end of the study, on December 31, 2019.
   2. Variables:
      1. Demographic characteristics (i.e., gender, age, and body mass index (BMI))
      2. Comorbidities before the prescription date of antidiabetic drugs (i.e., cardiovascular, chronic obstructive pulmonary, and rheumatic diseases) and the Charlson comorbidity index (CCI) score
      3. Long-term medications (i.e., antacids, gastroesophageal reflux disease (GORD), and gastrointestinal disorder agents) are prescribed during the 6months before a prescription for an antidiabetic drug
      4. . Laboratory test results (i.e., glycated hemoglobin (HbA1c), glucose AC, and albumin) within 12months before prescription of an antidiabetic drug
      5. 論文有2008.01-2020.12的資料，資料集只有到2019.12, Q:(資料完整性)
3. Elevated Free Thyroxine Levels Might Alter the Effect of the Lipid Profile on Insulin Resistance in Type 2 Diabetes Mellitus
   1. Outcome: The index date for this study was characterized as the date when antidiabetic medications were prescribed. The study's aim was to define any occurrence of pancreatic cancer within 4 years following this index date.22 Patients with pancreatic cancer were identified using data from the TMUCRD with the ICD-O-3 code C25. The participants were amended at a loss to follow-up, mortality date, or at the end of the study, on December 31, 2019.
4. Trends in prevalence and incidence of diabetes mellitus from 2005 to 2014 in Taiwan:
   1. Index date: First day,
   2. Exclude: (2) 年齡、性別、[出生](https://www.sciencedirect.com/topics/medicine-and-dentistry/childbirth)日期等資訊缺失； (3) 診斷 DM 時年齡 >100 歲。
5. Paper: Clinical significance of hepatic function in Graves disease with type 2 diabetic mellitus: A single-center retrospective cross-sectional study in Taiwan
   1. NOTE: hemoglobin A1c (HbA1C) <6.5% group and ≥6.5% group
6. Personalised prediction of maintenance dialysis initiation in patients with chronic kidney disease stages 3–5: a multicentre study using the machine learning approach