

**Atlas of Healthcare Variation:**

**Methodology | Diabetes**

February 2021

**General points**

* Data is not presented where the number of people was less than 10. This is to preserve confidentiality.
* People were assigned to their district health board (DHB) of domicile; where more than one domicile was recorded, the most recent value was selected.
* Ethnicity data presented is prioritised ethnic group (Māori, Pacific peoples, Asian and European/other). For people reporting multiple ethnic groups, the most recent value was selected.

**Exclusions**

People who died during the year were excluded from analysis.

**Data source**

Virtual Diabetes Registry, Ministry of Health (see [Appendix 1](#app1) for methodology).

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| **Standard deviation** |
| Data is presented as standard deviation from the mean.Standard deviation is a statistical measure of variation from a mean. Assuming that recorded instances are normally distributed (ie, they are in the usual ‘bell-shaped curve’), 68 percent of all recorded instances would be expected to be within one standard deviation either side of the mean and 95 percent within two standard deviations. The two ‘middle’ shades will be within one standard deviation of the mean. |

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| **Confidence intervals** |
| Data for each DHB is presented as a percentage. Upper and lower confidence intervals were calculated to 95 percent level of confidence. |

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| **Indicator #1:** | Prevalence of diabetes by DHB as per the Virtual Diabetes Register (VDR), percent |
| Numerator | VDR population identified as having diabetes (see [Appendix 1](#app1)) |
| Denominator | Statistics New Zealand estimated resident population (2019 update)  |
| Data source | Ministry of Health |

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| **Indicator #2:** | People with diabetes aged 25 and over regularly receiving metformin in a year, percent |
| Numerator | People with diabetes dispensed metformin in three or four quarters in a year |
| Denominator | VDR population identified as having diabetes (see [Appendix 1](#app1)) |
| Data source | Ministry of Health – Pharmaceutical Collection |
| Medicines | 1794 Metformin hydrochloride |

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| **Indicator #3:** | People with diabetes regularly receiving insulin in a year, percent |
| Numerator | People with diabetes dispensed insulin in three or four quarters in a year |
| Denominator | VDR population identified as having diabetes (see [Appendix 1](#app1)) |
| Data source | Ministry of Health – Pharmaceutical Collection |
| Medicines | 1192 Insulin lispro, 1648 Insulin neutral, 1649 Insulin isophane, 1655 Insulin zinc suspension, 3783 Insulin aspart, 3857 Insulin glargine, 3882 Insulin lispro with insulin lispro protamine, 3908 Insulin glulisine, 3982 Insulin aspart with insulin aspart protamine, 6300 Insulin isophane with insulin neutral |

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| **Indicator #4:** | People with diabetes aged 25 and over regularly receiving either metformin or insulin in a year, percent |
| Numerator | People with diabetes dispensed either metformin or insulin in three or four quarters in a year |
| Denominator | VDR population identified as having diabetes (see [Appendix 1](#app1)) |
| Data source | Ministry of Health – Pharmaceutical Collection |
| Medicines | Metformin: 1794 Metformin hydrochloride |
| Comments | Insulin: 1192 Insulin lispro, 1648 Insulin neutral, 1649 Insulin isophane, 1655 Insulin zinc suspension, 3783 Insulin aspart, 3857 Insulin glargine, 3882 Insulin lispro with insulin lispro protamine, 3908 Insulin glulisine, 3982 Insulin aspart with insulin aspart protamine, 6300 Insulin isophane with insulin neutral |

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| **Indicator #5:** | People with diabetes regularly receiving an ACEI or ARB in a year, percent |
| Numerator | People with diabetes receiving an ACE inhibitor or ARB in three or four quarters in a year |
| Denominator | VDR population identified as having diabetes (see [Appendix 1](#app1)) |
| Data source | Ministry of Health – Pharmaceutical Collection |
| Medicines | ACEI: 2794 benazepril, 2841 captopril, 2770 cilazapril, 2711 enalapril maleate, 2797 lisinopril, 2806 perindopril, 2772 quinapril, 1031 trandolapril  |

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| **Indicator #6:** | People with diabetes admitted one or more times to hospital with diabetic ketoacidosis, percent  |
| Numerator | People with diabetes admitted to hospital with diabetic ketoacidosis |
| Denominator | VDR population identified as having diabetes (see [Appendix 1](#app1)) |
| Data source | Ministry of Health – National Minimum Dataset |
| Comments | This indicator shows the count of people admitted one or more times in a year with a primary diagnosis of diabetic ketoacidosis |

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| **Indicator #7:** | People with diabetes admitted to hospital with hypoglycaemia, percent |
| Numerator | People with diabetes admitted to hospital with hypoglycaemia |
| Denominator | VDR population identified as having diabetes (see [Appendix 1](#app1)) |
| Data source | Ministry of Health – National Minimum Dataset |
| Comments | This indicator shows the count of people admitted one or more times in a year with a primary diagnosis of hypoglycaemia |

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| **Indicator #8:** | People with diabetes having a lower-limb amputation, percent |
| Numerator | People with diabetes recorded as having a lower-limb amputation |
| Denominator | VDR population identified as having diabetes (see [Appendix 1](#app1)) |
| Data source | Ministry of Health – National Minimum Dataset |
| Comments | This definition was drawn from the Ministry of Health definition |
| Exclude cancer and trauma amputations These codes are listed in ICD-10-AM-VI | Trauma

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| **Clinical code** | **Clinical code description** |
| S78 | Traumatic amputation of hip and thigh |
| S88 | Traumatic amputation of lower leg |
| S98 | Traumatic amputation of ankle and foot |
| T05.3 | Traumatic amputation of both feet |
| T05.4 | Traumatic amputation of one foot and other leg [any level, except foot] |
| T05.5 | Traumatic amputation of both legs [any levels] |
| T05.6 | Traumatic amputation of upper and lower limbs, any combination [any level] |
| T13.6 | Traumatic amputation of lower limb, level unspecified |

Primary lower-limb cancer

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| **Clinical code** | **Clinical code description** |
| C40.2 | Malignant neoplasm of long bones of lower limb |
| C40.3 | Malignant neoplasm of short bones of lower limb |
| C43.7 | Malignant melanoma of lower limb, including hip |
| C49.2 | Malignant neoplasm of connective and soft tissue of lower limb, including hip |

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| **Indicator #9:** | Proportion of medical-surgical bed-days for people with diabetes compared to those without diabetes, percent |
| Numerator | Number of bed-days occupied by people with diabetes, medical and surgical discharges  |
| Denominator | Total number of occupied bed-days for medical and surgical admissions  |
| Data source | Ministry of Health – National Minimum Dataset |
| Exclusions | Non-casemix events were excluded using the PU = EXCLU filter. This removes events that are funded differently or not funded, for example, error DRGs, non-treated patients (boarders or cancelled operations), mental health events, disability and some health of older people events such as rest home or respite care events |
| Comments | Health speciality code of D, M and S.Note when interpreting this indicator:* admissions in people with diabetes for any reason are included. Some admissions may be completely unrelated to their diabetes
* this indicator is dependent on several factors, the underlying prevalence of diabetes, and the frequency of medical-surgical bed-day use of people with diabetes compared with the general population by different age groups.

This effect of age could be addressed by age standardisation. In the Atlas, it is possible to stratify by age, so the effect on bed occupancy can be examined. |

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| **Indicator #10:** | People with diabetes having regular HbA1c monitoring, percent  |
| Numerator | People with diabetes recorded as having one or more HbA1c tests in a year |
| Denominator | VDR population identified as having diabetes (see [Appendix 1](#app1)) |
| Data source | Ministry of Health – Laboratory Collection |
| Code | BG2 – glycosylated haemoglobin, plasma HbA1c test |

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| **Indicator #11:** | People with diabetes having regular screening for renal disease (ACR), percent |
| Numerator | People with diabetes recorded as having one or more ACR tests in a year  |
| Denominator | VDR population identified as having diabetes (see [Appendix 1](#app1)) |
| Data source | Ministry of Health – Laboratory Collection |
| Code | BP8 – microalbumin, early morning urine |

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| **Indicator #12:** | People with diabetes having regular monitoring for renal disease (eGFR), percent  |
| Numerator | People with diabetes recorded as having one or more eGFR tests in a year |
| Denominator | VDR population identified as having diabetes (see [Appendix 1](#app1)) |
| Data source | Ministry of Health – Laboratory Collection |
| Code | BR1 - serum creatinine  |

**Appendix 1: Virtual Diabetes Registry December 2017 method – detail**

Detail of the VDR methodology has been included for your information. The VDR counts individuals who had the following.

1. Publicly funded hospital discharges from 2008 to 2017 with any of the following diagnosis codes (ICD-10-AM version 3)

E10 ‒ Type 1 diabetes mellitus

E11 ‒ Type 2 diabetes mellitus

E12 ‒ Malnutrition-related diabetes mellitus

E13 ‒ Other specified diabetes mellitus

E14 ‒ Unspecified diabetes mellitus

O240 ‒ Pre-existing diabetes mellitus, type 1, in pregnancy

O241 ‒ Pre-existing diabetes mellitus, type 2, in pregnancy

O242 ‒ Pre-existing diabetes mellitus, other specified type, in pregnancy

O243 ‒ Pre-existing diabetes mellitus, unspecified, in pregnancy

Note: Admissions with a code for gestational diabetes are not included.

2. Diabetes ‘education and management’ (purchase unit code of M20006) or diabetes retinal (fundus) screening (purchase unit code of M20007) within the outpatient collection (NNPAC) from 2015 to 2017.

3. Publicly funded pharmaceuticals dispensed within the community on two or more occasions between 2016 and 2017. Pharmaceuticals with the following chemical IDs are included:

1192 Insulin lispro

1247 Acarbose

1567 Glibenclamide

1568 Gliclazide

1569 Glipizide

1570 Glucagon hydrochloride

1648 Insulin neutral

1649 Insulin isophane

1655 Insulin zinc suspension

1794 Metformin hydrochloride

2276 Tolazamide

2277 Tolbutamide

3739 Rosiglitazone

3783 Insulin aspart

3800 Pioglitazone

3857 Insulin glargine

3882 Insulin lispro with insulin lispro protamine

3908 Insulin glulisine

3982 Insulin aspart with insulin aspart protamine

6300 Insulin isophane with insulin neutral

Note: metformin is also used to treat polycystic ovary syndrome in women aged 12‒45 years. Women within this age group, dispensed metformin, have not been included within the VDR. Likewise insulin is also used to treat gestational diabetes and therefore women dispensed insulin around the time of birth have not been included.

6. Four or more HbA1c lab tests (lab test code BG2) and two or more urinary albumin:creatinine ratio (ACR) tests (lab test code BG2 and BP8, respectively) between 2015 and 2017.

Note: to prevent unintentional inclusion of people with gestational diabetes, women with lab tests around the time of birth have not been included.

For more information or if you would like the updated VDR data please email data-enquiries@moh.govt.nz.