[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)對應糖尿病患者的各項併發症關係

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

**資料區間** : 2008-2019

**目標病患** : 糖尿病併發症患者(一年內 2次門診 或 1 次住院)

Index Date定義: 發病日

ICD CODE:

ICD9: 250, 251.8, 357.2, 362.01, 362.02, 366.41, 583.81

ICD10: E08, E09, E10, E11, E12

Outcom: 糖尿病引起的相關併發症:

|  |  |  |
| --- | --- | --- |
| 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  ICD10: H33.0, H33.10, H33.11, H33.19, H33.2, H33.3, H33.4, H33.8, E11.31, E11.32, E11.33, E11.34, E11.351, E11.359, H35.03, H35.38, H42, H54.0, H54.1, H54.2, H54.3, H54.8, H54.4, H54.5, H54.6, H54.7 | 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  ICD10: I11, I20.0, I20.8, I20.9, I25.2, I25.9, I42, I43, I50.1, I50.2, I50.3, I50.4, I50.9 |
| Cerebrovascular disease  CerebroDisease | ICD9: 435.9、434.91、432.9、437.1  ICD10: I62.9, I63.50, I63.511, I63.512, I63.519, I63.521, I63.522, I63.529, I63.531, I63.532, I63.539, I63.541, I63.542, I63.549, I63.59, I63.8, I63.9, I67.84, I67.81, I67.82, I67.89, G45.9 |
| Peripheral vascular disease  PeripheralVascDisease | ICD9: 440.2  ICD10: I70.2, I70.92, I75.01, I75.02 |
| Nephropathy  Nephropathy | ICD9: 583、585、V451  ICD10:  E10.21, E11.21, N05.0, N05.1, N05.2, N05.3, N05.4, N05.5, N05.6, N05.7, N05.8, N05.9, N06.0, N06.1, N06.2, N06.3, N06.4, N06.5, N06.6, N06.7  N06.8, N06.9, N07.0, N07.1, N07.2, N07.3, N07.4, N07.5, N07.6, N07.7, N07.8, N07.9, N14, N15.0, N15.8, N15.9, N16, N17.1, N17.2, N18.4  N18.5, N18.6, N18.9 |
| Diabetic neuropathy  DiabeticNeuro | ICD9: 357.2、337.1、353  ICD10: E08.42, E09.42, E10.40, E10.42, E11.40, E11.42, E13.42, G54, G55, G99.0 |

**Exclude (TODO)**

1. 性別、年齡不詳 ( N = ) drop unknown id == 1
2. Age < 20 or Age > 100 ( N = )
3. index date 前有 outcom及後一年內發生 ( N = ) outcome follow up date > 365 or < 0
4. 前一年是否有下列疾病:

|  |  |  |
| --- | --- | --- |
| 疾病名稱 / 簡寫 | ICD CODE | 操作定義 |
| Essential hypertension  Hypertension | ICD9: 401  ICD10: I10 | 一年內 2次門診 或 1 次住院 |
| Peripheral enthesopathies and allied syndromes  PeripheralEnthe | ICD9: 726  ICD10: M25.70, M25.71, M25.72, M25.73, M25.74, M25.75, M25.76, M25.77, M66.21, M66.81, M70.1, M70.2, M70.3, M70.4, M70.5, M70.6, M70.7, M75.0, M75.10, M75.11, M75.2, M75.3, M75.4, M75.5, M75.8, M75.9, M76, M77, |
| Other ill-defined and unknown causes of morbidity and mortality  UnknownCauses | ICD9: 799  ICD10: R09.0, R09.2, R41.89, R44.8, R44.9, R45.0, R45.3, R45.4, R45.87, R45.89, R46, R53.81, R64, R68.13, R68.19, R68.82, R68.89, R69 |
| Disorders of lipoid metabolism  LipoidMetabDis | ICD9: 272  ICD10: E71.30, E75.21, E75.22, E75.24, E75.3, E75.5, E75.6, E77, E78.0, E78.1, E78.2, E78.3, E78.4, E78.5, E78.5, E78.6, E78.70, E78.79, E78.8, E78.9, E88.1, E88.2, E88.89 |
| Acute upper respiratory infections of multiple or unspecified sites  AcuteURI | ICD9: 465  ICD10: J06 |
| Other symptoms involving abdomen and pelvis  AbdPelvicSymptoms | ICD9: 724、789  ICD10: M43.2, M43.8X9  M48.00, M48.04, M48.05, M48.06, M48.07, M48.08, M51.1, M53.2X7, M53.2X8, M53.3, M53.80, M53.84, M53.85, M53.86, M53.87, M53.88, M53.9, M54.03, M54.04, M54.05, M54.06, M54.07, M54.08, M54.09, M54.14, M54.15, M54.16, M54.17, M54.3, M54.4, M54.5, M54.6, M54.89, M54.9, M62.830, M99.22, M99.23, M99.24, M99.25, M99.26, M99.27, M99.28, M99.29, M99.32, M99.33, M99.34, M99.35, M99.36, M99.37, M99.38, M99.39, M99.42, M99.43, M99.44, M99.45, M99.46, M99.47, M99.48, M99.49, M99.52, M99.53, M99.54, M99.55, M99.56, M99.57, M99.58, M99.59, M99.62, M99.63, M99.64, M99.65, M99.66, M99.67, M99.68, M99.69, M99.72, M99.73, M99.74, M99.75, M99.76, M99.77, M99.78, M99.79, R10, R16, R18.8, R19.0, R19.3, R19.8 |
| Dermatophytosis  Dermatophytosis | ICD9: 110  ICD9: B35 |
| General symptoms  GenSymptoms | ICD9: 780  ICD10: E03.5, F51.8, G40.909, G47.0, G47.1, G47.20, G47.3, G47.5, G47.61, G47.69, G47.8, G47.9, G93.3, L74.51, L74.52, R40.0, R40.1, R40.20, R40.211, R40.212, R40.221, R40.222, R40.231, R40.232, R40.234, R40.3, R40.4, R41.0, R41.1, R41.2  R41.3, R41.82, R41.89, R41.9, R42, R44.0, R44.2, R44.3, R45.83, R45.84, R50.2, R50.81, R50.9, R52, R53.0, R53.1, R53.8, R55, R56, R61, R68.0, R68.11, R68.12, R68.81, R68.83, R68.89 |
| Symptoms involving respiratory system and other chest symptoms  RespChestSymptoms  Done | ICD9: 786  ICD10: R04.2, R04.8, R04.9, R05, R06.00, R06.01, R06.02, R06.09, R06.1, R06.2  R06.3, R06.3, R06.4, R06.6, R06.8, R06.9, R07.1, R07.2, R07.8, R07.9, R09.3, R09.89, R22.2, R91.8 |
| Symptoms involving head and neck  HeadNeckSymptoms | ICD9: 784  ICD10: G44.05, G44.09, G44.1, G44.3, G44.4, G44.52, G44.53, G44.59, G44.81, G44.82, G44.83, G44.84, G44.85, G44.89, R04.0, R04.1  R06.5, R06.7, R07.0, R19.6  R22.0, R22.1, R47.0, R47.1, R47.81, R47.89, R47.9, R48.0, R48.1, R48.2, R48.8, R48.9, R49, R51, R90.0 |
| Contact dermatitis and other eczema  ContactDermEczema | ICD9: 692  ICD10: L23, L24.0, L24.1, L24.2, L24.3, L24.4, L24.5, L24.6, L24.7, L24.8, L24.9, L25, L30.0, L30.2, L30.8, L30.9, L55, L56, L57.1, L57.5, L57.8, L57.9, L58, L59 |
| Viral infection in conditions classified elsewhere and of unspecified site  ViralInfection | ICD9: 79  ICD10: B34.9, E07.81, E79.0, I45.81, N39.0, O28, P09  R03, R09.0, R09.2, R19.5  R29.2, R41.81, R41.89, R44.8  R44.9, R45.0, R45.3, R45.4  R45.87, R45.89, R46,  R53.81, R54, R64, R68.13, R68.19, R68.82, R68.89  R69, R70, R71, R73.01, R73.02, R73.09, R73.9, R74, R75, R76, R77, R78, R79.0, R79.1, R79.81, R79.82, R79.89, R79.9, R80.0, R80.1, R80.3, R80.8, R80.9, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90.8, R91.8, R92.0, R92.1, R92.2, R92.8, R93, R94, R97, R99 |
| Overweight, obesity and other hyperalimentation  ObesityHyperal | ICD9: 278  ICD10: E65, E66.0, E66.1, E66.2, E66.8, E66.9, E67, E68 |
| Other and unspecified disorders of joint  JointDisorders | ICD9: 719  ICD10: M12.2, M12.3, M12.4, M25.0, M25.1, M25.4, M25.50, M25.51, M25.52, M25.53, M25.55, M25.56, M25.57, M25.60, M25.61, M25.62, M25.63, M25.64, M25.65, M25.66, M25.67, M25.8, M25.9, M79.643, M79.646, R26.2, R29.4, R29.898 |
| Acute bronchitis and bronchiolitis  AcuteBronchitis | ICD9: 466  ICD10: J20.8, J20.9, J21 |
| Other disorders of soft tissues  SoftTissueDis | ICD9: 729  ICD10: G47.62, M35.6  M54.10, M54.18, M60.8  M60.9, M70.8, M70.9, M72.9, M79, R25.2, R29.898 |
| Nonspecific findings on examination of blood  BloodExamFindings | ICD9: 790  ICD10: B34.9, E07.81, E79.0  R70, R71, R73.01, R73.02, R73.09, R73.9, R74, R77, R78, R79.0, R79.1, R79.81, R79.82, R79.89, R79.9, R97.2 |
| Disorders of refraction and accommodation  RefractionDis | ICD9: 367  ICD10: H52 |
| Disorders of conjunctiva  ConjunctivaDis | ICD9: 372  ICD10: H10.0, H10.1, H10.2, H10.3, H10.4, H10.5, H10.81, H10.89, H10.9, H11 |

**Table 1. 目標患者基本資料欄位分布**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| test\_item | outcome | n | Variable | HR | CI | p\_value |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

**Table 1. 目標患者基本資料欄位分布**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **無TBI**  **(n=14717793)** | **輕症**  **(n=1740331)** |  | **重症**  **(n=308103)** | **p.value** | **overall**  **(n=16766227)** |
| **ID\_S** |  |  |  |  |  | **<0.001** |  |
|  | **男** | **7435965(50.52%)** | **935759(53.77%)** |  | **186342(60.48%)** |  | **8558066(51.04%)** |
|  | **女** | **7281828(49.48%)** | **804572(46.23%)** |  | **121761(39.52%)** |  | **8208161(48.96%)** |
| **AGE** |  |  |  |  |  |  |  |
|  | **Mean(sd)** | **45.28(17.92)** | **45.27(20.04)** |  | **49.4(20.79)** | **<0.001** | **45.36(18.21)** |
|  | **Median(IQR)** | **43(26)** | **43(33)** |  | **49(36)** | **<0.001** | **43(26)** |
|  | **(Min,Max)** | **(18,100)** | **(18,100)** |  | **(18,100)** |  | **(18,100)** |
| **age\_group** |  |  |  |  |  | **<0.001** |  |
|  | **18 - 30** | **3537051(24.03%)** | **541301(31.1%)** |  | **77629(25.2%)** |  | **4155981(24.79%)** |
|  | **31 - 40** | **3039341(20.65%)** | **265114(15.23%)** |  | **38613(12.53%)** |  | **3343068(19.94%)** |
|  | **41 - 50** | **2935448(19.94%)** | **259134(14.89%)** |  | **44185(14.34%)** |  | **3238767(19.32%)** |
|  | **51 - 60** | **2293695(15.58%)** | **244549(14.05%)** |  | **45457(14.75%)** |  | **2583701(15.41%)** |
|  | **61 - 70** | **1377123(9.36%)** | **189796(10.91%)** |  | **41660(13.52%)** |  | **1608579(9.59%)** |
|  | **71 以上** | **1535135(10.43%)** | **240437(13.82%)** |  | **60559(19.66%)** |  | **1836131(10.95%)** |
| **Income** |  |  |  |  |  | **<0.001** |  |
|  | **0** | **283887(1.93%)** | **131(0.01%)** |  | **31(0.01%)** |  | **284049(1.69%)** |
|  | **0-20,000** | **9236547(62.76%)** | **1206747(69.34%)** |  | **231026(74.98%)** |  | **10674320(63.67%)** |
|  | **20,000-40,000** | **3540463(24.06%)** | **379635(21.81%)** |  | **55872(18.13%)** |  | **3975970(23.71%)** |
|  | **40,000 以上** | **1656896(11.26%)** | **153818(8.84%)** |  | **21174(6.87%)** |  | **1831888(10.93%)** |
| **Index Year** |  |  |  |  |  | **<0.001** |  |
|  | **2001** | **848132(5.76%)** | **122491(7.04%)** |  | **29219(9.48%)** |  | **999842(5.96%)** |
|  | **2002** | **816974(5.55%)** | **116223(6.68%)** |  | **26572(8.62%)** |  | **959769(5.72%)** |
|  | **2003** | **796784(5.41%)** | **108727(6.25%)** |  | **24989(8.11%)** |  | **930500(5.55%)** |
|  | **2004** | **784222(5.33%)** | **98678(5.67%)** |  | **21444(6.96%)** |  | **904344(5.39%)** |
|  | **2005** | **773596(5.26%)** | **87212(5.01%)** |  | **18126(5.88%)** |  | **878934(5.24%)** |
|  | **2006** | **772043(5.25%)** | **76566(4.4%)** |  | **16657(5.41%)** |  | **865266(5.16%)** |
|  | **2007** | **767420(5.21%)** | **70886(4.07%)** |  | **14994(4.87%)** |  | **853300(5.09%)** |
|  | **2008** | **770918(5.24%)** | **66444(3.82%)** |  | **14960(4.86%)** |  | **852322(5.08%)** |
|  | **2009** | **770041(5.23%)** | **65676(3.77%)** |  | **14207(4.61%)** |  | **849924(5.07%)** |
|  | **2010** | **769603(5.23%)** | **65223(3.75%)** |  | **14199(4.61%)** |  | **849025(5.06%)** |
|  | **2011** | **770023(5.23%)** | **65507(3.76%)** |  | **13442(4.36%)** |  | **848972(5.06%)** |
|  | **2012** | **775054(5.27%)** | **63187(3.63%)** |  | **12211(3.96%)** |  | **850452(5.07%)** |
|  | **2013** | **774312(5.26%)** | **58597(3.37%)** |  | **11711(3.8%)** |  | **844620(5.04%)** |
|  | **2014** | **777630(5.28%)** | **57593(3.31%)** |  | **11331(3.68%)** |  | **846554(5.05%)** |
|  | **2015** | **779468(5.3%)** | **55129(3.17%)** |  | **11302(3.67%)** |  | **845899(5.05%)** |
|  | **2016** | **785794(5.34%)** | **168897(9.7%)** |  | **14342(4.65%)** |  | **969033(5.78%)** |
|  | **2017** | **791555(5.38%)** | **149780(8.61%)** |  | **14064(4.56%)** |  | **955399(5.7%)** |
|  | **2018** | **793230(5.39%)** | **142740(8.2%)** |  | **14248(4.62%)** |  | **950218(5.67%)** |
|  | **2019** | **600994(4.08%)** | **100775(5.79%)** |  | **10085(3.27%)** |  | **711854(4.25%)** |
| **Hypertension** |  |  |  |  |  | **<0.001** |  |
|  | **0** | **13039370(88.6%)** | **1455611(83.64%)** |  | **246067(79.87%)** |  | **14741048(87.92%)** |
|  | **1** | **1678423(11.4%)** | **284720(16.36%)** |  | **62036(20.13%)** |  | **2025179(12.08%)** |
| **Diabetes**  **Mellitus** |  |  |  |  |  | **<0.001** |  |
|  | **0** | **13897039(94.42%)** | **1590676(91.4%)** |  | **274181(88.99%)** |  | **15761896(94.01%)** |
|  | **1** | **820754(5.58%)** | **149655(8.6%)** |  | **33922(11.01%)** |  | **1004331(5.99%)** |
| **Asthma** |  |  |  |  |  | **<0.001** |  |
|  | **0** | **14486999(98.43%)** | **1695691(97.43%)** |  | **300114(97.41%)** |  | **16482804(98.31%)** |
|  | **1** | **230794(1.57%)** | **44640(2.57%)** |  | **7989(2.59%)** |  | **283423(1.69%)** |
| **peptic ulcer** |  |  |  |  |  | **<0.001** |  |
|  | **0** | **14241333(96.76%)** | **1660486(95.41%)** |  | **290031(94.13%)** |  | **16191850(96.57%)** |
|  | **1** | **476460(3.24%)** | **79845(4.59%)** |  | **18072(5.87%)** |  | **574377(3.43%)** |
| **Gastroesophagealreflux\_disease** |  |  |  |  |  | **<0.001** |  |
|  | **0** | **14495700(98.49%)** | **1698687(97.61%)** |  | **302917(98.32%)** |  | **16497304(98.4%)** |
|  | **1** | **222093(1.51%)** | **41644(2.39%)** |  | **5186(1.68%)** |  | **268923(1.6%)** |
| **alcohol use** |  |  |  |  |  | **<0.001** |  |
|  | **0** | **14134086(96.03%)** | **1646144(94.59%)** |  | **287868(93.43%)** |  | **16068098(95.84%)** |
|  | **1** | **583707(3.97%)** | **94187(5.41%)** |  | **20235(6.57%)** |  | **698129(4.16%)** |