Case study: Harnessing data for local quality improvement in diabetes

About this case study

This case study describes a project run by Te Awakairangi Health Network (TeAHN) to use local data relating to diabetes to:

- identify practice variation
- explore the local drivers contributing to variation
- support quality improvement.

Data from the Commission's Atlas of Healthcare Variation gave TeAHN a starting point for conducting local analysis, with an equity focus, and considering system-level factors that contribute to observed variation.

About TeAHN

TeAHN is the primary health organisation (PHO) in the Hutt Valley. It plans, funds and provides primary health care services to its enrolled population of 117,200, which covers around 80 percent of the enrolled population for Hutt Valley District Health Board (DHB). TeAHN includes 23 general practices operating from 25 clinic sites.

Process for choosing and analysing diabetes data

The diagram below shows the process TeAHN undertook to select diabetes as a topic for analysis, analyse data and engage with providers.
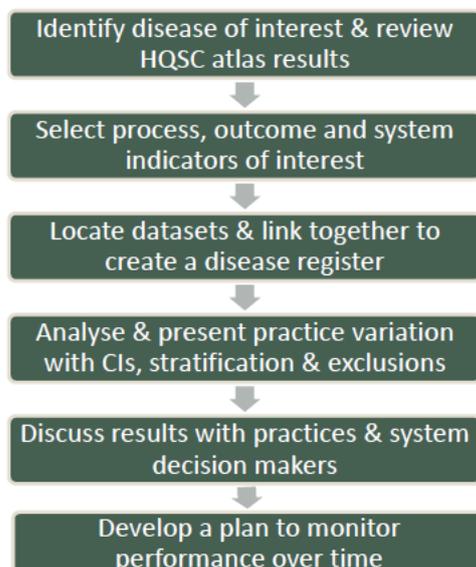
TeAHN chose diabetes as a focus topic because it is a common long-term condition. Also, the Atlas findings showed Hutt Valley DHB as having high rates of lower limb amputation among its diabetic population. This suggests the potential for quality improvement through macrovascular disease prevention.

About diabetes

Diabetes affects an estimated 242,000 people in New Zealand. A further 500,000 are believed to have pre-diabetes (HbA1c 41–49 mmol/mol). If the current trend continues, the number of people with diabetes in New Zealand is expected to double in the next 20 years.

HbA1c is a blood measurement that gives an indication of a person's average blood glucose levels (their 'glycaemic control') over the previous 2–3 months. It is useful for monitoring diabetes because evidence indicates good glycaemic control has a clear benefit on microvascular outcomes and, if started early enough, on long-term macrovascular outcomes.[1] If a person with diabetes cannot to control their HbA1c level with dietary and lifestyle modifications, drug therapy is recommended. Medication for diabetes includes metformin and insulin.

What the Atlas shows

The Atlas presents data by DHB across the spectrum of diabetes care, from identification (prevalence) and pharmaceutical management through to hospital admissions for complications. Measures include:

- diabetes prevalence
- people with diabetes aged 25 and over regularly receiving metformin
- people with diabetes regularly receiving insulin
- people with diabetes aged 25 and over regularly receiving either metformin or insulin
- people with diabetes aged 25 and over regularly receiving either ACEI[2] or ARB[3]
- people with diabetes admitted due to diabetic ketoacidosis
- people with diabetes admitted due to hypoglycaemia
- people with diabetes having a lower limb amputation
- proportion of medical and surgical bed-days occupied by people with diabetes
- people with diabetes who received regular HbA1c monitoring
- people with diabetes who received regular screening for renal disease (ACR[4])
- people with diabetes who received regular monitoring for renal disease (eGFR[5]).

Pharmaceutical indicators include medication for glycaemic control and to manage blood pressure and renal disease.

Finally, quality of care indicators include admissions for poorly controlled diabetes, lower limb amputations and bed-days in people with diabetes.

Atlas results for Hutt Valley DHB

The lower limb amputation rate was generally low across New Zealand and statistically significant differences were limited. However, Hutt Valley DHB appeared in the group of DHBs with higher rates of amputations, and its rate was higher in two of the three years presented.

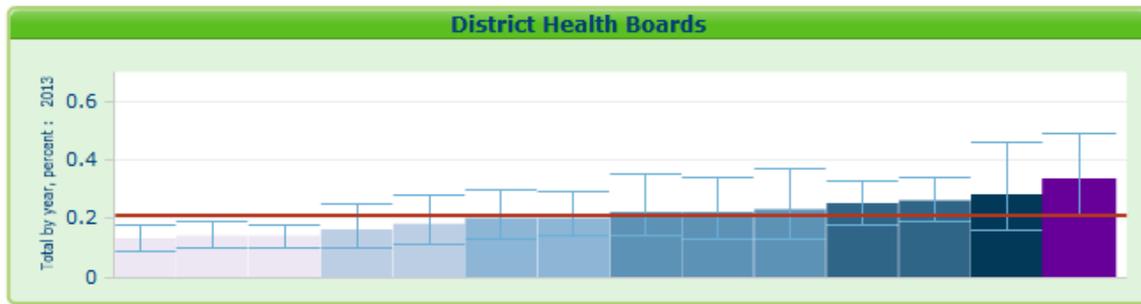[1] www.health.govt.nz/publication/new-zealand-primary-care-handbook-2012
[2] Angiotensin-converting-enzyme inhibitor
[3] Angiotensin receptor blockers
[4] Albumin:creatinine ratio
[5] Estimated glomerular filtration rate

Figure 1: Percentage of lower limb amputations in people with diabetes by DHB, 2013

Note: Hutt Valley DHB is shown in purple. The red line represents the mean for New Zealand.

Figure 2: Percentage of people with diabetes receiving a lower limb amputation by year, 2011–13
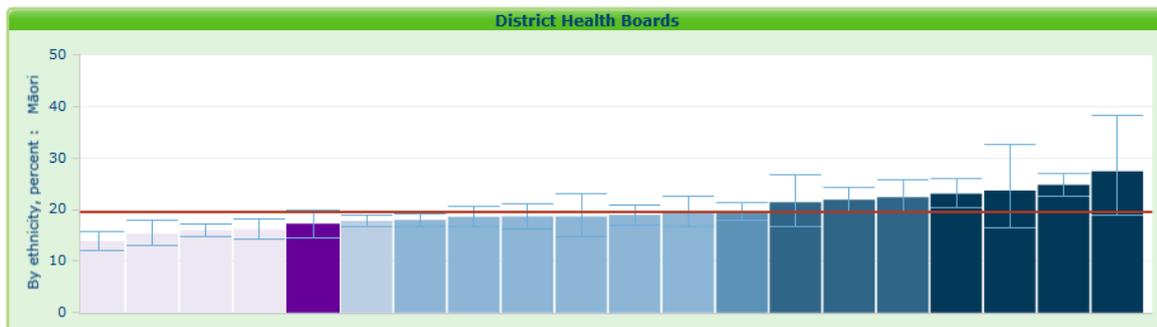

Note: Hutt Valley DHB is shown in orange. The red line represents the average for New Zealand.

Insulin is increasingly being used earlier to maintain good glycaemic control in people with type 2 diabetes.

The proportion of people with diabetes regularly receiving insulin by ethnicity was explored. Regular use was defined as insulin dispensed in three or four quarters in a year. Hutt Valley DHB's rate of regular insulin use was around the national mean for Māori, but the rate was significantly lower for Pacific peoples. In contrast, the rate was above the national mean for those of European or other ethnicities.

Figure 3: Percentage of regular insulin use in Māori with diabetes by DHB, 2013
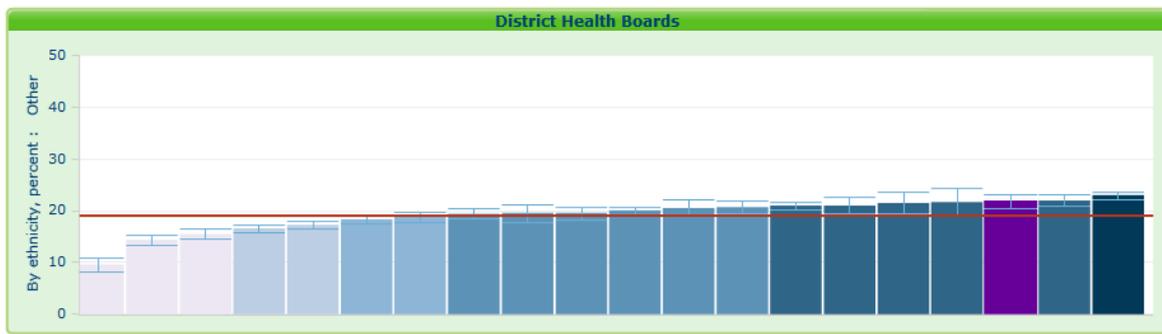

Note: Hutt Valley DHB is shown in purple. The red line represents the mean for New Zealand.

Figure 4: Percentage of regular insulin use in Pacific peoples with diabetes by DHB, 2013
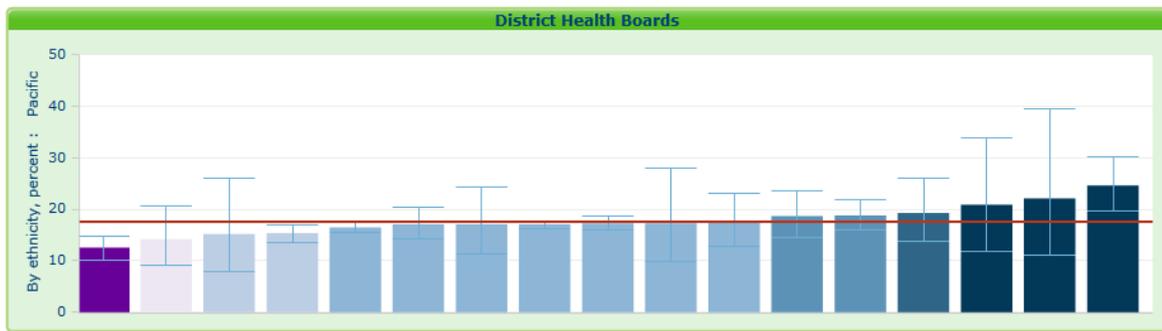
Note: Hutt Valley DHB is shown in purple. The red line represents the mean for New Zealand.

Figure 5: Percentage of regular insulin use in people of European/Other ethnicities by DHB, 2013

Note: Hutt Valley DHB is shown in purple. The red line represents the mean for New Zealand.

Atlas data is from the national data collections held by the Ministry of Health. For medicines the data is for medicines dispensed in community pharmacies. Medicines that are prescribed but not dispensed are not included.

Local data

TeAHN recently installed software into practices that improves identification and analysis of people with diabetes by National Health Index (NHI). This primary care data was linked via NHI with the following data sets:

- PHO register for patient demographics
- The Pharmaceutical Collection for dispensing (eg, virtual diabetes register (VDR))
- Hospital admissions (National Minimum Dataset) and emergency department presentations (National Non-Admitted Patients Collection)
- Primary care funding (eg, CarePlus), nurse/doctor ratios, etc.

The Ministry of Health's VDR data for TeAHN's enrolled population was available by NHI through the DHB. It was used to calculate the proportion of people with diabetes on insulin. The data was approximately one year out of date but the pattern of prescribing was very similar to the Best Practice Advocacy Centre New Zealand (bpac[NZ]) prescribing reports sent to GPs every year.

Analysis

Given the impact of glycaemic control on long-term macrovascular outcomes, the first question considered was whether or not there was variation in HbA1c control between practice populations. Figure 6 shows the proportion of each practice's population with diabetes whose HbA1c levels were ≤64 mmol/mol. The black line is the mean for all TeAHN practices.

Figure 6: HbA1c control, 30 November 2014
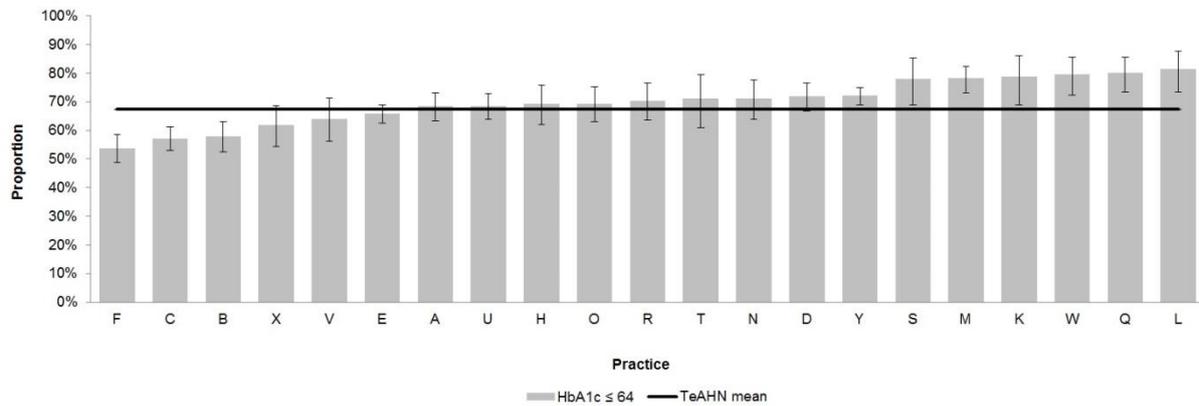
The regular use of insulin by each practice's total and Pacific peoples population with diabetes was explored. The wide confidence intervals overlapping the mean line shows that only three of the practices had statistically lower rates of insulin use compared with the TeAHN mean

Figure 7: Proportion of people with diabetes who had 3+ insulin dispensed, January 2011 to December 2013
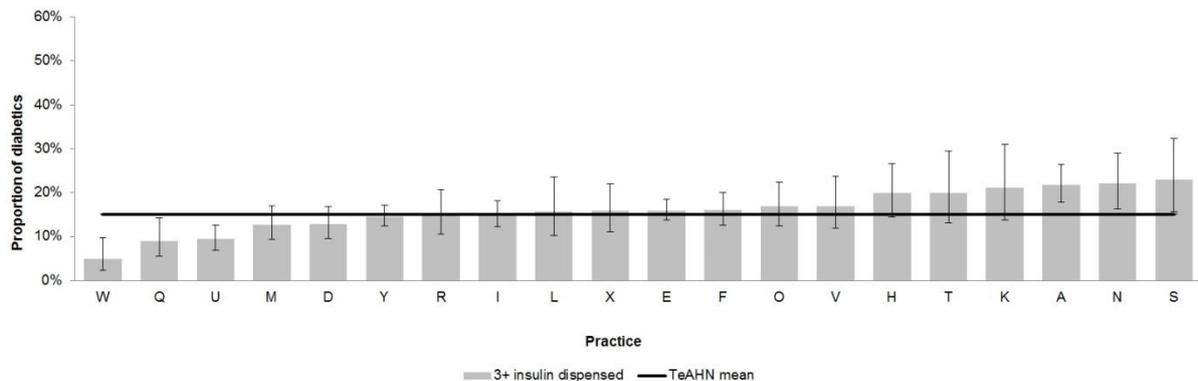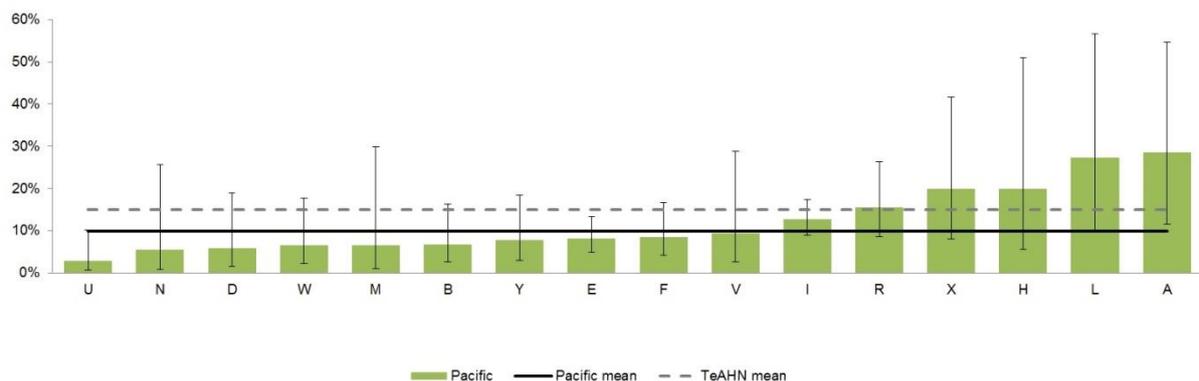

Figure 8: Proportion of Pacific peoples with diabetes who had 3+ insulin dispensed, January 2011 to December 2013

As the summary table below shows, Pacific peoples with diabetes were less likely to have good glycaemic control (HbA1c ≤64 mmol/mol) and were also less likely to receive regular insulin treatment.

Figure 10: Hospital admissions and use of preventers by ethnicity, TeAHN enrolled

TeAHN enrolled	Pacific	Maori	Other
Good control	56%	59%	72%
Insulin treatment	10%	14%	16%
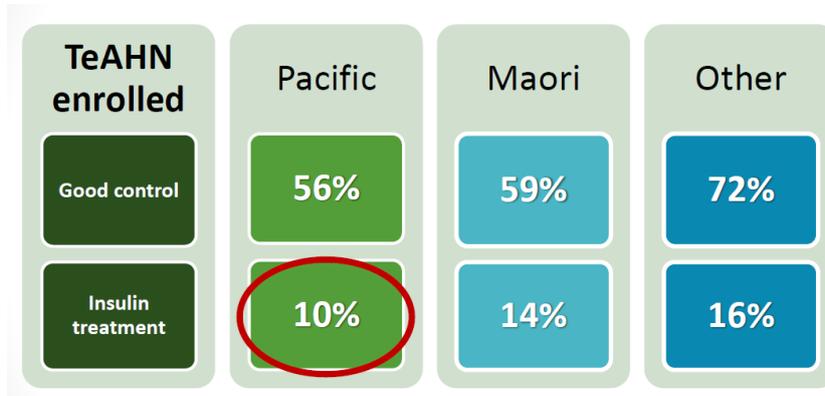
Actions

The results of the analyses were discussed with selected practices. Each practice was given its results in a practice report. The TeAHN team (often comprising a public health registrar/clinical facilitator/pharmacist/team leader) explored the results with practice teams: were they as expected; was there any room for improvement? Practices were receptive, keen to see their results and interested in what could be done.

The practice visits led to discussions about improvements in long-term condition management. For example:

- self-management groups were planned to be more relevant to Pacific peoples
- practices tried new systems to improve opportunistic heart checks, such as an appointment scanner
- indicators were used to select patients for a pharmacist medication review initiative.

The results were also shared with TeAHN staff in lunchtime seminars, the clinical governance group at TeAHN and the Hutt INC Alliance group of primary and secondary clinicians to inform diabetes service development.

Specialist diabetes nurses found the TeAHN report helpful in planning how to target their services. After seeing the report, the Alliance group wanted to explore indicators from other domains of service development in the same way. Practices used the diabetes indicators as the starting point for ongoing monitoring and long-term condition management plans.

The following framework for action helped practices and the wider system decide what actions to take in response to the observed variation, including system and practice level improvements:
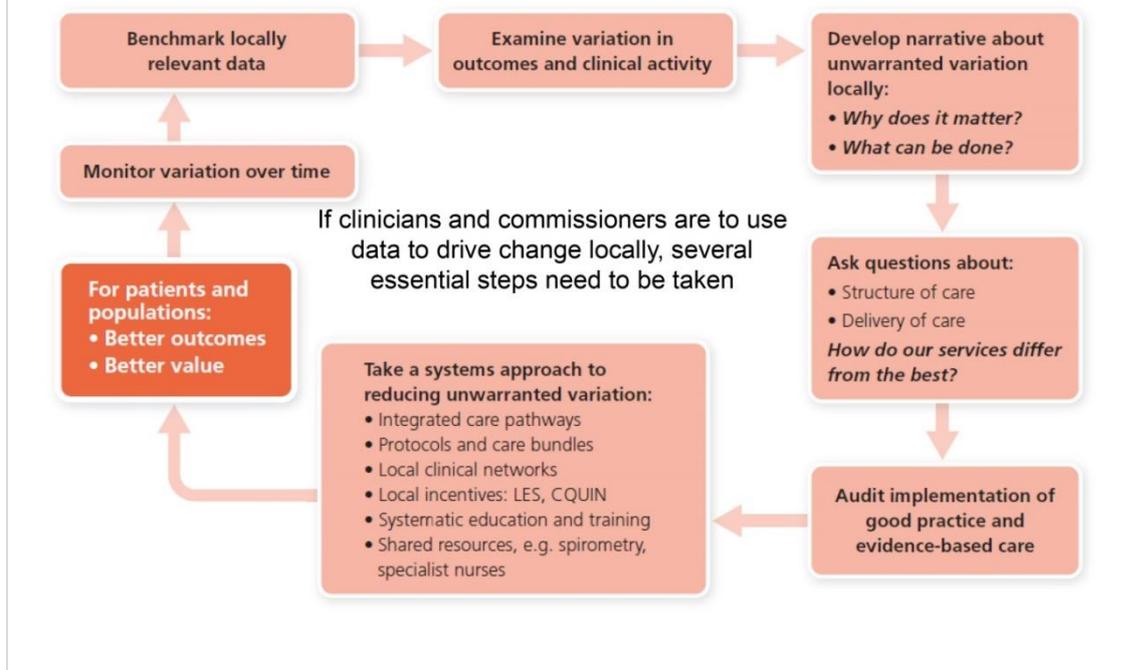
Source: NHS Rightcare. See: www.slideshare.net/fullscreen/rightcare/nhs-atlas-of-variation-for-people-with-respiratory-disease/23

Summary

TeAHN recognises the importance of providing systematic analyses to its practices and providers.

Analyses can inform long-term condition practice plans, in quarterly reporting cycles.

Within TeAHN, the engagement of the following people was vital for success of the project:

- an organisational lead
- analytical capacity
- clinical involvement.

Acknowledgement