**流程圖:**

|  |  |  |
| --- | --- | --- |
| 步驟 | 說明 | 患者數量 |
| 1 | 篩選就診病例紀錄的病例資料、議題相關疾病碼:  輸出 目標疾病相關的所有病歷紀錄  (糖尿病、相關併發症、控制疾病) |  |
| 2 | 篩選目標病患  操作定義: 一年內3次門診或1次住院疾病紀錄 | N = 7692 |
| 3. | 合併1. 病人基本資料、2.目標病患及相關病歷資料 |  |
| 4 | 排除:  病歷資料對應失效性別年齡 (N = 76)  年齡 < 20 或年齡 > 100 (N = 3)  index date < min(index date year) + 1 (N = 741) | N = 6872 |

**Table1. 糖尿病整體病患基本資料欄位資料分布**

|  |  |  |
| --- | --- | --- |
|  | | overall(n=6872) |
| AGE | | |
|  | Mean(SD) | 68.23(12.23) |
| Median(IQR) | 68.35(17.64) |
| (Min,Max) | (21.63,99.25) |
| year | | |
|  | 2015 | 1399(20.36%) |
| 2011 | 653(9.5%) |
| 2018 | 467(6.8%) |
| 2012 | 889(12.94%) |
| 2016 | 1026(14.93%) |
| 2014 | 456(6.64%) |
| 2017 | 620(9.02%) |
| 2013 | 568(8.27%) |
| 2009 | 309(4.5%) |
| 2019 | 191(2.78%) |
| 2010 | 294(4.28%) |
| SEX\_TYPE |  |  |
|  | 1 | 3823(55.63%) |
|  | 0 | 3049(44.37%) |
| AGE\_GROUP |  |  |
|  | 60-70 | 1974(28.73%) |
|  | 70-80 | 1843(26.82%) |
|  | 50-60 | 1294(18.83%) |
|  | 80-90 | 1120(16.3%) |
|  | 40-50 | 394(5.73%) |
|  | 90-100 | 159(2.31%) |
|  | 30-40 | 71(1.03%) |
|  | 20-30 | 17(0.25%) |
| Hypertension\_event |  |  |
|  | 1 | 1143(16.63%) |
|  | 0 | 5729(83.37%) |
| PeripheralEnthe\_event |  |  |
|  | 1 | 95(1.38%) |
|  | 0 | 6777(98.62%) |
| UnknownCauses\_event |  |  |
|  | 1 | 7(0.1%) |
|  | 0 | 6865(99.9%) |
| LipoidMetabDis\_event |  |  |
|  | 1 | 992(14.44%) |
|  | 0 | 5880(85.56%) |
| AcuteURI\_event |  |  |
|  | 1 | 33(0.48%) |
|  | 0 | 6839(99.52%) |
| AbdPelvicSymptoms\_event |  |  |
|  | 1 | 135(1.96%) |
|  | 0 | 6737(98.04%) |
| Dermatophytosis\_event |  |  |
|  | 1 | 102(1.48%) |
|  | 0 | 6770(98.52%) |
| GenSymptoms\_event |  |  |
|  | 1 | 654(9.52%) |
|  | 0 | 6218(90.48%) |
| RespChestSymptoms\_event |  |  |
|  | 1 | 196(2.85%) |
|  | 0 | 6676(97.15%) |
| HeadNeckSymptoms\_event |  |  |
|  | 1 | 96(1.4%) |
|  | 0 | 6776(98.6%) |
| ContactDermEczema\_event |  |  |
|  | 1 | 103(1.5%) |
|  | 0 | 6769(98.5%) |
| ViralInfection\_event |  |  |
|  | 1 | 200(2.91%) |
|  | 0 | 6672(97.09%) |
| ObesityHyperal\_event |  |  |
|  | 1 | 13(0.19%) |
|  | 0 | 6859(99.81%) |
| JointDisorders\_event |  |  |
|  | 1 | 17(0.25%) |
|  | 0 | 6855(99.75%) |
| AcuteBronchitis\_event |  |  |
|  | 1 | 35(0.51%) |
|  | 0 | 6837(99.49%) |
| SoftTissueDis\_event |  |  |
|  | 1 | 191(2.78%) |
|  | 0 | 6681(97.22%) |
| BloodExamFindings\_event |  |  |
|  | 1 | 82(1.19%) |
|  | 0 | 6790(98.81%) |
| RefractionDis\_event |  |  |
|  | 1 | 9(0.13%) |
|  | 0 | 6863(99.87%) |
| ConjunctivaDis\_event |  |  |
|  | 1 | 142(2.07%) |
|  | 0 | 6730(97.93%) |

**Table2. 糖尿病整體病患各季HbA1c的檢驗值中位數、次數**

|  |  |  |
| --- | --- | --- |
|  |  | overall(n=1133) |
| median\_value\_0 |  |  |
|  | Mean(sd) | 8.07(1.97) |
|  | Median(IQR) | 7.5(2.45) |
|  | (Min,Max) | (4.75,17.9) |
| median\_value\_1 |  |  |
|  | Mean(sd) | 7.29(1.36) |
|  | Median(IQR) | 7(1.5) |
|  | (Min,Max) | (3.5,14) |
| median\_value\_2 |  |  |
|  | Mean(sd) | 7.24(1.32) |
|  | Median(IQR) | 6.9(1.4) |
|  | (Min,Max) | (4.2,14.2) |
| median\_value\_3 |  |  |
|  | Mean(sd) | 7.22(1.28) |
|  | Median(IQR) | 6.9(1.4) |
|  | (Min,Max) | (4,13.4) |
| median\_value\_4 |  |  |
|  | Mean(sd) | 7.24(1.37) |
|  | Median(IQR) | 6.9(1.3) |
|  | (Min,Max) | (4.1,15.5) |
| n\_0 |  |  |
|  | Mean(sd) | 1.35(0.55) |
|  | Median(IQR) | 1(1) |
|  | (Min,Max) | (1,4) |
| n\_1 |  |  |
|  | Mean(sd) | 1.19(0.42) |
|  | Median(IQR) | 1(0) |
|  | (Min,Max) | (1,4) |
| n\_2 |  |  |
|  | Mean(sd) | 1.13(0.36) |
|  | Median(IQR) | 1(0) |
|  | (Min,Max) | (1,3) |
| n\_3 |  |  |
|  | Mean(sd) | 1.1(0.3) |
|  | Median(IQR) | 1(0) |
|  | (Min,Max) | (1,3) |
| n\_4 |  |  |
|  | Mean(sd) | 1.08(0.28) |
|  | Median(IQR) | 1(0) |
|  | (Min,Max) | (1,3) |
| total |  |  |
|  | Mean(sd) | 5.84(0.94) |
|  | Median(IQR) | 6(1) |
|  | (Min,Max) | (5,11) |

**Talble3糖尿病整體病患各季HbA1c的檢驗值中位數、次數**

|  |  |  |
| --- | --- | --- |
|  |  | overall(n=174) |
| median\_value\_0 | |  |
|  | Mean(sd) | 3.75(0.55) |
|  | Median(IQR) | 3.85(0.74) |
|  | (Min,Max) | (2.3,4.8) |
|  |  | 0 |
| median\_value\_1 | |  |
|  | Mean(sd) | 3.85(0.48) |
|  | Median(IQR) | 3.9(0.6) |
|  | (Min,Max) | (2.5,4.8) |
|  |  | 0 |
| median\_value\_2 | |  |
|  | Mean(sd) | 3.88(0.5) |
|  | Median(IQR) | 3.9(0.6) |
|  | (Min,Max) | (2,4.9) |
|  |  | 0 |
| median\_value\_3 | |  |
|  | Mean(sd) | 3.84(0.52) |
|  | Median(IQR) | 3.9(0.6) |
|  | (Min,Max) | (2.1,4.9) |
|  |  | 0 |
| median\_value\_4 | |  |
|  | Mean(sd) | 3.85(0.5) |
|  | Median(IQR) | 3.9(0.65) |
|  | (Min,Max) | (2.15,4.8) |
|  |  | 0 |
| n\_0 |  |  |
|  | Mean(sd) | 2.26(1.47) |
|  | Median(IQR) | 2(2) |
|  | (Min,Max) | (1,11) |
|  |  | 0 |
| n\_1 |  |  |
|  | Mean(sd) | 2.27(1.25) |
|  | Median(IQR) | 2(2) |
|  | (Min,Max) | (1,9) |
|  |  | 0 |
| n\_2 |  |  |
|  | Mean(sd) | 2.24(1.25) |
|  | Median(IQR) | 2(2) |
|  | (Min,Max) | (1,11) |
|  |  | 0 |
| n\_3 |  |  |
|  | Mean(sd) | 2.33(1.48) |
|  | Median(IQR) | 2(2) |
|  | (Min,Max) | (1,12) |
|  |  | 0 |
| n\_4 |  |  |
|  | Mean(sd) | 2.29(1.5) |
|  | Median(IQR) | 2(2) |
|  | (Min,Max) | (1,13) |
|  |  | 0 |
| total |  |  |
|  | Mean(sd) | 11.4(5.32) |
|  | Median(IQR) | 12(8) |
|  | (Min,Max) | (5,40) |
|  |  | 0 |

併發症流程圖 :

|  |  |  |
| --- | --- | --- |
|  | 說明 | 患者數量 |
| 1 | 排除：  index date 前有發生 Eye complications (N = 232)  index date 後一年內發生 Eye complications (N = 444)  index date 一年內沒有 HbA1c 的糖尿病患者 (N = 5163) | N = |
| 2 | 排除：  index date 前有發生 Cardiovascular disease (N = 232)  index date 後一年內發生 Cardiovascular disease (N = 444)  index date 一年內沒有 HbA1c 的糖尿病患者 (N = 5163) |  |
| 3 | 排除：  index date 前有發生Cerebrovascular disease (N = 232)  index date 後一年內發生 Cerebrovascular disease (N = 444)  index date 一年內沒有 HbA1c 的糖尿病患者 (N = 5163) |  |
| 4 | 排除：  index date 前有發生Peripheral vascular disease  index date 後一年內發生Peripheral vascular disease  index date 一年內沒有 HbA1c 的糖尿病患者 (N = 5163) |  |
| 5 | 排除：  index date 前有發生Nephropathy (N = 232)  index date 後一年內發生 Nephropathy (N = 444)  index date 一年內沒有 HbA1c 的糖尿病患者 (N = 5163) |  |
| 6 | 排除：  index date 前有發生Diabetic neuropathy(N = 232)  index date 後一年內發生 Diabetic neuropathy(N = 444)  index date 一年內沒有 HbA1c 的糖尿病患者 (N = 5163) |  |
| 7 | 排除：  index date 前有發生 Eye complications (N = 232)  index date 後一年內發生 Eye complications (N = 444)  index date 一年內沒有 HbA1c 的糖尿病患者 (N = 5163) |  |
| 8 | 排除：  index date 前有發生 Cardiovascular disease (N = 232)  index date 後一年內發生 Cardiovascular disease (N = 444)  index date 一年內沒有 ALBUMIN的糖尿病患者 (N = 5163) |  |
| 9 | 排除：  index date 前有發生Cerebrovascular disease (N = 232)  index date 後一年內發生 Cerebrovascular disease (N = 444)  index date 一年內沒有 ALBUMIN的糖尿病患者 (N = 5163) |  |
| 10 | 排除：  index date 前有發生Peripheral vascular disease  index date 後一年內發生Peripheral vascular disease  index date 一年內沒有 ALBUMIN的糖尿病患者 (N = 5163) |  |
| 11 | 排除：  index date 前有發生Nephropathy (N = 232)  index date 後一年內發生 Nephropathy (N = 444)  index date 一年內沒有 ALBUMIN的糖尿病患者 (N = 5163) |  |
| 12 | 排除：  index date 前有發生Diabetic neuropathy(N = 232)  index date 後一年內發生 Diabetic neuropathy(N = 444)  index date 一年內沒有 ALBUMIN的糖尿病患者 (N = 5163) |  |

排除：

index date 前有發生Diabetic neuropathy(N = 232)

index date 後一年內發生 Diabetic neuropathy(N = 444)

index date 一年內沒有 ALBUMIN的糖尿病患者 (N = 5163)

lab 處理方式

**Table4: 糖尿病患者各併發症情況: (IR)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Outcome test** | **# of event** | **sum of follow up** | **N** |
| **PeripheralVascDisease\_HbA1c** | **10** | **2522218** | **1129** |
| **EyeComp\_HbA1c** | **71** | **2206525** | **1052** |
| **DiabeticNeuro\_HbA1c** | **76** | **2220496** | **1035** |
| **Nephropathy\_HbA1c** | **131** | **2174790** | **1033** |
| **CerebroDisease\_HbA1c** | **142** | **2145730** | **965** |
| **CardioDisease\_HbA1c** | **260** | **1481514** | **791** |
| **PeripheralVascDisease\_ALBUMIN** | **4** | **338207** | **173** |
| **DiabeticNeuro\_ALBUMIN** | **8** | **313118** | **161** |
| **EyeComp\_ALBUMIN** | **9** | **271929** | **151** |
| **CerebroDisease\_ALBUMIN** | **22** | **285877** | **150** |
| **CardioDisease\_ALBUMIN** | **36** | **147782** | **93** |
| **Nephropathy\_ALBUMIN** | **16** | **57896** | **43** |

分析結果 :

1. 固定變數:

SEX\_TYPE, Index year, AGE\_GROUP、baseline、相關control disease

2. P-value: \*: p < 0.05, \*\*: p < 0.01, \*\*\*: p < 0.001

Table5: Cox model 分析結果

Outcome: Eye complications、Test item: HbA1c

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Models | Variables | HR | 95%CI | P-value |
| Model1: Baseline | Baseline |  |  |  |
| Model2: Baseline + SD | Baseline |  |  |  |
|  | SD |  |  |  |
| Model3: Baseline + CV | Baseline |  |  |  |
|  | CV |  |  |  |
| Model4: Baseline + RMS | Baseline |  |  |  |
|  | RMS |  |  |  |

Table6: Cox model 分析結果

Outcome: Eye complications、Test item: ALBUMIN

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Models | Variables | HR | 95%CI | P-value |
| Model1: Baseline | Baseline |  |  |  |
| Model2: Baseline + SD | Baseline |  |  |  |
|  | SD |  |  |  |
| Model3: Baseline + CV | Baseline |  |  |  |
|  | CV |  |  |  |
| Model4: Baseline + RMS | Baseline |  |  |  |
|  | RMS |  |  |  |

Table7: Cox model 分析結果

Outcome: Cardiovascular disease、Test item: HbA1c

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Models | Variables | HR | 95%CI | P-value |
| Model1: Baseline | Baseline |  |  |  |
| Model2: Baseline + SD | Baseline |  |  |  |
|  | SD |  |  |  |
| Model3: Baseline + CV | Baseline |  |  |  |
|  | CV |  |  |  |
| Model4: Baseline + RMS | Baseline |  |  |  |
|  | RMS |  |  |  |

Table8: Cox model 分析結果

Outcome: Cardiovascular disease、Test item: ALBUMIN

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Models | Variables | HR | 95%CI | P-value |
| Model1: Baseline | Baseline |  |  |  |
| Model2: Baseline + SD | Baseline |  |  |  |
|  | SD |  |  |  |
| Model3: Baseline + CV | Baseline |  |  |  |
|  | CV |  |  |  |
| Model4: Baseline + RMS | Baseline |  |  |  |
|  | RMS |  |  |  |

Table9: Cox model 分析結果

Outcome: Cerebrovascular disease、Test item: HbA1c

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Models | Variables | HR | 95%CI | P-value |
| Model1: Baseline | Baseline |  |  |  |
| Model2: Baseline + SD | Baseline |  |  |  |
|  | SD |  |  |  |
| Model3: Baseline + CV | Baseline |  |  |  |
|  | CV |  |  |  |
| Model4: Baseline + RMS | Baseline |  |  |  |
|  | RMS |  |  |  |

Table10: Cox model 分析結果

Outcome: Cerebrovascular disease、Test item: ALBUMIN

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Models | Variables | HR | 95%CI | P-value |
| Model1: Baseline | Baseline |  |  |  |
| Model2: Baseline + SD | Baseline |  |  |  |
|  | SD |  |  |  |
| Model3: Baseline + CV | Baseline |  |  |  |
|  | CV |  |  |  |
| Model4: Baseline + RMS | Baseline |  |  |  |
|  | RMS |  |  |  |

Table11: Cox model 分析結果

Outcome: Peripheral vascular disease、Test item: HbA1c

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Models | Variables | HR | 95%CI | P-value |
| Model1: Baseline | Baseline |  |  |  |
| Model2: Baseline + SD | Baseline |  |  |  |
|  | SD |  |  |  |
| Model3: Baseline + CV | Baseline |  |  |  |
|  | CV |  |  |  |
| Model4: Baseline + RMS | Baseline |  |  |  |
|  | RMS |  |  |  |

Table12: Cox model 分析結果

Outcome: Peripheral vascular disease、Test item: ALBUMIN

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Models | Variables | HR | 95%CI | P-value |
| Model1: Baseline | Baseline |  |  |  |
| Model2: Baseline + SD | Baseline |  |  |  |
|  | SD |  |  |  |
| Model3: Baseline + CV | Baseline |  |  |  |
|  | CV |  |  |  |
| Model4: Baseline + RMS | Baseline |  |  |  |
|  | RMS |  |  |  |

Table13: Cox model 分析結果

Outcome: Nephropathy、Test item: HbA1c

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Models | Variables | HR | 95%CI | P-value |
| Model1: Baseline | Baseline |  |  |  |
| Model2: Baseline + SD | Baseline |  |  |  |
|  | SD |  |  |  |
| Model3: Baseline + CV | Baseline |  |  |  |
|  | CV |  |  |  |
| Model4: Baseline + RMS | Baseline |  |  |  |
|  | RMS |  |  |  |

Table14: Cox model 分析結果

Outcome: Nephropathy、Test item: ALBUMIN

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Models | Variables | HR | 95%CI | P-value |
| Model1: Baseline | Baseline |  |  |  |
| Model2: Baseline + SD | Baseline |  |  |  |
|  | SD |  |  |  |
| Model3: Baseline + CV | Baseline |  |  |  |
|  | CV |  |  |  |
| Model4: Baseline + RMS | Baseline |  |  |  |
|  | RMS |  |  |  |

Table15: Cox model 分析結果

Outcome: Diabetic neuropathy、Test item: HbA1c

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Models | Variables | HR | 95%CI | P-value |
| Model1: Baseline | Baseline |  |  |  |
| Model2: Baseline + SD | Baseline |  |  |  |
|  | SD |  |  |  |
| Model3: Baseline + CV | Baseline |  |  |  |
|  | CV |  |  |  |
| Model4: Baseline + RMS | Baseline |  |  |  |
|  | RMS |  |  |  |

Table16: Cox model 分析結果

Outcome: Diabetic neuropathy、Test item: ALBUMIN

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Models | Variables | HR | 95%CI | P-value |
| Model1: Baseline | Baseline |  |  |  |
| Model2: Baseline + SD | Baseline |  |  |  |
|  | SD |  |  |  |
| Model3: Baseline + CV | Baseline |  |  |  |
|  | CV |  |  |  |
| Model4: Baseline + RMS | Baseline |  |  |  |
|  | RMS |  |  |  |

結論:

ALBUMIN、Nephropathy的組合是可以後續進行探討

目標變異程度大風險上升HR>1、顯著

才可以說考慮這個生理數值

**架構:**

**研究目的:**

**參考論文**:

**資料描述:**

**資料來源、資料區間**

**目標疾病、相關併發症**

**Exclude1、Control disease**

**LAB 的定義**

**流程圖:**

**Step1: 三院 lab清理**

**資料摘要1(資料分布問題)**

**Step2: 併發症及目標病患篩選**

**資料摘要2 (資料分布問題)**

**分析結果**

**結論:**

**預期: 變異程度越高 => 越不穩定 => 理論上要增加併發症的風險(HR > 1)**

**TODO:**

**算IR:**

看其他test\_item的狀況

看中風是否有相關併發症、和做哪些檢驗