Our Picture of Health

Tama tū, tama ora
Tama noho, tama mate

"Those who choose to take action will be well"

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Foreword

The ProCare vision is 'that every New Zealander has the right to live well'.

To achieve this vision, we first have to understand the health needs of our population, which is why we have, for the first time, conducted a comprehensive health needs analysis - Our Picture of Health.

We developed Our Picture of Health because as a PHO, responsible for the health of our enrolled population, we first had to understand the key challenges we face, and where the gaps lie, so that we may set the future direction of our PHO.

With the data articulating the needs of our population, we now have the information to form the basis of a population health strategy, with a focus on improving equity. This strategy will in turn drive future investment in funded programmes and service delivery that meets the needs identified in Our Picture of Health.

It is about focus where it is needed most, rather than increasing workloads, to ensure we are doing the right things to reduce inequity and improve the health of our population.

With this in mind, we know it is important we continue to innovate to meet the changing needs of our population today and into the future. Our commitment is to work closely with you, to ensure your voice and experience in providing care to your patients is heard and informs the further development of policy, strategies and new programmes that aim to serve our population.

There are still many gaps in our knowledge as much of what is important and matters to people is not measured or easy to measure. While acknowledging this, we have identified things that we can do as health practitioners that would make a difference to the health of the population in terms of wellbeing, morbidity and mortality. The report though, starkly reveals that we need to do better to close the gap in outcomes for Māori and Pacific people in particular.

We recognise that clinical care is just one aspect of achieving positive health and wellbeing and respect the fundamental role that people play in managing their own health, whilst also acknowledging the life long relationship that some people have with their general practice and our role as patient advocates. Working in partnership with organisations, agencies and our communities to impact the social determinants of health will be important as we work to redress the inequities.

We would like to acknowledge Associate Professor Sue Wells, for her dedication and commitment in creating the report, along with our own data and analytics team.

We hope that your practice will benefit from the information in Our Picture of Health. That identification of sub populations in the report, will help you focus your own activities towards meeting the specific needs of your enrolled patients.

Tevita Funaki
CHAIRMAN
PROCARE NETWORKS LIMITED

Dr Harley Aish
CHAIRMAN
PROCARE HEALTH LTD

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Executive summary

ProCare is a large primary health organisation (PHO) serving over 170 practices and more than 800,000 enrolled patients. The purpose of this report is to take a population health approach by providing a systematic assessment of ProCare's enrolled population health needs. Traditionally District Health Boards (DHBs) have conducted health needs analyses (HNAs) for their respective populations in order to prioritise service funding and planning. However, to our knowledge this is the first comprehensive HNA undertaken by a PHO whose enrolled patients span three regional DHB catchments.

We have extracted data from a series of clinical and administrative datasets and conducted simple descriptive analyses stratified by population group (eg, patient domicile, practice location, age, gender, prioritised ethnicity, socioeconomic deprivation) depending on the clinical question. The report covers ProCare's enrolled population as at 1 January 2017 and describes:

- sociodemographic characteristics
- practice sizes by GP and nurse full time equivalents (FTE)
- access and utilisation of general practices
- preventive care measures
- risk factors for long term conditions
- the burden of established long term conditions
- medical management according to evidence-based best practice
- the ability for patients to engage with their health and health care providers via patient portals
- patient experience measures
- use of secondary care services (emergency department visits, total and ambulatory sensitive hospitalisations) and;
- population risk modelling; identifying populations at highest risk of a hospital admission in the next six months.

Key findings

Demography, practice and access

As at 1 January 2017, ProCare had 824,735 enrolled patients, making up 51% of Auckland region's population and 17% of New Zealand's population.

ProCare is responsible for the largest Māori (89,912) and Pacific (109,239) communities of any PHO in New Zealand and the largest high needs population in New Zealand (263,173). It is also responsible for the largest Asian population of any PHO (176,469).

Overall 22% of ProCare's enrolled population are less than 15 years old and 5% are 75+ years old.

The majority of ProCare's Māori (61%) and Pacific (75%) peoples live in the most socioeconomically deprived areas of Auckland.

Small practices (fewer than four FTE GPs) make up 79% of ProCare practices and care for 56% of the total enrolled population.

ProCare has on average one GP FTE per 1,694 patients (0.59 FTE /1000 patients). This is a slightly higher enrolled patient ratio than the New Zealand average of one GP FTE per 1,650 patients (0.61/1000 patients).

Variation in ProCare's nursing workforce is marked with small practices having an average 0.37 FTE vs 0.95 FTE in large practices.

In 2016 more than 2.4 million GP and nurse consultations were recorded – a conservative estimate as nursing visits are unreliably recorded. Overall 80.5% of the enrolled ProCare population were seen in the previous two years (19.5% had not visited in two years).

ProCare patients saw their GP on average 2.9 times per year. People classified as being 'high needs' (Māori, Pacific and those residing in New Zealand Deprivation Index Quintile 5 [NZDep Q5], the most deprived areas in the Auckland region) saw their GP 3.0 times per year. This group comprises 29% of the population and utilises 30% of GP visits. This pattern raises issues relating to equity of access given observed health need.

By visit frequency:

- 50% of patients had between zero and three GP visits/year
- 75% of patients had fewer than eight GP visits/year
- 5% had 18 or more visits/year.

Thirty-four percent of high needs population (Māori, Pacific and NZDep Q5) were not enrolled in very low cost access (VLCA) practices.

Preventive care, risk factors and long term conditions

Overall 93% and 92% had completed 8 month and 2 year immunisations respectively. Three percent of eligible children had one or more immunisations recorded as declined by their caregivers; the highest rate of declining for Māori children (5%).

Only 57% of patients over 15 years had a recorded Body Mass Index (BMI). Of these, only about one third were within a healthy weight range. The majority of Pacific (78%) and Māori (51%) people were recorded as obese or morbidly obese.

ProCare has a lower smoking prevalence (9%) than that reported for New Zealand overall (17%) suggesting that data quality issues may be present or reporting bias. Reported smoking prevalence is one in five Māori, one in eight Pacific and one in 15 European and Others.

Most (92%) of ProCare's eligible population have had a cardiovascular (CVD) risk assessment in the last five years. The biggest gap in CVD risk assessment was for younger Māori, Pacific and Indian men aged 35-44 years. This is 73%, 81% and 83% respectively.

About half of people at a very high five-year CVD risk (≥ 20%) were receiving recommended dual therapy (blood pressure lowering and lipid lowering medications).

Large Read coding gaps were found for long term conditions compared to national prevalence estimates for ischaemic stroke, peripheral vascular disease, haemorrhagic stroke, heart failure, renal failure, cancers, COPD and mental health but not for ischaemic heart disease, gout and asthma.

Fifty-five percent of people classified as having a prior CVD event were receiving recommended triple therapy (blood pressure lowering, lipid lowering medications and antiplatelet or anticoagulant medication).

As at 1 January 2017 ProCare had more than 45,000 patients with diabetes; a prevalence of 6% - similar to national and regional estimates. For these people:

- The prevalence was highest among Pacific (14%) and Indian (13%) people
- 78% of Māori and Pacific people with diabetes were obese or morbidly obese compared to 47% European/Other, 33% Indian and 12% Chinese
- About 70% had adequate blood pressure control
- Across average measurements for HbA1c, eGFR and ACR including overt diabetic nephropathy (ACR≥30) Māori and Pacific patients recorded the least favourable clinical indicators
- If microalbuminuria or overt diabetic nephropathy were recorded as present, over a quarter of patients were not receiving ACE or ARB therapy.

Overall there were more than 10,500 patients over the age of 65 years who were on 8-10 medications and more than 4,500 on 11+ medications.

As at Quarter 2 2017, approximately 15% of ProCare patients have registered and used a patient portal.

Hospitalisations and ED visits

In 2015 and 2016, ProCare patients had more than 180,000 acute and elective hospital admissions per year with over 500,000 bed days.

The average age standardised acute admission rate is 228/1000 patients/year. Acute admission rates were highest among those practices serving higher deprivation areas although there was marked practice variation even after controlling for deprivation. Practices within the Waitemata District Health Board (WDHB) catchment had a higher overall acute admission rate. This observation was unexpected and warrants further investigation into underlying causes.

Ambulatory sensitive hospitalisation (ASH) rates were highest for patients aged 0-4 years, 65-74 years and 75+ years. Māori and Pacific patients had 50% higher ASH rates than European/Other with particularly high rates among those aged 65 years or older. Pacific children (0-4 years) had twice the ASH hospitalisation rate of their European counterparts. Across all age groups Chinese had the lowest ASH rates.

For the 0-4 age group, respiratory infections and asthma were the biggest causes for ASH admissions. Cardiovascular disease (heart and stroke), kidney disease, respiratory infections and COPD dominated ASH rates for older age groups.

On average Auckland regional emergency departments (EDs) had 165,940 attendances per year from ProCare patients of whom nearly 60% were routinely discharged from care. ED attendance was highest among patients who resided in more deprived areas. When stratified by NZ Deprivation index quintile, Māori and Pacific ED attendance was higher than that of other ethnic groups.

The Sapere population risk model for an acute admission in the next six months estimated that about 5% of ProCare's population are at high risk (greater than 1 in 10 chance of an admission in the next six months).

Conclusion

"Without data, you're just another person with an opinion." *W Edwards Deming*

This is the first such report undertaken by ProCare. It provides a baseline of key information and offers practical insights into what a picture of population health looks like from a PHO perspective, what the easy wins might be, what primary care information systems offer and where are the key gaps in information quality, evidence based provider processes, and patient outcomes. The depth and breadth of available practice and patient collated data has huge potential to support learning from data and clinical quality improvement.

This report shows that ProCare has significant challenges to address. In particular there is a need to accelerate Māori and Pacific health gain.

Enormous variation exists across all data and all strata of health indicators raising many questions regarding underlying causes. Some of the challenges presented are specific to the organisation, others are shared by healthcare organisations throughout New Zealand and internationally. These include a rapidly growing and aging patient population, significant ethnic health inequities, general practice and nurse workforce issues, medical IT advancement, and new models of primary care calling for consumer co–design. However, all this must be viewed within the understanding that health services contribute to an estimated 20% of population health, the remaining 80% coming from socioeconomic and other environmental determinants. This calls for significant sustained partnerships across other sectors and advocacy for the health of our populations.

The next step is translating 'Our Picture of Health' into "so what"? What is it telling us regarding ProCare existing plans and processes, the effectiveness of our current services, are they targeted according to population need, where are the gaps, what should be prioritised, what should we be doing differently?

These questions form the next phase of our work developing a population health strategy; a road map for change which takes a quality improvement approach together with our patients (and their families and whānau) and our practices.

Introduction

The purpose for preparing this report was to take a population health approach by providing a systematic assessment of ProCare's enrolled population health needs.

Population health means the health outcomes of defined populations – groups, families and communities – and the distribution of outcomes within populations.[1] It also means that health equity – the avoidable or remediable differences in health between population groups – is a core part of understanding population health. Failure to avoid or overcome inequities infringes on fairness and human rights.

The health of a population is influenced by a wide range of factors (see model below); what we are born with (genes and hereditary factors), what we do (lifestyle behaviours such as alcohol, smoking, diet and activity), socioeconomic factors (such as employment, education, housing), clinical care (access and quality of care and where we live (built environment, environmental quality). It has been estimated that clinical care contributes only about 20% of the influence on population health, 80% coming from all the other determinants.[2] Therefore improving population health requires many different interventions and approaches such as those advocated by the Ottawa Charter; healthy public policy, community advocacy and action, reorienting health services to meet the needs of patients and their whānau, developing personal skills and supporting each other in communities.[3]

Dalgren and Whitehead Model [Picture source: https://www.kingsfund.org.uk/]

Accelerate Māori health gain

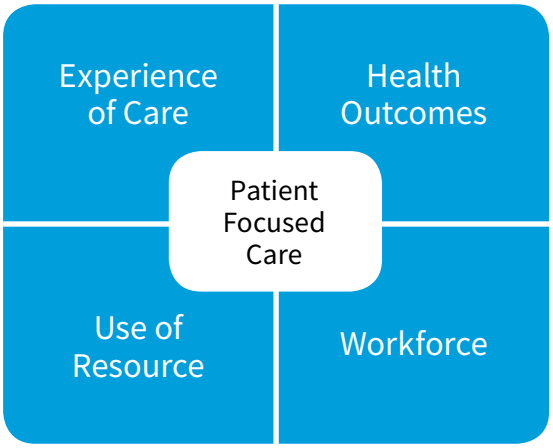
The Treaty of Waitangi is the founding document of Aotearoa New Zealand between Māori and the Crown. However, our colonial history helped to pre-determine social and economic inequities between New Zealand European and Māori resource and asset bases. New Zealand's governing structures and our underlying value systems maintained these inequities. The current state of Māori health has been directly and indirectly influenced by this positioning and has become 'normalised' into New Zealand's social constructs and organisations including its health system.

A broad population health approach has the potential to lose focus on Māori equity when it presents Māori health inequities alongside those of Pacific and other high needs people living in the most socioeconomically deprived neighbourhoods. This results in tensions regarding the splitting of the equity focus of this report and its recommendations. We have endeavoured to describe results related to Māori health equity as a priority. This report provides the basis of a more focused investigation, drilling down into key areas likely to impact on Māori health and inform ProCare's Māori Health Strategy. This is an area of ongoing work and improvement for ProCare.

Clinical quality improvement

This report offers levers for change or action – supporting the proactive application of strategies and interventions for defined cohorts of individuals within our enrolled population. The data allow us to benchmark how we are performing against the dimensions of ProCare's Quality Quadrant. It provides an evidence base for many of the performance indicators noted in the current Outcomes and Quality Framework that contribute to the national strategic priorities outlined in the System Level Measures Framework (SLMF).

ProCare Quality Quadrant



Methods

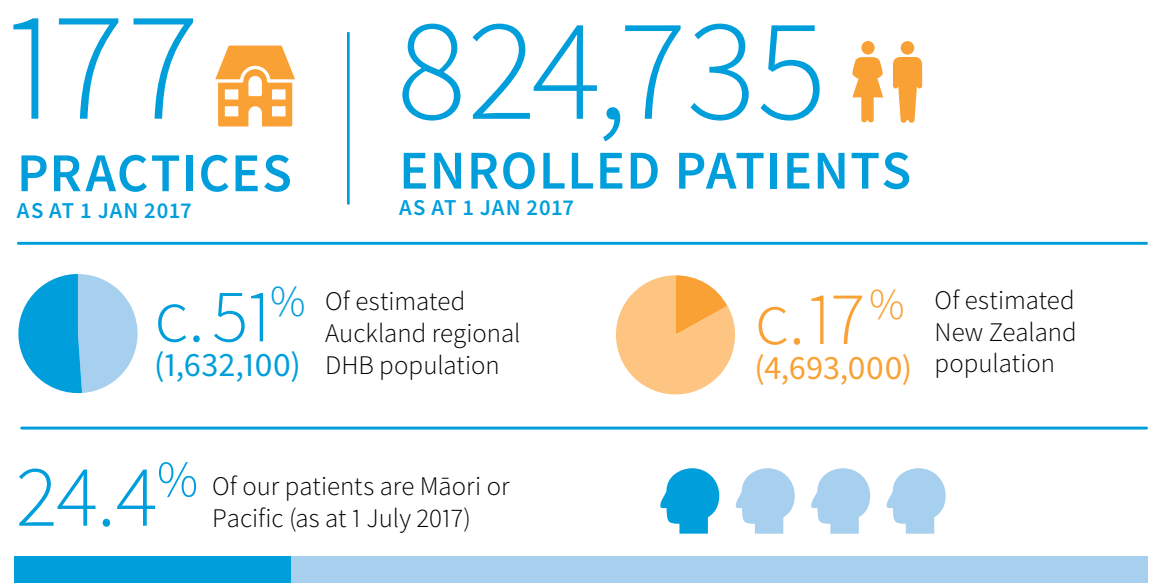
The health needs analysis aimed to describe the distributions of clinical measures and patient health outcomes of the ProCare enrolled population as at 1 January 2017 according to age, sex, ethnicity (Māori, Pacific, Indian, Chinese and European and Other ethnicity groups) and socioeconomic deprivation (New Zealand Deprivation Index quintile).

The data came from a variety of sources:

- The ProCare enrolled patient Age-Sex register/ Clinical Performance Indicators (CPI) dataset is extracted by the company Karo for national administrative and system performance reasons. This includes 177 practices and their enrolled patients (824,735). While East Tamaki Health Care functions as an independent entity, for historical reasons, the ProCare Age-Sex register also includes some East Tamaki Health Care practices within Auckland and Waitemata District Health Board Catchment. The combined Age-Sex register is used for demography purposes in the health needs analysis
- The Clinical Intelligence System (CIS) has data from 110 ProCare practices' patient management systems and includes 389,778 patients (47%)
- The DrInfo dataset includes data extracted from specific clinical queries developed by DrInfo software; 144 practices use DrInfo and includes 671,163 patients (81%)
- The Customer Relationship Management (CRM) system is a ProCare database filled in by individual practices and used to calculate GP and nursing work force full time equivalent (FTE)
- ProCare has participated in the PREDICT cohort study since its inception in 2002.[12] From this dataset over 250,000 patients have had their CVD, CVD risk and diabetes status assessed by ProCare GPs and practice nurses. Anonymised summary statistics have been provided by the University of Auckland for prevalence estimates
- The Ministry of Health National Minimum dataset (NMDS) for the years 2015 and 2016 included data for total acute and elective hospitalisations, ambulatory sensitive hospitalisations and emergency department visits
- The Patient Experience Survey aggregated data was provided by the Health Quality and Safety Commission
- Patient portal information was derived from portal vendors.

Data is displayed in tables and graphs. Limitations are noted as relevant. Pratice-level variation is displayed anonymously. As age structures and population sizes of ethnicity groups differ markedly, comparisons between groups are described by age-specific rates and where relevant, age-standardised by the direct method to the World Health Organisation population.

Domain 1: ProCare's population



New Zealand's **largest network** of primary healthcare professionals

Table 1. ProCare enrolled patients by District Health Board (DHB) of practice

	DHB of Practice		
Total ProCare enrolled pop	Auckland (ADHB)	Waitemata (WDHB)	Counties Manukau (CMDHB)
824,735	366,689 (44%)	262,644 (32%)	195,402 (24%)

By DHB of practice, 44% of enrolled ProCare patients go to practices within ADHB, 32% to practices within WDHB and 24% to practices within CMDHB catchment.

PROCARE POPULATION AS AT 1 JAN 2017

(N = 824,735)

- 11% Māori (89,912)
- 13% Pacific (109,239)
- 7.5% Indian (62,072)
- 6.5% Chinese (53,618)
- 62% European/ Other (509,894)

ProCare is responsible for the largest Māori and Pacific communities in New Zealand.

ProCare also has the largest enrolled high-needs patient population in New Zealand.

263,173

ProCare is responsible for the largest Māori (89,912) and Pacific (109,239) communities of any PHO in New Zealand. Collectively, Māori, Pacific and those residing in New Zealand Deprivation Index Quintile 5 [NZDep Q5] are defined as a 'high needs patient population'. ProCare cares for more than a quarter of a million (263,173) people who meet this definition.

ProCare practices care for significant Pacific and Asian subgroups as well as Middle Eastern, Latin American and African ethnic groups (Table 2). As at 1 January 2017, the population counts of these groups are described below. ProCare has the largest Asian population of any PHO (176,469) in New Zealand. It is possible that some Fijian Indian people may be misclassified in the enrolled population age-sex register as Fijian rather than of Indian ethnicity.

Table 2. ProCare enrolled patients within Pacific, Asian and Middle Eastern, Latin American and African (MELAA) subgroups

Pacific Subgroups	N	Asian subgroups	N	MELAA subgroups	N
Samoan	47,606	Indian	62,072	Middle Eastern	8,075
Tongan	21,335	Chinese	53,618	Latin American	2,951
Cook Islander	16,445	South East Asian	20,018	African	5,481
Fijian	11,079	Other Asian	40,761		
Niuean	6,487				
Tokelauan	607				
Other Pacific	5,680				

For this HNA, ethnic groups were prioritised in the following order; Māori, Pacific, Indian, Chinese and a combined European and Other ethnicities group (henceforth called European/Other or shortened to Euro/Other in Tables and Figures). The Other ethnicities group include Middle Eastern, Latin American and African (MELAA) subgroups and South East Asian and Other Asian.

Age groups and sex

The ProCare patient population is made up of 48% men and 52% women.

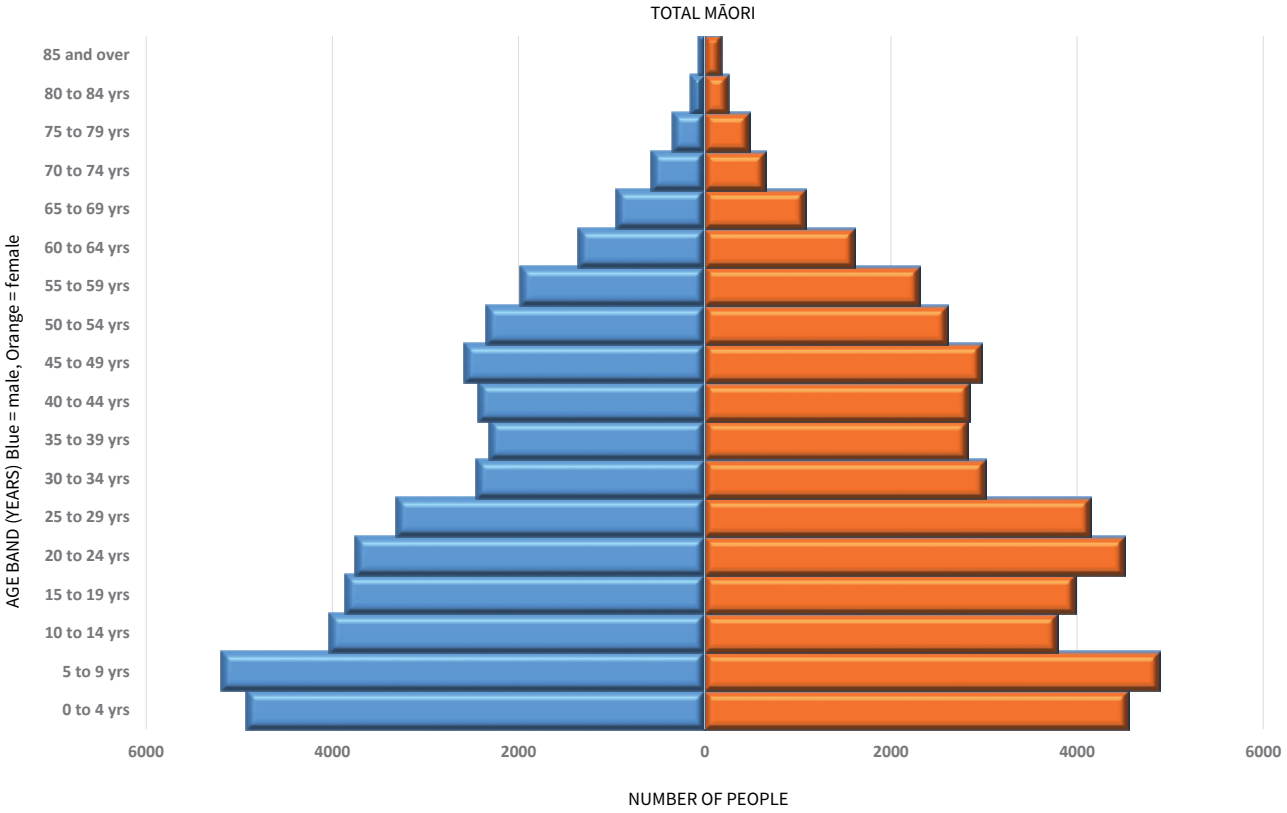
ProCare has a very similar age group pattern as the Auckland region and the total New Zealand DHB population (2013 Census).

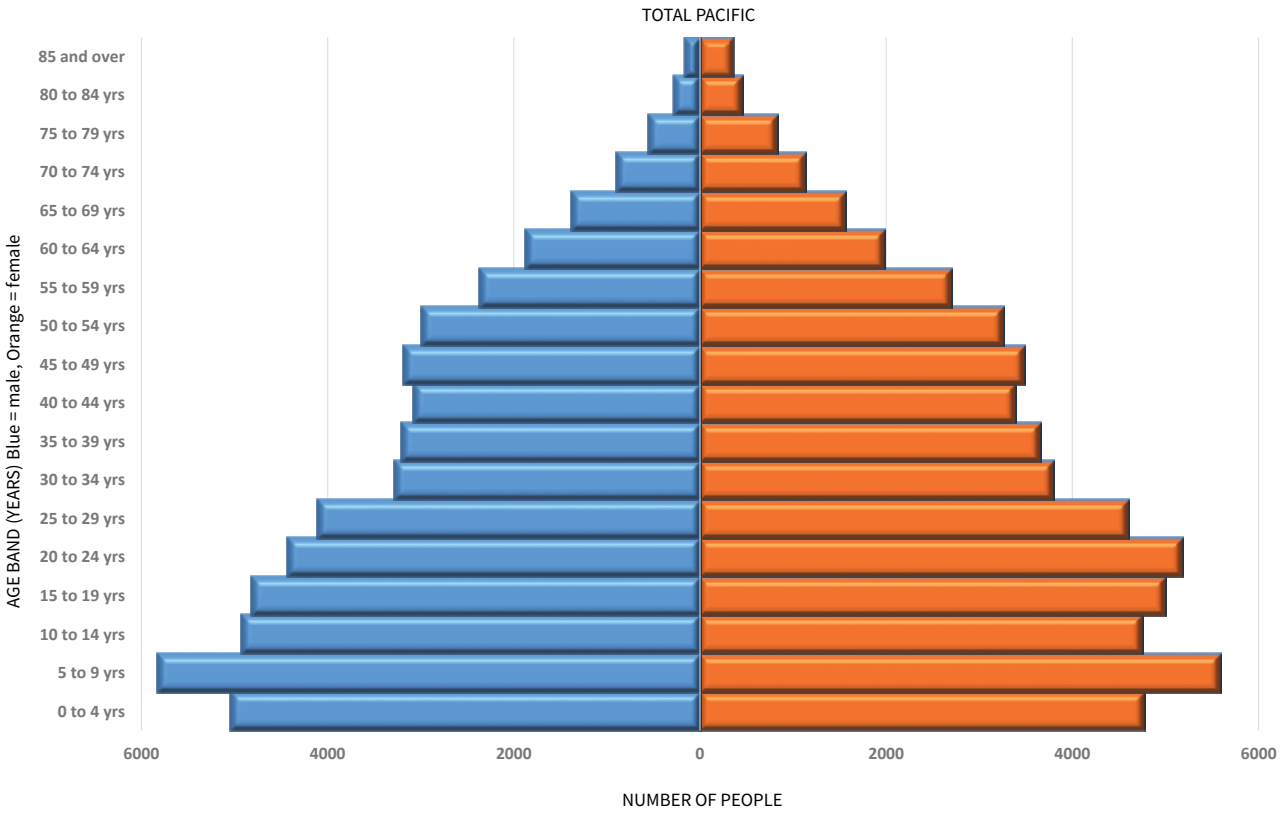
Overall 22% are less than 15 years old and 5% are 75+ years old.

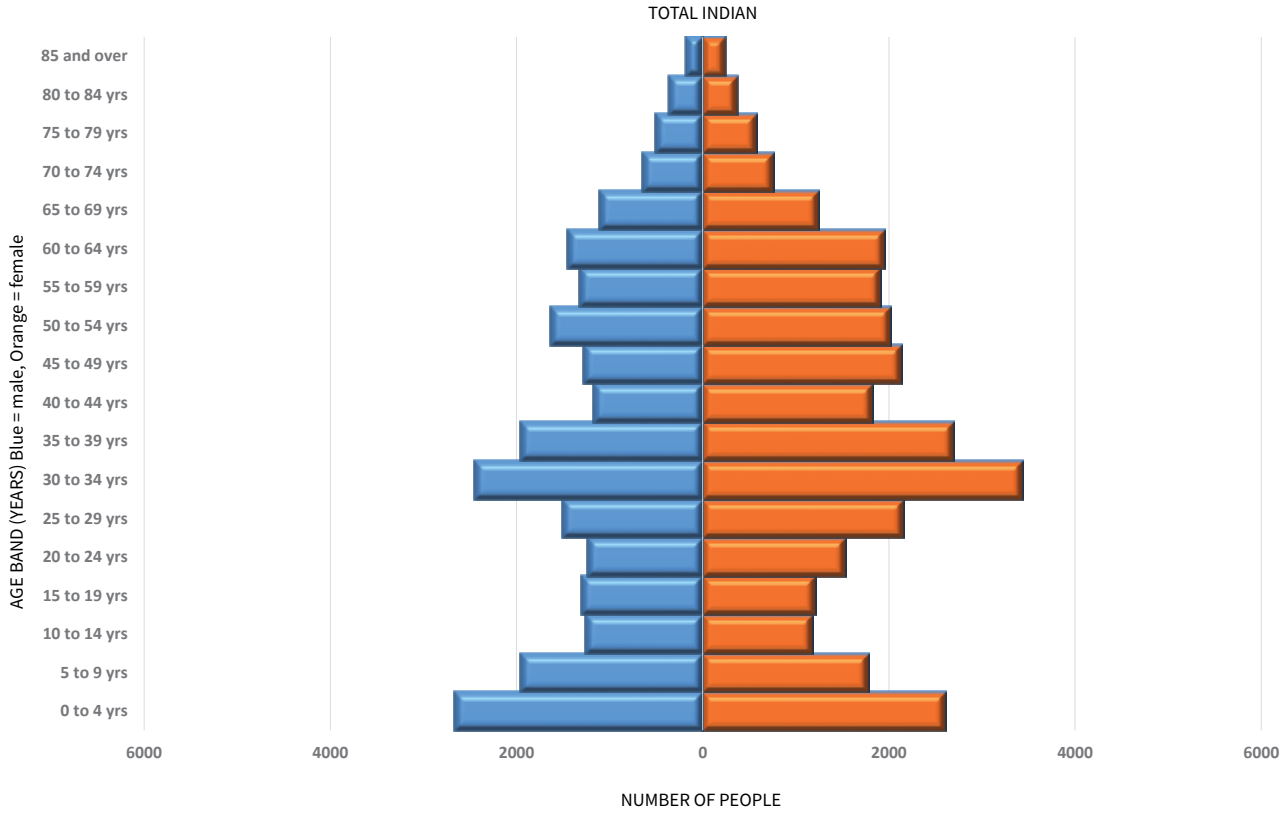
Each five year age group is approximately 7% of the total ProCare population up until the age of 60 years dropping thereafter to 5% at 60-65 years down to 1-2% over 80 years. However, the age and sex structure of ethnic groups differ markedly.

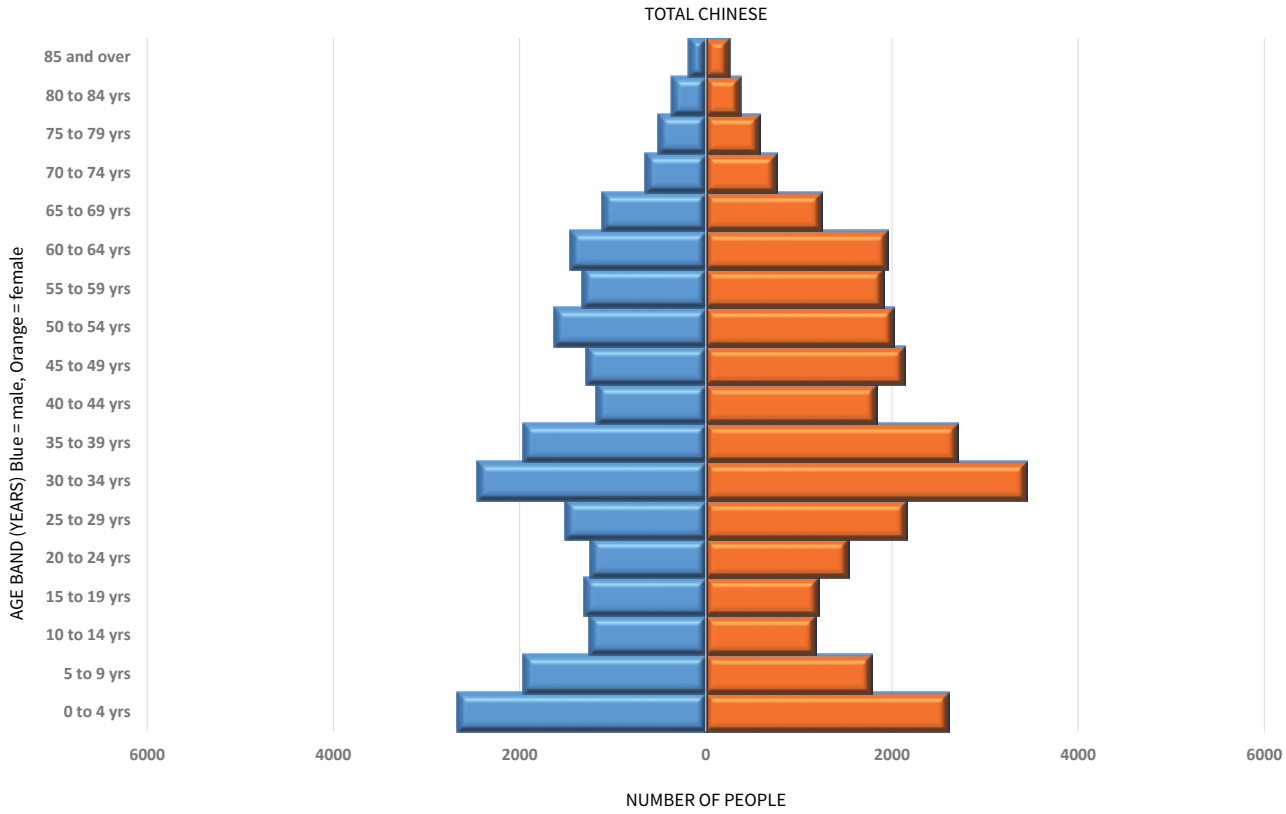
Population age pyramids were constructed to visualise the age/sex structures of Māori, Pacific, Indian, Chinese and European/Other ethnic groups (Fig 1). Each step represents five year age bands with the exception of 85 years and over. The blue bars represent men and orange bars, women. The x-axis for European/Other ethnicity differs from Māori, Pacific, Indian and Chinese due to the population count being so much greater. Māori and Pacific populations are relatively younger (0-24 years) compared to Indian, Chinese and European/Other and have relatively fewer older members aged 65 and over compared to European/Other.

Fig 1. Population age pyramids for men and women for Māori, Pacific, Indian, Chinese and European/Other ethnic groups




TOTAL PACIFIC
AGE BAND (YEARS) Blue = male, Orange = female
85 and over
80 to 84 yrs
75 to 79 yrs
70 to 74 yrs
65 to 69 yrs
60 to 64 yrs
55 to 59 yrs
50 to 54 yrs
45 to 49 yrs
40 to 44 yrs
35 to 39 yrs
30 to 34 yrs
25 to 29 yrs
20 to 24 yrs
15 to 19 yrs
10 to 14 yrs
5 to 9 yrs
0 to 4 yrs
6000
4000
2000
0
2000
4000
6000
NUMBER OF PEOPLE


TOTAL INDIAN
AGE BAND (YEARS) Blue = male, Orange = female
85 and over
80 to 84 yrs
75 to 79 yrs
70 to 74 yrs
65 to 69 yrs
60 to 64 yrs
55 to 59 yrs
50 to 54 yrs
45 to 49 yrs
40 to 44 yrs
35 to 39 yrs
30 to 34 yrs
25 to 29 yrs
20 to 24 yrs
15 to 19 yrs
10 to 14 yrs
5 to 9 yrs
0 to 4 yrs
6000
4000
2000
0
2000
4000
6000
NUMBER OF PEOPLE


TOTAL CHINESE
AGE BAND (YEARS) Blue = male, Orange = female
85 and over
80 to 84 yrs
75 to 79 yrs
70 to 74 yrs
65 to 69 yrs
60 to 64 yrs
55 to 59 yrs
50 to 54 yrs
45 to 49 yrs
40 to 44 yrs
35 to 39 yrs
30 to 34 yrs
25 to 29 yrs
20 to 24 yrs
15 to 19 yrs
10 to 14 yrs
5 to 9 yrs
0 to 4 yrs
6000
4000
2000
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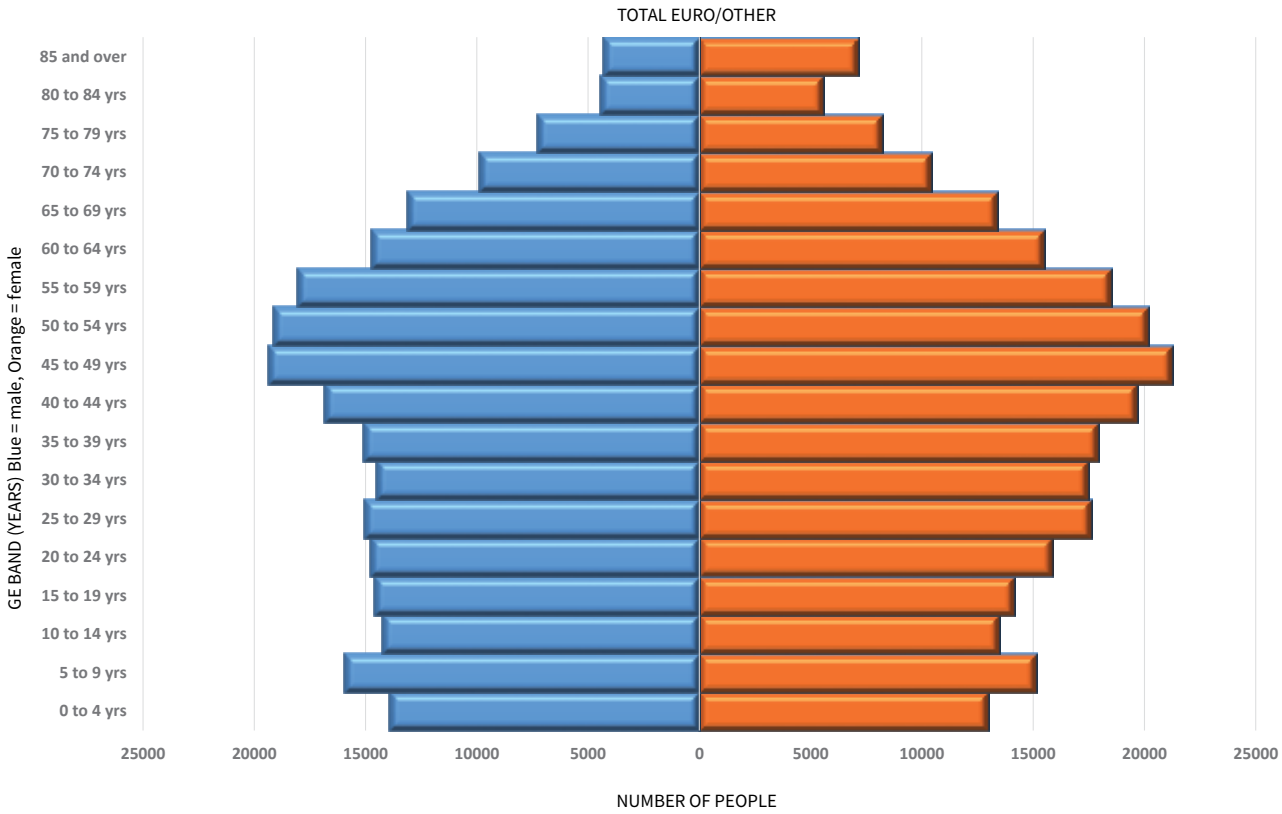
NUMBER OF PEOPLE


TOTAL EURO/OTHER
GE BAND (YEARS) Blue = male, Orange = female
85 and over
80 to 84 yrs
75 to 79 yrs
70 to 74 yrs
65 to 69 yrs
60 to 64 yrs
55 to 59 yrs
50 to 54 yrs
45 to 49 yrs
40 to 44 yrs
35 to 39 yrs
30 to 34 yrs
25 to 29 yrs
20 to 24 yrs
15 to 19 yrs
10 to 14 yrs
5 to 9 yrs
0 to 4 yrs
25000
20000
15000
10000
5000
0
5000
10000
15000
20000
25000
NUMBER OF PEOPLE

ProCare ethnicity composition compared to Auckland Region and NZ census data

The ProCare ethnicity distribution closely reflects the total Auckland regional distribution which has higher proportions of Asian and Pacific people and lower Māori and European proportions than the total NZ population (Table 3).

Table 3. ProCare ethnicity composition compared to the Auckland region, census and population projection data

	Total ProCare N (column %)	Auckland region	New Zealand	2018 NZ pop projection
	1 Jan 2017	Census 2013	Census 2013	
Ethnicity	N=824,735	N= 1,431,195	N= 4,442,100	N= 4,738,400
Māori	11%	10.1%	15.6%	16.1%
Pacific	13%	13.7%	7.8%	8.2%
Indian	7.5 %			
Chinese	6.5%			
Total Asian	21%	21.5%	12.2%	14.6%
European/Other	54.5%	54.7%	74.6%	72.3%

Ethnicity composition of enrolled ProCare patients by DHB of practice

The ethnicity composition within ProCare practices varies markedly depending on DHB catchment (Table 4). Those located within Counties Manukau have 19% Māori and 19% Pacific enrolled patients compared with only 6% and 13% respectively in practices located within ADHB. Similarly the Indian population makes up only 3% of enrolled population in ProCare Waitemata practices compared with 10% in Counties Manukau and 9% in Auckland practices.

Table 4. Ethnicity composition within ProCare practices by District Health Board catchment

		DHB of practice		
	Total ProCare	Auckland (ADHB)	Waitemata (WDHB)	Counties Manukau (CMDHB)
Ethnicity	N =824,735(col %)	N =366,689 (col%)	N=262,644 (col%)	N= 195,402 (col%)
Māori	89,912 (11%)	22,828 (6%)	29,349 (11%)	37,735 (19%)
Pacific	109,239 (13%)	49,026 (13%)	23,221 (9%)	36,992 (19%)
Indian	62,072 (7.5%)	34,681 (9.5%)	6,530 (2.5%)	18,861 (10%)
Chinese	53,618 (6.5%)	28,474 (7.8%)	18,410 (7%)	6,734 (3.4%)
European/Other	509,894 (62%)	231,680 (63%)	183,134 (70%)	95,080 (49%)
Total	100%	100%	100%	100%

ProCare patients domiciled in Auckland regional DHBs

Many patients travel across DHB catchments to go to their preferred GP. Travel distances may be 50kms or more e.g. from Pukekohe to Takapuna. While Table 4 reflects where enrolled patients' practices are located, this does not necessarily reflect their place of residence. Overall ProCare patients reside in and make up 56% of Auckland District Health Board (ADHB) catchment population, 50% of Waitemata District Health Board (WDHB) and 42% of Counties Manukau Health (CMDHB).

Table 5. Ethnicity composition of ProCare enrolled patients by their place of residence according to District Health Board catchment

	ADHB (2016/17)	ProCare patients domiciled in ADHB	WDHB (2016/17)	ProCare patients domiciled in WDHB	CMDHB (2016/17)	ProCare patients domiciled in CMDHB
	Total N	N (%ADHB)	Total N	N (%WDHB)	Total N	N (%CMDHB)
Total pop	**510,450**	**283,942 (56%)**	**597,510**	**298,668 (50%)**	**541,080**	**227,517 (42%)**
Māori	41,856	19,584 (47%)	59,751	30,350 (51%)	86,032	39,367 (46%)
Pacific	54,108	34,211 (63%)	42,423	27,443 (65%)	114,168	47,427 (42%)
Indian	38,000*	24,406 (64%)	21,000*	13,505 (64%)	56,690**	24,044 (42%)
Chinese	52,257*	20,873 (40%)	39,860*	21,895 (55%)	43,180**	10,765 (25%)
European/ Other	324,229	194,686 (60%)	434,476	205,475 (47%)	241,010	105,914 (44%)

* Personal communication Lifeng Zhou Waitemata DHB and author of International Benchmarking of Asian Health Outcomes 2017 (may be undercount as population projections to 2016/17 underestimated Asian population growth)

**Extrapolated from CMDHB Asian Health Plan (total Asian 127,000 of which 47% are Indian and 34% Chinese)

Socioeconomic status

Socioeconomic status is commonly assessed using the New Zealand Deprivation Index Score (NZDep2013), which is a measure assigned to a patient's area of residence at the time of national Census.[4] NZDep2013 provides a deprivation score for each meshblock in New Zealand. Meshblocks are the smallest geographical area defined by Statistics New Zealand, with a population of around 60–110 people. The score is based on nine variables from the 2013 Census relating to income, home ownership, employment, qualifications, family structure, housing, access to transport and communications.

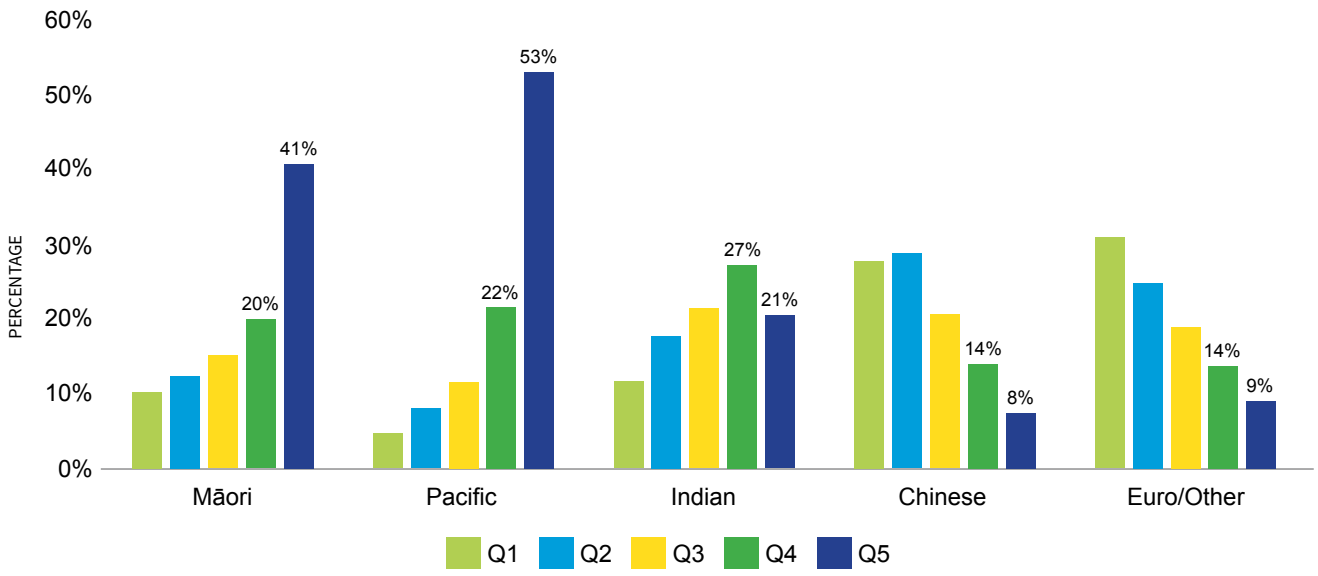
For these analyses, quintiles (one least deprived to five most deprived) are shown for the total ProCare population and by ethnicity.

Table 6. ProCare enrolled population according to NZDep Index quintile and ethnic group

	Total ProCare	Māori	Pacific	Indian	Chinese	Euro/Other
NZDep2013	**N (%)**	N (%)	N (%)	N (%)	N (%)	N (%)
Quintile 1	**195,528 (24)**	9,228 (10)	5,337 (5)	7,339 (12)	14,911 (28)	158,713 (31)
Quintile 2	**175,522 (21)**	11,398 (13)	8,809 (8)	11,155 (18)	15,456 (29)	128,704 (25)
Quintile 3	**148,944 (18)**	13,716 (15)	13,030 (12)	13,299 (21)	11,102 (21)	97,797 (19)
Quintile 4	**136,904 (17)**	18,271 (20)	23,684 (22)	17,017 (27)	7,632 (14)	70,300 (14)
Quintile 5	**158,424 (19)**	36,573 (41)	57,829 (53)	12,859 (21)	4,067 (8)	47,096 (9)
Missing	**9,413 (1)**	726 (1)	550 (1)	403 (1)	450 (1)	7,284 (1)
Total N	**824,735**	89,912	109,239	62,072	53,618	509,894

Overall, the ProCare population is evenly distributed by quintile of deprivation (range 17-24%) but this is largely driven by the combined population of European and Other ethnicities. Marked differences emerge by ethnic group with the majority of Euro/Other living in least deprived quintiles 1 and 2 (56%) compared with the majority of Māori (61%) and Pacific (75%) peoples living in the most deprived quintiles 4 and 5.

Fig 2. ProCare enrolled population according to NZDep Index quintile and ethnic group



Household occupancy

There is a strong link between housing and health - mainly for respiratory disease and mental health.[5]

Aucklanders are currently facing a housing crisis. House prices have become unaffordable, available rental properties are scarce in many suburbs, state houses are fully occupied and increased overcrowding is being reported by StatsNZ.

While subject to differential reporting by country, New Zealand is recorded as having the worst homelessness in the OECD, an estimated 40,000 (24,000 people in Auckland) living on the streets or in emergency housing or substandard shelters without homes. http://www.newshub.co.nz/home/politics/2017/07/nz-s-homelessness-the-worst-in-oecd-by-far.html

We measured household occupancy to evaluate the extent of this issue using eight or more people residing at the same residential address as a proxy threshold for overcrowding. While this estimate excluded nursing homes and aged residential care addresses, we were unable to exclude occupants of high rise apartments.

Of the total ProCare population 38,060 (4.5%) of the population were living in homes with a household occupancy of eight or more (average number per house 11 people). Overcrowding was worse in South Auckland (7%). Further analysis is required to investigate overcrowding by ethnicity and age.

Table 7. Household occupancy of eight or more by DHB catchment

	Total ProCare	ADHB	WDHB	CMDHB
	824,735	**366,689**	**262,644**	**195,402**
Household occupancy eight or more (People)	38,060	13,210 (4%)	11,555 (4%)	13,295 (7%)
Household occupancy eight or more (Homes)	3,598	1,059	1,198	1,341

Coding of iwi

As part of meeting Cornerstone standards for the Royal New Zealand College of GPs (RNZCGP), some practices have conducted iwi coding in addition to collecting patients' self-identified ethnicity.

We sought to gain some measure of this using Clinical Intelligence System (CIS) data aggregated from 110 ProCare practices with 389,778 patients (47% total population). A preliminary investigation of the IWI CODE field from MedTech revealed a mix of 137 numeric codes and two free text codes (NGA, NGAP). The numeric codes were matched with the list of StatsNZ iwi codes.

There were 41,242 Māori identified in the CIS data of whom over 1 in 4 (28%) also had an iwi code.

In total 12,044 recordings of iwi were identified. As expected, the top six iwi represented in this coding were Ngāpuhi, Tainui and Ngāti Porou followed by Tūhoe, Te Arawa and Ngāti Whātua.

Table 8. Iwi coding within Clinical Intelligence System data (110 Practices)

	Total	Māori	Pacific	Indian	Chinese	Euro/Other
Iwi code recorded in MedTech	12,044	11,481 (95%)	199	4	2	358

Māori have specific information needs that reflect te ao Māori and Māori aspirations for community and iwi development. Guidance for the ongoing collection and interpretation of iwi information will in future be undertaken by ProCare Māori Advisory Committee, ProCare's Māori providers and Māori community stakeholders.

Domain 2: Practices and providers

This domain looks at the general practices and providers who care for ProCare's enrolled patients.

Full time equivalent GPs and nurses

Table 9 below outlines the number of full time equivalent (FTE) GPs and nurses as of 1 January 2017. This data is from 156/177 ProCare practices, as rest home or residential village medical clinics, East Tamaki Health Care (ETHC) practices and four practices with incomplete data have been excluded. By FTE category the mean enrolled population, minimum and maximum patient count (range) and proportion of the total population is given.

Table 9. Size of ProCare practices according to GP and nurse full time equivalents (FTE) and enrolled patients

GP FTE per practice	Practice (N)	Mean enrolled patients	Range Min.	Range Max.	Total Pop (%)	FTE per 1000	1FTE/pts
0-1.9 FTE	73	2,251	600	6,433	164,354 (23%)	0.55	1FTE/1818
2-3.9 FTE	51	4,643	1,673	11,364	236,799 (33%)	0.59	
4-6.9 FTE	26	8,471	6,352	13,113	220,253 (31%)	0.62	
7+ FTE	6	15,656	11,523	19,443	93,938 (13%)	0.59	
Grand Total	**156***	**4,586**	**600**	**19,443**	**715,344**	**0.59**	**1FTE/1694**

Nurse FTE/ practice							
0-1.9 FTE	84	2,556	600	4,995	214,707 (30%)	0.37**	1FTE/2703
2-3.9 FTE	42	5,241	996	11,364	220,103 (31%)	0.51	
4-6.9 FTE	23	8,166	2,992	14,648	187,828 (26%)	0.58	
7+ FTE	7	13,244	6,532	19,443	92,706 (13%)	0.95	
Grand Total	**156***	**4,586**	**600**	**19,443**	**715, 344**	**0.54**	**1FTE/1852**

* rest home or residential village medical clinics, ETHC practices and four practices with clearly incomplete data have been excluded
**13 practices appear to have 0 nurse FTE

Small practices (those with fewer than four GP FTE) make up 79% of ProCare practices and care for 56% of the total enrolled population. These small practices also have fewer than four nurse FTEs per practice with 13 practices having no nurse recorded in the customer relationship management (CRM) system which is updated quarterly. The ProCare practice engagement team was consulted regarding data validity and confirmed that FTE reports by practice were as expected.

ProCare has on average 1 GP FTE per 1,694 patients (0.59 FTE /1000 patients). This is a slightly higher enrolled patient ratio (or slightly less GP FTE) than the Ministry of Health reported New Zealand average of one GP FTE per 1,650 patients (0.61/1000 patients).

The variation in nursing workforce is marked between the smallest and largest ProCare practices; small practices having an average 0.37 nurse FTE vs 0.95 nurse FTE in large practices.

The overall practice average nurse FTE/1,000 is 0.54 (equivalent to one nurse FTE to 1,852 patients). The only external comparison practice average nurse FTE/1,000 data that was found was from a Medical Assurance Society report (MAS HealthyPractice®Subscriber Analysis Report, January 2014) from 551 practices around New Zealand (one nurse FTE to 1,959 patients [0.51/1,000] and one GP FTE per 1,663 patients [0.60/1,000]). According to this report, compared to 551 practices around New Zealand, ProCare has more nurse FTE/1,000.

There is currently no data indicating the number of nurse practitioners, health navigators/coaches and health care assistants within ProCare practices. This is a gap in information that could guide work undertaken by the Patient Services Team and Equity Team regarding healthcare provider scope of practice, expansion of skills, capability and needs.

Average GP and nurse FTE/1,000 of domiciled patients by DHB

An analysis was undertaken to calculate the average GP FTE/1,000 of domiciled patients by Auckland regional DHB catchment. While practices may be located in a specific DHB catchment, this analysis is problematic as they often have enrolled patients who are domiciled in all three DHB areas and also patients who are domiciled in other regions. Therefore the FTE has been apportioned by the size of the domiciled population within each practice. For example, Table 10 describes Practice X with 6.8 GP FTE. This practice is located in central Auckland and has a total population of 10,378 patients who reside mostly in ADHB or WDHB but a small proportion who also live in CMDHB and regions beyond.

Table 10. Explanatory table of FTE split by patient domicile for an individual central Auckland practice

	ADHB	WDHB	CMDHB	Other DHB	Total enrolled pop
Practice X	7,273	2,507	483	115	10,378
6.8 GP FTE split	4.77	1.64	0.32	0.08	

For the 156 ProCare practices included in the initial FTE tables, the average GP and nurse FTE/1,000 of domiciled patients by DHB is shown in Table 11.

Table 11. GP and nurse FTE split by patient domicile

	ADHB	WDHB	CMDHB	Other
GP FTE /1,000	0.61 1 GP FTE/1,639 patients	0.57 1 GP FTE/1,754 patients	0.58 1 GP FTE/1,724 patients	0.59 1 GP FTE/1,694 patients
Nurse FTE /1,000	0.48 1 nurse FTE/2,083 patients	0.51 1 nurse FTE/1,961 patients	0.66 1 nurse FTE/1,515 patients	0.62 1 nurse FTE/1,613 patients

GP FTE in ADHB is the same as the national average, but slightly lower in the other DHB catchments. Nurse FTE in Counties Manukau is much higher than the other DHB regions and the MAS report of 551 New Zealand practices (average nursing FTE 0.51/1,000).

Figures 3. and 4. represent the variation in GP and nurse FTE across the network practices ordered by FTE/1,000 enrolled patients with blue bars representing those practices with above average FTE and orange representing those below this average.

Fig 3. GP full time equivalents (FTE) per 1,000 patients by practice

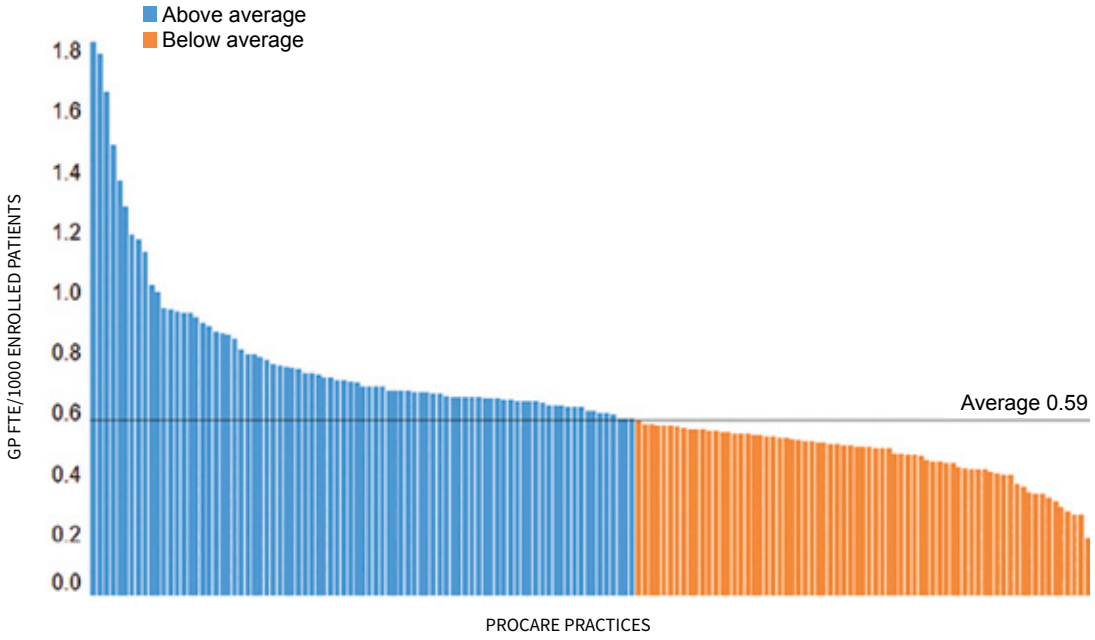
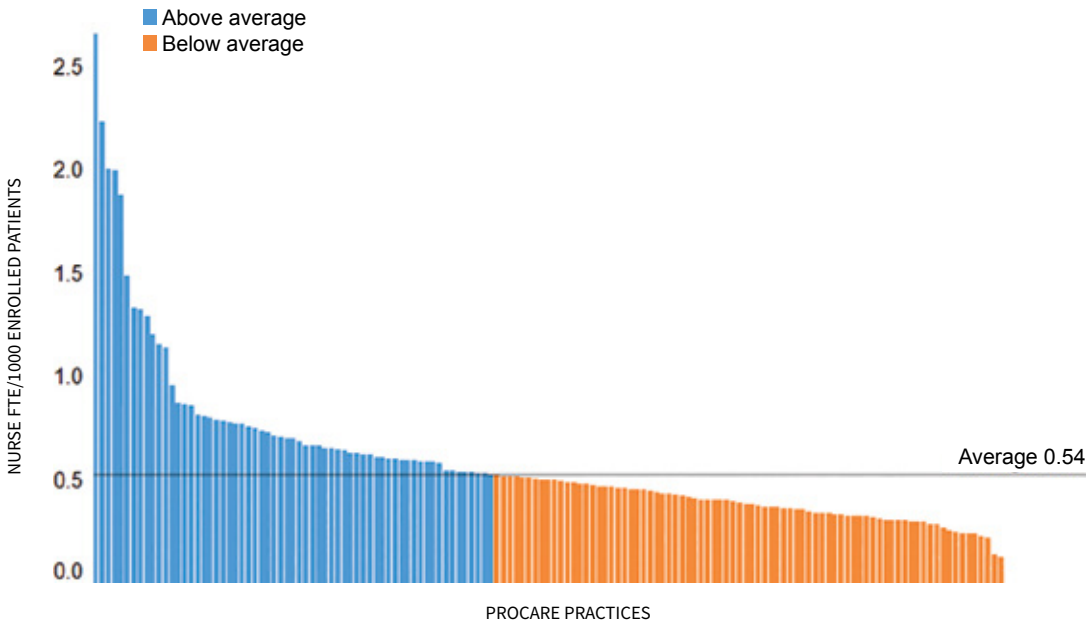


Fig 4. Nurse full time equivalents (FTE) per 1,000 patients by practice



Domain 3: Access and utilisation

Very Low Cost Access practices

From October 2009, the Ministry of Health brought into effect a Very Low Cost Access (VLCA) payment as a strategy to improve access to primary care for high needs patients. The payment was limited to PHOs and contracted general practices meeting the eligibility criteria of 50% high needs population (defined as Māori, Pacific or New Zealand Deprivation Index quintile 5), and currently charging or prepared to reduce their fees to:

- zero fees for children 0–12 years
- $12 maximum for children 13–17 years
- $18 maximum for adults 18 years and over.

ProCare has 55 VLCA practices (inclusive of ETHC practices):

- 19 within ADHB catchment
- 11 in WDHB
- 25 in CMDHB
- 310,411 (38%) of the ProCare population is enrolled in a VLCA practice
- Of these 310, 411 patients just over half (55% mean) were classified as being of high needs.

Who is missing out?

Of the total 263,173 classified as being high needs (Māori, Pacific or Q5) across the whole of ProCare, 66% were enrolled in a VLCA practice. Therefore 89,844 (34%) high needs patients are missing out on VLCA subsidies.

66% Of high-needs patients **(263,173)** are enrolled in VLCA practices, so...

34% Of high-needs patients **(89,844)** are **missing out** on VLCA subsidies

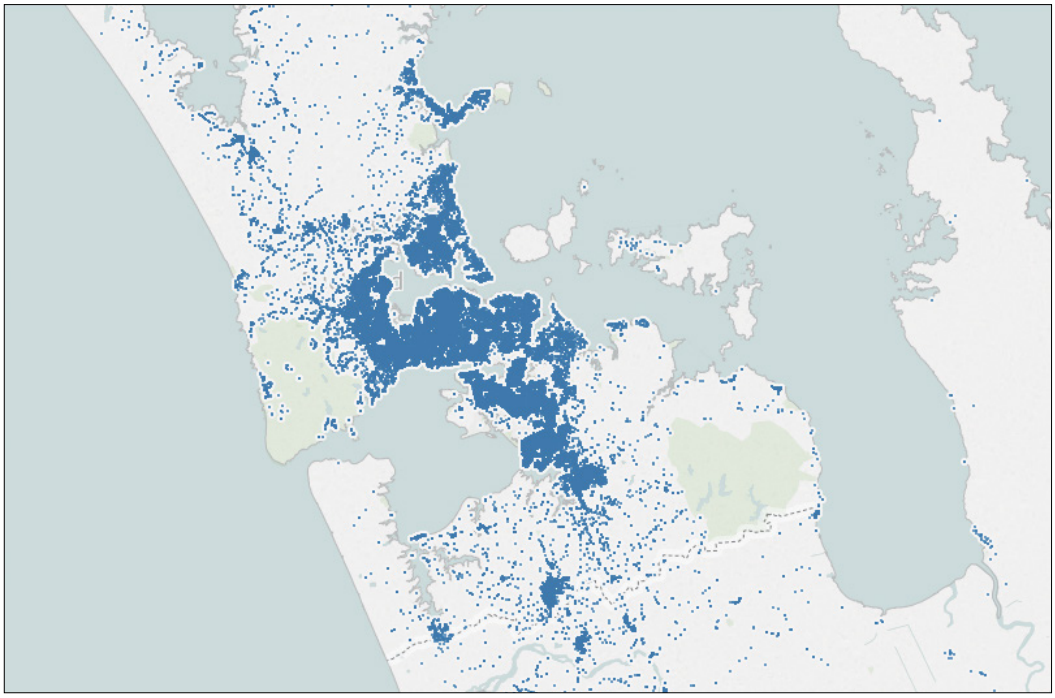
Conversely there are 137,062 patients who are not 'high needs' but are enrolled in VLCA practices.

Location of VLCA practices and domicile of high needs patients

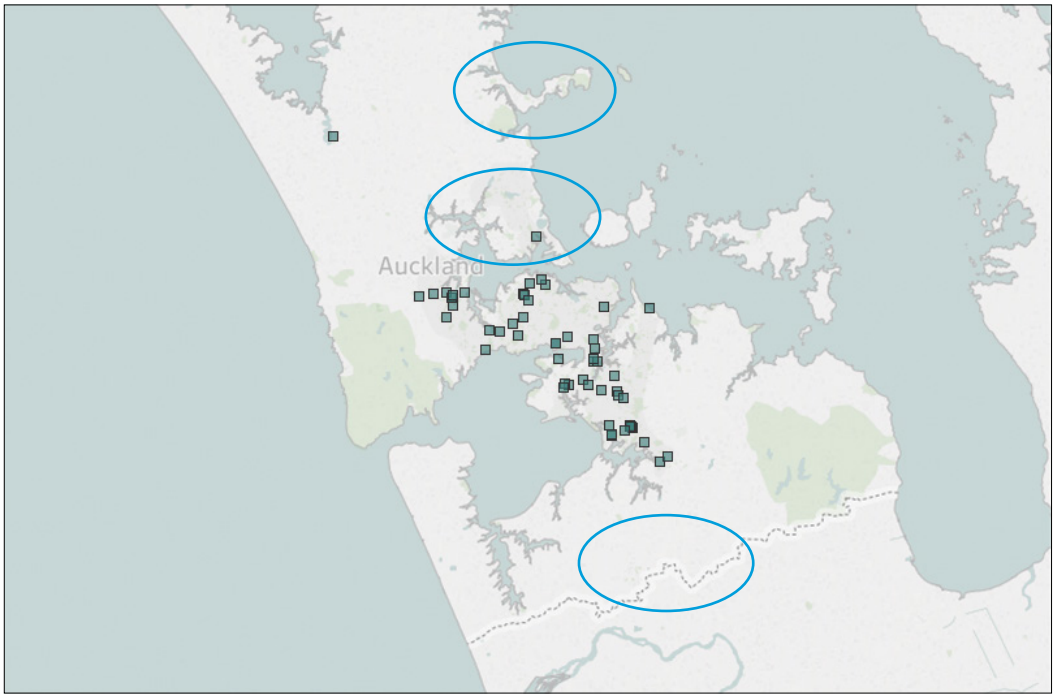
Figure 5. shows two Auckland regional maps showing the domicile of high needs patients and the location of VLCA practices. Ideally these two maps would be superimposed on each other. Three notable areas that appear to be inadequately serviced by VLCA practices are Silverdale-Whangaparoa, the North Shore and Franklin areas.

Fig 5. Auckland regional map showing domicile of high needs patients (Māori, Pacific and NZDep Quintile 5) compared to location of VLCA practices

HIGH NEEDS POPULATION DISTRIBUTION



VCLA PRACTICE DISTRIBUTION



GP and nurse visits

Table 12 describes visits for all enrolled patients rather than total consults per practice (i.e. enrolled and casual patients). It also focuses on patients being seen in the practice that they are enrolled in so total visits per patient may be a little higher because a ProCare network enrolled patient may also visit another practice. GP and nurse visits include all capitation/general medical services (GMS) visits in the last 12 months with a second row assigned to other visits types (e.g. ACC). Note that newly enrolled patients will have fewer visits recorded in the last 12 months. An important consideration is that nursing visits are reported to be unreliably recorded. Future work is needed to quantify how unreliable the recording of nurse visit is especially if we are moving to new models of care such as Health Care Home or Mental Health Stepped Care Model.

Table 12. GP and practice nurse visits recorded in the last 12 months by ethnic group

	Total pop	All high needs	Māori	Pacific	Other Q5	Indian Q1-4	Chinese Q1-4	Euro/ Other Q1-4
	732,198	**215,783**	**74,998**	**86,650**	**54,135**	**33,269**	**47,348**	**435,798**
GP mean (sd) visits/yr	2.9 (3.5)	3.0 (3.8)	2.9 (3.7)	2.8 (3.6)	3.3 (4.1)	3.1 (3.4)	2.1(2.8)	2.9 (3.5)
GP visits last 12 months (capitation/ GMS)	2,006,442	603,033	203,417	226,832	172,784	100,415	96,325	1,206,669
GP visits last 12 months - Other	92,507	34,552	11,328	15,501	7,723	3,300	5,311	49,344
Total GP/ other visits	**2,098,949**	**637,585**	**214,745**	**242,333**	**180,507**	**103,715**	**101,636**	**1,256,013**
*Nurse mean visits/yr	0.4	0.5	0.6	0.6	0.4	0.4	0.2	0.4
*Nurse and other visits last 12 months	307,375	115,247	44,001	47,741	23,505	12,573	9,380	170,175
*Nurse visits last 12 months-Other	4,562	1,703	681	692	330	109	97	2,653
*Total nurse/other visits	311,937	116,950	44,682	48,433	23,835	12,682	9,477	172,828

* 160 practices included in these analyses (ETHC practices and rest home/residential village clinics have been excluded). Nurse recording unreliable.

On average, the total enrolled population see their GP 2.9 times a year with high needs populations (Māori, Pacific and Other ethnic groups living in NZDep Quintile 5) seeing their GP three times a year. The high needs populations make up 29% of the population and utilise 30% of GP visits. Total visit frequency (GP and nurse) is similar across ethnic groups except for Chinese patients who have a lower frequency of visiting in the previous 12 months than all other ethnic groups.

PROCARE PRACTICES – NUMBER OF VISITS

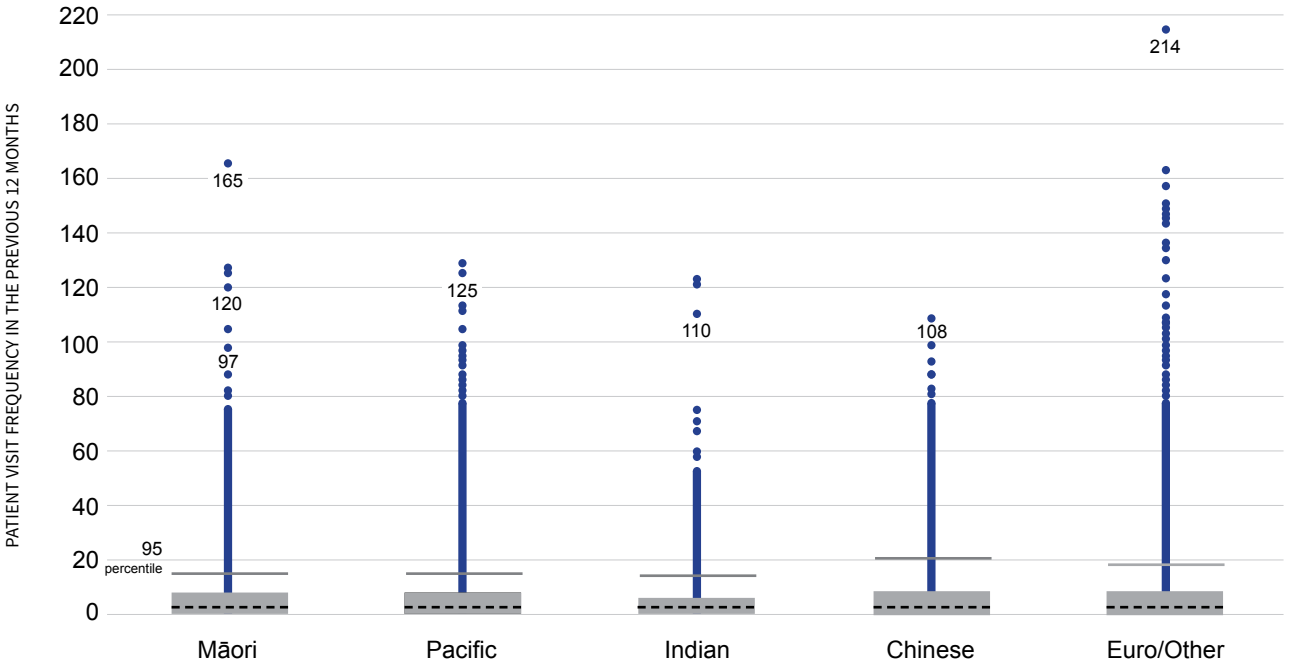
On average, **general patients** see their GP
2.9 TIMES A YEAR

On average, **high-needs patients** see their GP
3.0 TIMES A YEAR

Box and Whisker plot of a funded GP visit (capitation/GMS) in the previous 12 month per patient by ethnicity

Figure 6. is a Box and Whisker plot of GP visits (capitation/GMS) in the last 12 months by ethnic group. The grey rectangles at the bottom of the plots represent percentiles of patients having a funded GP visit (capitation/GMS) in the previous 12 months. The top of the grey rectangles is the 75th percentile and the the dark line above the rectangle represents the 95th percentile. The blue lines are called the 'whiskers' and represent the range of per patient visits e.g. from 0 to 165 visits for a Māori patient and 0 to 214 for a European/Other patient.

Fig 6. Box and Whisker plot of a funded GP visit (capitation/GMS) in the previous 12 month per patient by ethnicity



RANGE OF VISITS FOR TOTAL POPULATION (0-214 VISITS)

From this plot we can see that there is little ethnic group variation in per person funded GP visits (capitation/GMS).

- 50% of patients will have between zero and three funded GP visits/year
- 75% of patients will have less than eight funded GP visits/year
- 5% will have 18 or more visits/year. Future work needs to characterise the sociodemographic and morbidity patterns of this 5% of patients to determine how best to support them.

50%
of patients will have
MORE THAN **3** FUNDED GP VISITS A YEAR

IN 2016
MORE THAN **2.4 million** Nurse & GP consultations

Visit frequency by low cost access

As visit frequency may be determined by cost, further analyses were conducted separating per patient visit frequency by VLCA enrolment.

Table 13. GP and practice nurse visits recorded in the last 12 months stratified by VLCA or non-VLCA practice and ethnic group

		Total pop	Māori	Pacific	Other Q5	Indian Q1-4	Chinese Q1-4	Euro/ Other Q1-4
		504,719	**35,674**	**25,095**	**26,997**	**18,723**	**35,900**	**362,330**
Non-VLCA practices 114	GP mean (sd) visits/yr	2.8 (3.4)	2.9 (3.7)	2.9 (3.6)	3.3 (4.1)	2.9 (3.3)	2.1 (2.7)	2.8 (3.4)
	GP visits last 12 months (capitation/GMS)	1,368,474	97,507	69,522	86,045	52,914	72,172	990,314
	GP visits last 12 months - Other e.g. ACC	59,867	5,530	3,530	4,138	2,176	2,462	42,031
	Total GP/other visits	1,428,341	103,037	73,052	90,183	55,090	74,634	1,032,345
	*Nurse mean visits/yr	0.3	0.3	0.2	0.4	0.3	0.2	0.3
	*Nurse and other visits last 12 months	155,845	10,824	5,691	9,881	5,149	6,830	117,470
	*Nurse visits last 12 months - Other e.g. ACC	2,947	281	162	80	44	75	2,305
	*Total nurse/other visits	158,792	11,105	5,853	9,961	5,193	6,905	119,775

		Total pop	Māori	Pacific	Other Q5	Indian Q1-4	Chinese Q1-4	Euro/ Other Q1-4
		227,479	**339,324**	**61,555**	**27,138**	**14,546**	**11,448**	**73,468**
VLCA practices 46	GP mean (sd) visits/yr	2.9 (3.7)	2.8 (3.8)	2.8 (3.6)	3.3 (4.2)	3.3 (3.6)	2.4 (3.2)	3.0 (3.6)
	GP visits last 12 months (capitation/GMS)	637,968	105,910	157,310	86,739	47,501	24,153	216,355
	GP visits last 12 months - Other e.g. ACC	32,640	5,798	11,971	3,585	1,124	2,849	7,313
	Total GP/other visits	670,608	111,708	169,281	90,324	48,625	27,002	223,668
	*Nurse mean visits/yr	0.7	0.9	0.7	0.5	0.5	0.2	0.7
	*Nurse and other visits last 12 months	151,530	33,177	42,050	13,624	7,424	2,550	52,705
	*Nurse visits last 12 months - Other e.g. ACC	1,615	400	530	250	65	22	348
	*Total nurse/other visits	153,145	33,577	42,580	13,874	7,489	2,572	53,053

* 160 practices included in these analyses (ETHC practices and rest home/residential village clinics have been excluded). Nurse recording unreliable.

Overall there was no difference in GP visit rate between VLCA and non-VLCA practices for high-needs patients although there was a tendency for Indian, Chinese and European/other (non-high needs) populations to visit more frequently in VLCA practices. However, recorded nurse visits in VLCA practices were 2-3 fold greater for all ethnic groups except for Chinese.

Age is an important predictor of visit frequency in the last 12 months due to increasing co-morbidities with advancing age. Mean GP and nurse visits by VLCA enrolment were also analysed by age groups 45-64 years and 65 years and over. The following observations were found:

- GP and nurse visit frequency increased with age in both non VLCA and VLCA practices
- Overall visits were more frequent in VLCA practices especially recorded nurse visits
- Within VLCA and non-VLCA practices, Māori, Pacific and other patients living in the most deprived quintile of NZ Deprivation Index saw their GP more than European and Other patients
- Māori, Pacific and other patients living in the most deprived quintile of NZ Deprivation Index saw their GP slightly more if enrolled in a VLCA practice than their counterparts enrolled in a non-VLCA practice.

Table 14. GP and practice nurse visits recorded in the last 12 months to VLCA or non-VLCA practices by age and ethnic group

Low cost access	Age group years		Total pop	Māori	Pacific	Other Q5	Indian Q1-4	Chinese Q1-4	Euro/ Other Q1-4
Non-VLCA practices 114	45-64	Count	138,876	7,539	5,393	6,670	3,807	8,772	106,695
		GP mean (sd) visits/yr	2.9 (3.1)	3.6 (4.1)	3.6 (3.8)	3.6 (3.3)	3.6 (3.9)	2.0 (2.4)	2.8 (3.0)
		Nurse mean	0.4	0.5	0.4	0.4	0.5	0.2	0.4
	65+	Count	71,832	2,079	1,895	3,992	1,378	3,305	59,183
		GP mean (sd) visits/yr	5.3 (4.7)	6.1 (5.3)	5.6 (4.7)	6.2 (5.6)	5.2 (4.0)	3.5 (3.2)	5.3 (4.6)
		Nurse mean	0.7	0.8	0.4	0.9	0.6	0.3	0.7
VLCA practices 46	45-64	Count	54,254	7,560	12,336	6,599	3,443	3,399	20,917
		GP mean (sd) visits/yr	3.6 (3.9)	4.1 (4.5)	4.0 (4.1)	3.9 (4.2)	4.3 (3.9)	2.4 (3.0)	3.2 (3.5)
		Nurse mean	0.9	1.4	1.2	0.6	0.8	0.2	0.8
	65+	Count	24,808	1,992	4,423	3,769	1,297	1,750	11,577
		GP mean (sd) visits/yr	5.7 (5.1)	6.6 (5.7)	5.9 (5.5)	6.0 (5.6)	5.9 (4.6)	4.0 (3.9)	5.6 (4.8)
		Nurse mean	1.4	2.5	1.6	0.9	1.2	0.5	1.5

Who does not visit in two years?

We explored by age, gender, ethnicity and deprivation who did not have a recorded GP or nurse visit or immunisation in the past two years. The following data is derived from all enrolled ProCare population and shows the proportion (in coloured panels) not seen by age and ethnicity groups.

Overall 19% of enrolled patients had no recorded visit to their practice in the previous two years.

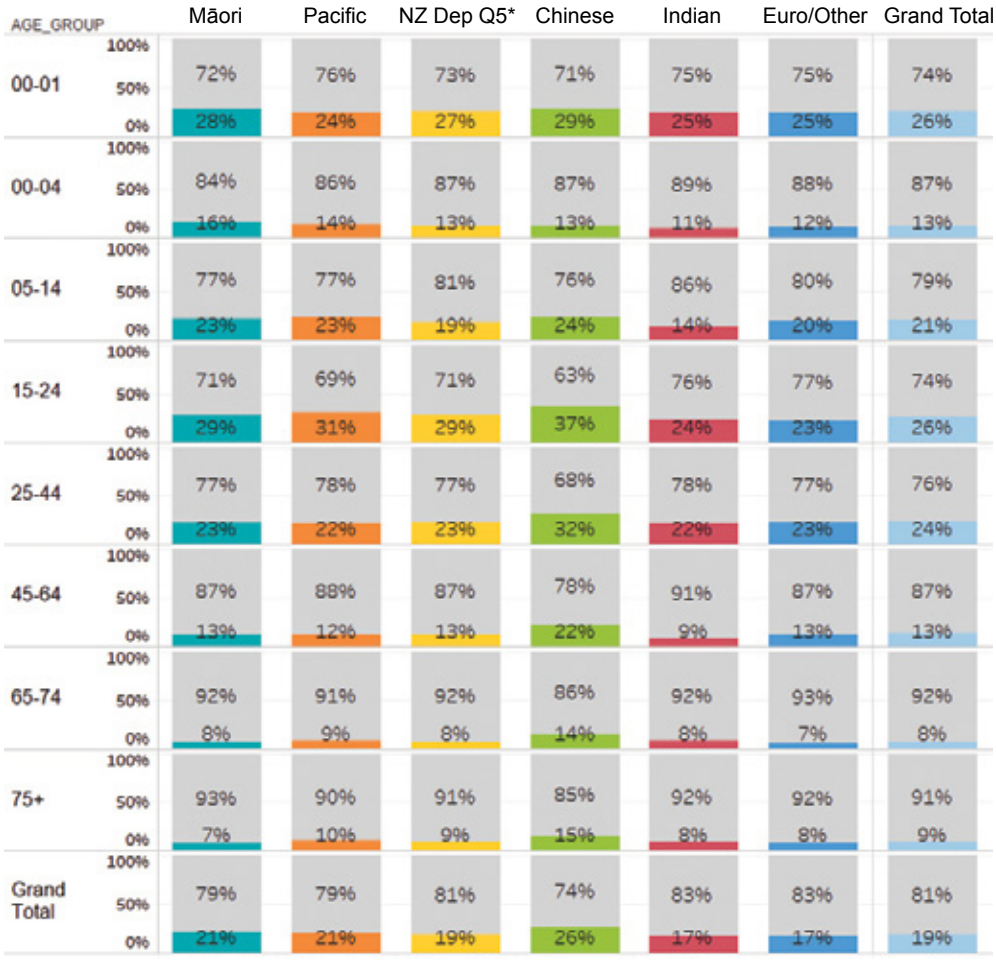
Utilisation data for older age groups (over five years) are likely to be accurate. However, for the younger age group, especially newborn to two years, the timing of the date of enrolment can influence whether there is consultation history data. This issue with the data requires further investigation as infant immunisation rates are over 90% but recorded consult visits are lower than this (71-76%). Therefore the two year non-visit proportion will be an overestimate.

The age groups 5-14 years, 15-24 years and 25-44 years were the least likely to visit. Factors possibly influencing their visit rate are residential mobility, low burden of chronic disease, seeking 'as required' care after hours at ED and accident and medical clinics, and use of family planning clinics.

The flip side is that overall 81% of the enrolled ProCare population has been seen in the previous two years (from 1 January 2017). This is lower than previous research findings that 90% of New Zealanders will see their GP at least once irrespective of ethnicity in two years.[6] Only enrolled patients over 65 years saw their practice with this frequency.

By ethnicity, more than one in four Chinese (26%) had not visited their doctor in the previous two years along with 21% of enrolled Māori and Pacific patients. Other people classified as being high needs (NZDep Q5) had a similar non-visit rate as other Indian and European/Other ethnic groups in less deprived areas (NZDep Q1-4).

Fig 7. Percentage of patients with recorded visits (grey) and with no recorded visit (coloured) in the past two years (as at January 2017) by age, ethnicity and NZ Deprivation Index Quintile 5

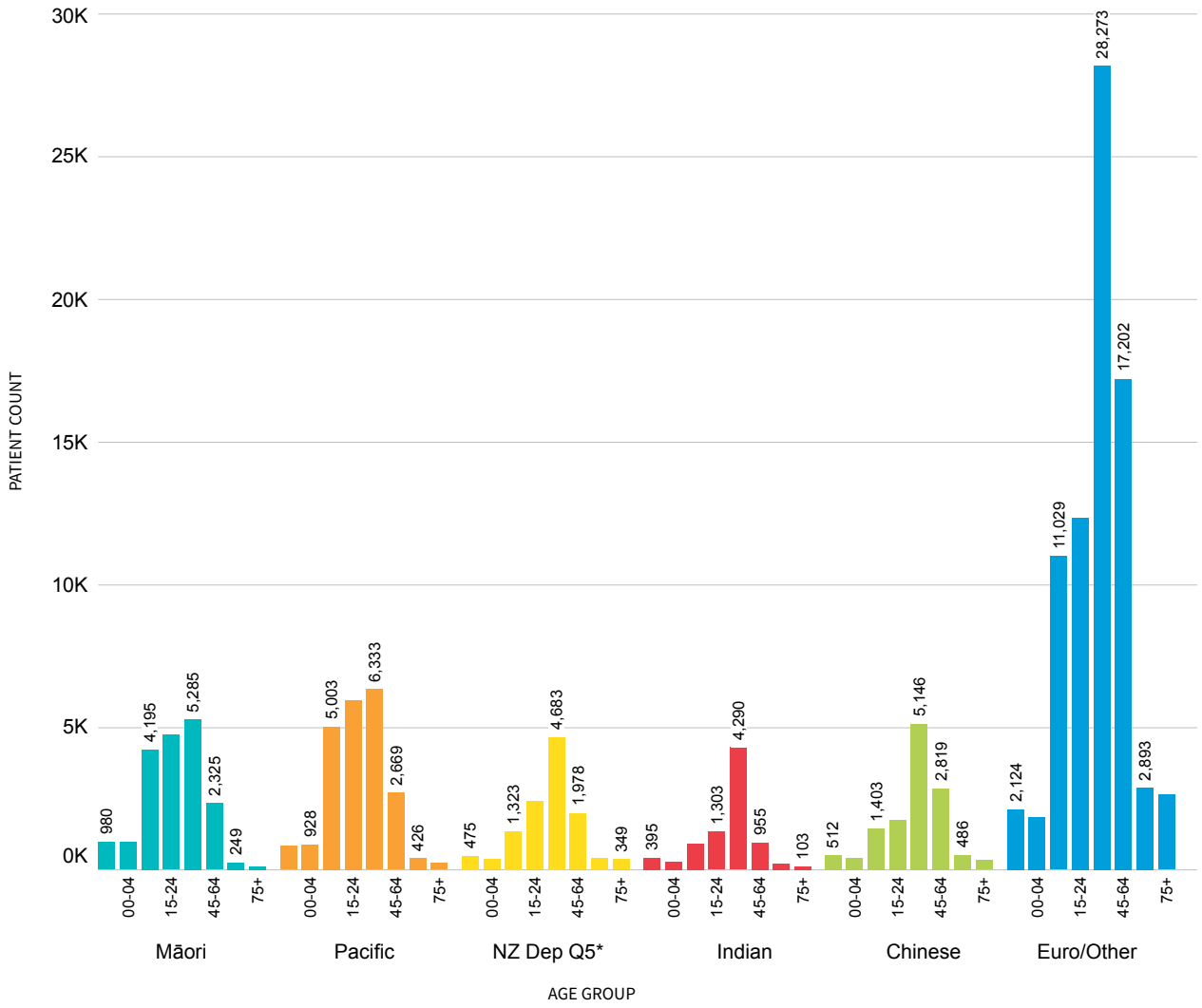


* NZDepQ5 includes all non-Māori non-Pacific ethnic groups residing in the most deprived quintile of New Zealand Deprivation Index.

* Labelling of plots includes all up to the next age group e.g. Infants 0-1 includes all infants up to 23 months.

For completeness, age-specific counts of patients who have not seen their GP/nurse in two years are given below according to ethnic group and being classified as being 'high needs' (Māori, Pacific and NZDep Q5).

Fig 8. Number of patients who do not have a recorded visit to their GP in the last two years (as at January 2017) by age, ethnicity and NZ Deprivation Index Quintile 5



* NZDepQ5 includes all non-Māori non-Pacific ethnic groups residing in the most deprived quintile of New Zealand.

**Note Chinese, Indian, Euro/Other patient counts are for those residing in NZDep quintiles 1-4.

Domain 4: Risk factors

Body mass index (BMI)

We aimed to describe the recording of BMI in ProCare practices and the status of BMI for the ProCare enrolled population 15 years and over recorded in the last two years as of 1 January 2017.

The data is limited to the Clinical Intelligence System (CIS); 110/170 ProCare practices. For ProCare patients aged 15 years and over, the CIS dataset contains data for 63% of the total enrolled population. The CIS therefore is a reasonable proxy estimate of BMI recording and BMI status for the entire network.

BMI recording gap

Table 15. Proportion of patients with recorded BMI

	All recorded	Māori	Pacific	Indian	Chinese	Euro/Other
Total CIS 15+years	**409,129**	**36,878**	**45,119**	**25,235**	**25,207**	**276,600**
BMI recorded	235,109 (57%)	20,586 (56%)	29,911 (66%)	17,511 (69%)	13,747 (55%)	153,354 (55%)
Missing data	174,020	16,292	15,208	7,814	11,460	123,246

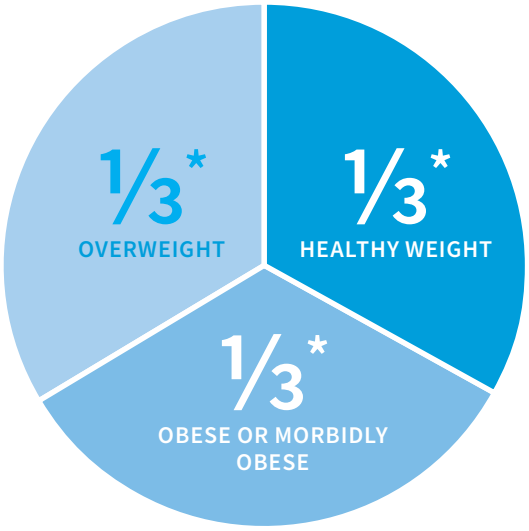
Overall 57% of patients over 15 years within CIS dataset have a recorded BMI. Pacific (66%) and Indian (69%) groups are more likely to have their BMI recorded than other ethnicities.

This is a large quality gap given the strong association between BMI and diabetes, elevated blood pressure, abnormal lipid profile and other morbidities (e.g. gall stones, cancer, osteoarthritis). Losing 5-10% of body weight can lower blood pressure, improve cholesterol levels, and help protect against diabetes and cancer.

One reason for not having a recording available may be that if height data is old, BMI may not be calculated in the electronic patient management system even though weight is available. Therefore it is likely that practices could close the recording gap relatively quickly from existing data.

BMI status

Assuming that BMI is missing at random and the CIS data is representative of the total ProCare population; only about one third of patients over 15 years are within a healthy weight range.



POPULATION OVER 15 YEARS OLD

* Approximate figures only

Table 16. BMI status by ethnicity

CIS recorded BMI	All recorded	Māori	Pacific	Indian	Chinese	Euro/Other
	409,129	**36,878**	**45,119**	**25,235**	**25,207**	**276,600**
BMI<25 (normal/ underweight)	37%	22%	10%	38%	66%	41%
BMI=25-29 (overweight)	33%	27%	22%	40%	28%	35%
BMI=30-39 (obese)	25%	38%	47%	20%	5%	21%
BMI>40 (morbidly obese)	6%	13%	21%	2%	0.2%	3%

These results are similar to the 2015/16: New Zealand Health Survey where:

- Almost one in three adults (aged 15 years and over) were obese (32%)
- A further 35% of adults were overweight but not obese
- 47% of Māori adults were obese
- 67% of Pacific adults were obese.

Further analyses need to be conducted for Pacific people by ethnic group (i.e. Tongan, Samoan, Cook Island, Niuean). While it is likely that the BMI category proportions will be similar, there are cultural differences between these groups and therefore different intervention models for managing obesity may need to be employed.

Smoking

The definition for current smokers includes those who have given up in the past 12 months. After 12 months of abstinence a smoker is classified as an ex-smoker. This information is available on all the ProCare population aged over 15 years (CPI data).

As of 1 January 2017, there were around 75,000 people classified as smokers; one in five Māori, one in seven Pacific, one in 15 European/Other, one in 22 Chinese and one in 25 Indian. There were marked sex differences in prevalence of smoking for Indian
and Chinese with men much more likely to smoke than women.

Table 17. Smoking prevalence by ethnicity

Total ProCare enrolled pop	Totals	Māori	Pacific	Indian	Chinese	Euro/Other
	824,735	**89,912**	**109,239**	**62,072**	**53,618**	**563,512**
	N col%	N col%	N col%	N col%	N col%	N col%
Total smokers	75,474 (9%)	19,029 (21%)	14,183 (13%)	2,498 (4%)	2,480 (5%)	37,284 (7%)
Women smokers	32,210 (4%)	10,239 (11%)	5,570 (5%)	296 (0.5%)	356 (1%)	15,749 (3%)
Men smokers	43,264 (5%)	8,790 (10%)	8,613 (8%)	2,202 (3.5%)	2,124 (4%)	21,535 (4%)

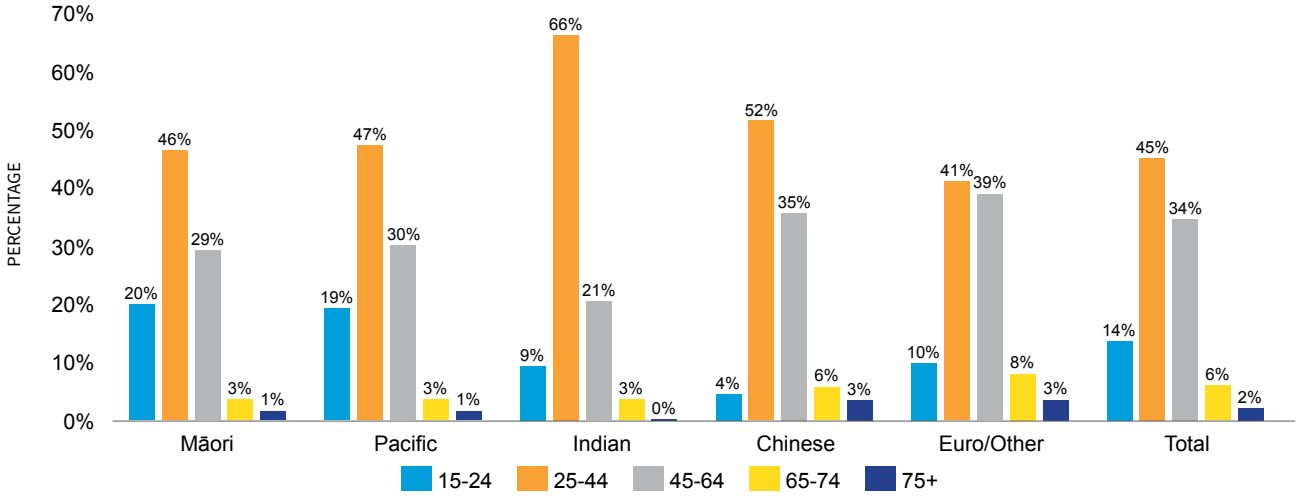
Comparing with national statistics, ProCare has a lower smoking prevalence (9%) than New Zealand overall (17%) and for Māori, Pacific and European/Other ethnic groups:

- ProCare Māori 21% vs NZ Māori 38%
- ProCare Pacific 13% vs NZ Pacific 24%
- ProCare European/Other 7% vs NZ European/Other 15%.

ProCare Indian (4%) and Chinese (5%) smoking prevalence is similar to New Zealand Asian overall (6%) http://www.smokefree.org.nz/smoking-its-effects/facts-figures.

The lower smoking prevalence than that reported for New Zealand overall suggests that data quality issues may be present or reporting bias.

Fig 9. Proportion of smoking by ethnicity and age groups



In the ProCare enrolled population:

- 79% people who smoke are between 25-64 years
- 20% of Māori youth and 19% Pacific youth aged 15-24 years are recorded as smokers
- 66% of Indian people who smoke are 25-44 years
- Over 65 yrs – less than 4% Māori, Pacific and Indian elders smoke but 9% Chinese and 11% of people within European/Other group.

Further analyses need to be conducted stratifying Pacific youth in the top four Pacific groups; Tongan, Samoan, Cook Island, Niuean. This is relevant for future smoking cessation programmes.

Smoking indicators of care

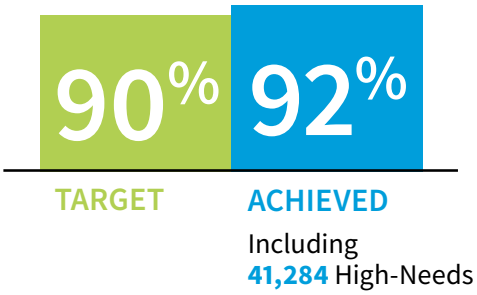
Brief advice

As of 1 January 2017, 89% of people who had a smoking status of current smoker within the last 15 months have been recorded as receiving brief advice to quit. By 30 June 2017 this had increased to 92%.

Smoking cessation

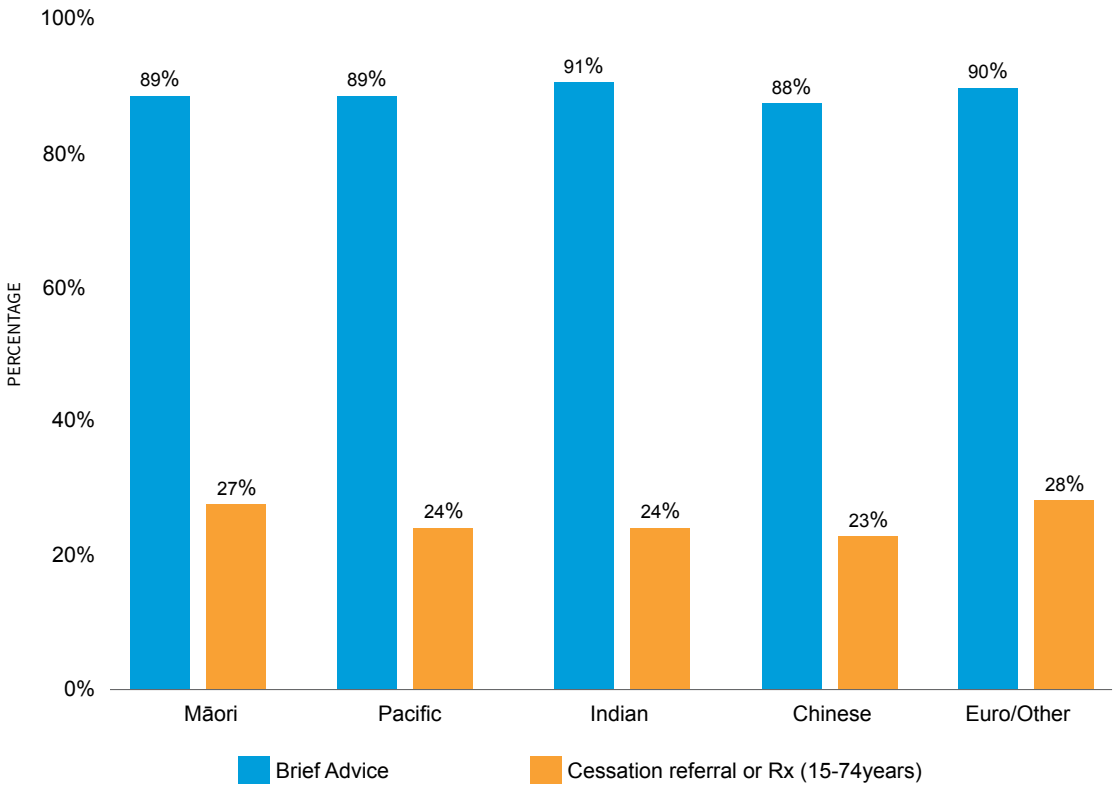
Simple advice has a small effect on cessation rates. Assuming an unassisted quit rate of 2 to 3%, a brief advice intervention can increase quitting by a further 1 to 3% and even the act of referral also has some positive benefit.[7] Smoking cessation support was defined as the enrolled population aged 15-74 years who had a smoking status of current smoker within the last 15 months and who have been recorded as having been referred to cessation services (e.g. Quitline, Choose to be Free or Ready Steady Quit) or prescribed medication.

BETTER HELP FOR SMOKERS TO QUIT
(PRIMARY CARE)



Including **41,284** High-Needs

Fig 10. Smoking performance indicators: Smoking brief advice given or patients recorded as receiving smoking cessation treatment or referral to cessation services



As at 1 January 2017, overall 19,854 (27%) smokers aged 15-74 years had been referred to cessation services or prescribed medication. By count, 10,395 European/Other smokers, 4,915 Māori smokers and 3,408 Pacific smokers had been referred compared to 588 Indian smokers and 548 Chinese smokers.

While patients (and their families/whānau) and doctors have a role with respect to quitting smoking, quit support and referral to cessation services, this data indicates that the goal of reducing prevalence to below 5% by 2025 is not on track, and will be missed by a wide margin for Māori and Pacific peoples.

Blood pressure and cholesterol

PREDICT is a web-based clinical tool used during primary care patient consultations to estimate a patient's five-year risk of a cardiovascular disease (CVD) event such as a heart attack or stroke. The software also provides CVD and diabetes guideline management advice tailored to each individual's risk profile. With permission from primary health care organisations, patient CVD profiles using the PREDICT online forms in New Zealand are anonymised and made available to University of Auckland researchers to generate the PREDICT-CVD cohort. ProCare has participated in the PREDICT CVD cohort study since its inception. From this dataset 255,528 patients have been assessed by ProCare GPs from August 2002 to October 2015. Two summary tables are given below. They represent ProCare practice CVD risk assessment data by risk factor profile according to sex and ethnicity. All data has been age-standardised according to the WHO population due to the differences in age structure of the populations.

Table 18. Characteristics of ProCare men and women aged 35-74 years who have had a CVD risk assessment using PREDICT software from August 2002 to October 2015*

WOMEN, aged 35-74 years

	Age-standardised values					
	TOTAL	Māori	Pacific	Indian	Chinese	European
	n (%) or mean (SD)	% of known data or mean				
n	111,081	13,406	13,668	7,895	7,702	68,410
Age, actual years (SD)	57 (8.7)	53 (8.4)	53 (9.0)	53 (8.8)	59 (7.4)	60 (8.0)
% Deprivation index, Q5	26.4	45.0	53.1	34.7	12.0	15.7
Blood pressure						
Systolic (mean), mmHg	128	130	130	126	121	128
Diastolic (mean), mmHg	79	81	81	78	76	78
<140/90 mmHg, %	72.1	68.5	69.7	78.5	80.7	71.6
TC/HDL cholesterol	3.8	4.0	4.0	4.0	3.6	3.8

MEN, aged 35-74 years

	TOTAL	Māori	Pacific	Indian	Chinese	European
n (% of total)	144,447	14,940	15,679	10,944	8,250	9,4634
Age, actual years (SD)	54 (9.8)	49 (9.7)	49 (10.0)	48 (10.5)	56 (8.8)	55 (9.1)
% Deprivation index, Q5	22.9	41.5	52.8	33.5	11.7	13.0
Blood pressure						
Systolic, mmHg	129	131	130	128	125	130
Diastolic, mmHg	80	83	82	79	79	80
<140/90 mmHg, %	72.0	66.4	69.3	78.2	80.1	72.0
TC/HDL cholesterol	4.4	4.5	4.4	4.5	4.3	4.4

* Analyses provided by Dr K. Poppe, University of Auckland.

At the time of CVD risk assessment overall 72% had a blood pressure (BP) less than 140/90mmHg. Māori and Pacific men and women had higher mean BPs and a lower proportion of those with BP<140/90 compared to their non–Māori non–Pacific counterparts.

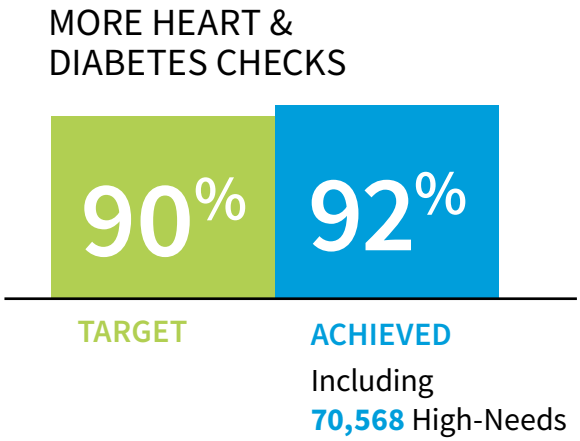
Women had a lower overall total cholesterol/high density lipoprotein cholesterol (TC/HDL ratio) 3.8 compared to 4.4 for men which would contribute to their overall lower risk of a CVD event.

CVD risk assessment

National performance targets recommend all women 55- 74 years and all men at 45-74 years to have a CVD risk assessment undertaken (and 10 years earlier for Māori, Pacific and Indo-Asian).

Overall 92% of ProCare eligible population have had a CVD risk assessment in the last five years.

The biggest gap in CVD risk assessment is for younger Māori, Pacific and Indian men aged 35-44 years. This is 73%, 81% and 82% respectively.



CVD risk

CVD risk refers to the proportion of people who are predicted to have a hospitalisation or death from a CVD event (e.g. heart attack or stroke) in the next five years. For example, a CVD risk of 20% means that 20 out of 100 people are predicted to experience a heart attack or stroke in the next five years.

Data on CVD risk status has been derived from the Clinical Intelligence System (CIS); 110 practices. The estimated proportions of ProCare patients by five year risk category are as below:

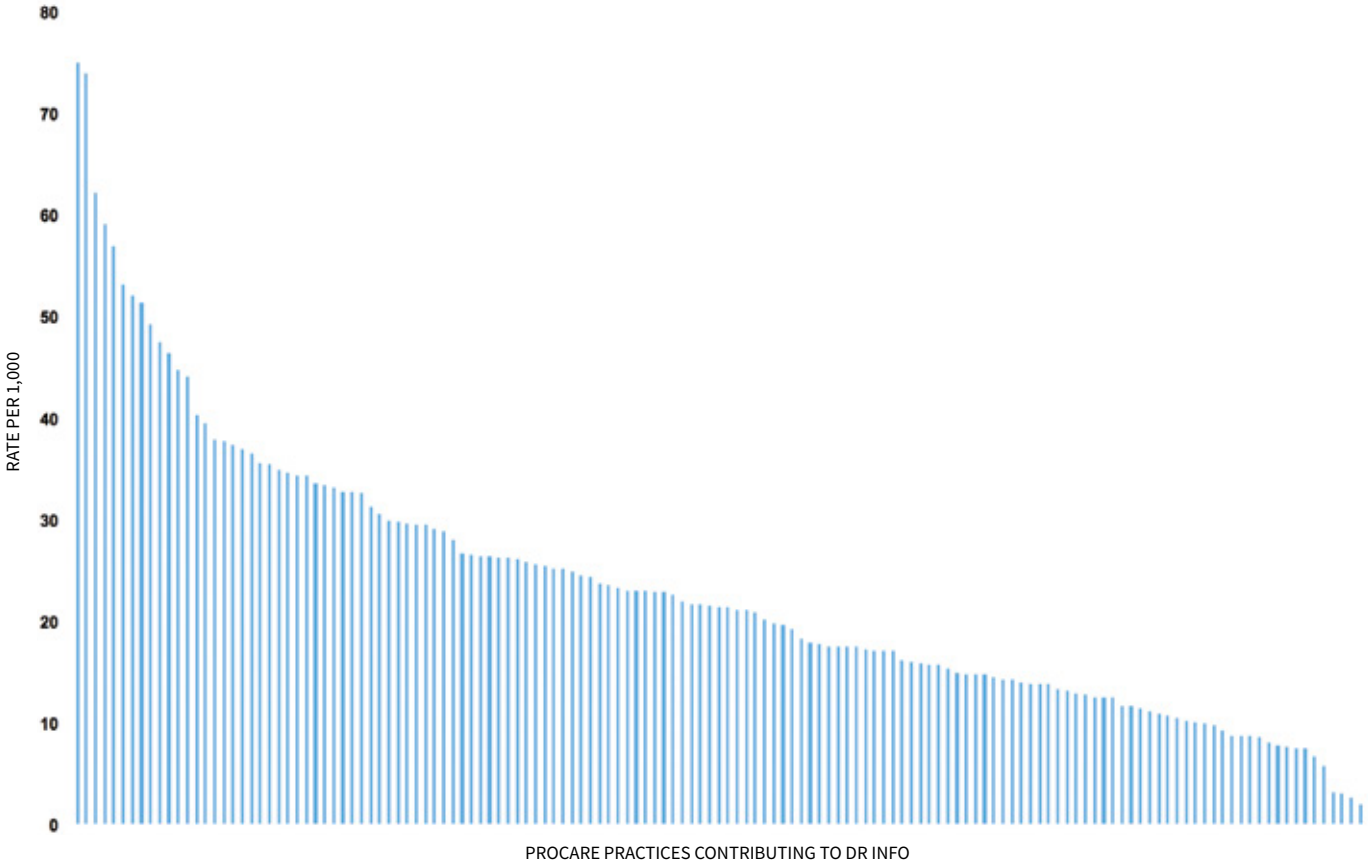
- 19% with a low CVD risk (<5%)
- 24% with CVD risk 5-9%
- 11% with CVD risk 10-14%
- 5% with high CVD risk 15-19%
- 3% with very high CVD risk ≥ 20%.

Assuming the CIS proportion of 3% with very high CVD risk of 20% or more is representative of the whole enrolled population, this is equivalent to 11,600 ProCare patients who are at very high risk of a fatal or non-fatal heart attack or stroke in the next five years.

11.6k ARE AT **VERY HIGH RISK** OF CARDIOVASCULAR DISEASE

However, there is marked variation across practice enrolled populations. Using DrInfo as an additional data source (144 practices), the prevalence of people with a CVD risk of 20% or more per 1,000 patients eligible for CVD risk assessment varied from 0/1,000 to 75/1,000. Although some of this variation may be due to defined practice populations (aged care or student health), this variation needs to be investigated further.

Fig 11. CVD risk ≥ 20% per 1,000 eligible patients per practice

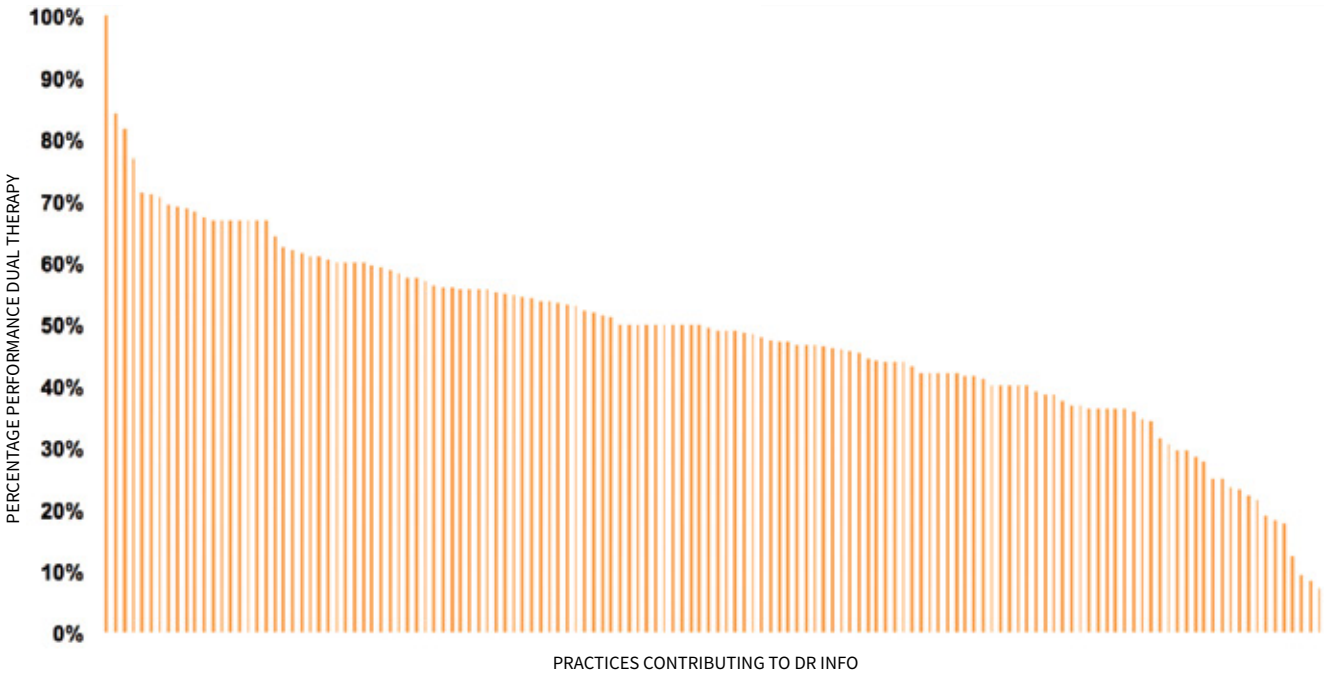


Medical management of very high CVD risk ≥ 20% (dual therapy)

National guidelines recommend that people with a CVD risk ≥ 20% should be treated with BP lowering and lipid lowering medications.[8] Dual therapy for this population group is a ProCare Outcomes and Quality Framework performance indicator. Using DrInfo extracts (144 practices), as at May 2017 dual therapy performance for people at very high five-year CVD risk ≥ 20%:

- Varies from 0-100%
- Mean practice dual therapy performance is 49%
- Mean practice dual therapy performance is 50% for 'high needs' (Māori, Pacific and others residing in NZDepQ5).

Fig 12. Medical management (dual therapy) of very high CVD risk ≥ 20% by practice



Domain 5: Long term condition prevalence

Cardiovascular disease (CVD) prevalence

CVD is the leading cause of mortality accounting for 30% of deaths annually, many of which are premature and preventable.[9] CVD is the second leading cause of health loss in New Zealand, in disability adjusted life years, with 8% of total health loss in New Zealand as a result of ischaemic heart disease (IHD) and 3% related to stroke.[10] While mortality rates of ischaemic heart disease in New Zealand have reduced by over 70% since 1980, significant inequalities in CVD hospitalisations and mortality relating to both ethnicity and deprivation have persisted. National data show that after controlling for deprivation, Māori IHD mortality rates remain higher than non–Māori rates. Therefore Māori experience worse IHD outcomes that are independent of, and in addition to, those associated with deprivation.[11]

ProCare has participated in the PREDICT cohort study since its inception.[12] From this dataset 255,528 patients have been assessed by ProCare GPs from August 2002 to 12 October 2015. A summary table (unpublished data) is given below for the prevalence of ischaemic CVD by sex and ethnicity (Table 19). Ischaemic CVD includes a number of disease conditions including angina, myocardial infarction, coronary artery operations including bypass grafting, ischaemic stroke and transient ischaemic attack (TIA) and peripheral vascular disease. In addition the prevalence of haemorrhagic stroke, heart failure and atrial fibrillation is also given.

The prevalence of these conditions will be used in later tables as population estimates in comparison to Read coded prevalence in CIS practices.

A history of CVD is both GP recorded in the PREDICT template at the time of a first PREDICT assessment as well as an ICD-10 coded CVD hospitalisation. For ischaemic heart disease (IHD), the diagnosis was also augmented by whether a patient had been dispensed more than one prescription of nitrate therapy (for angina). All data has been age-standardised according to the WHO population due to the differences in age structure of the populations.

Table 19. Characteristics of ProCare men and women aged 35-74 years who have a history of CVD occurring between August 2002 and October 2015*

ProCare WOMEN aged 35-74 years	Age-standardised values					
	TOTAL	Māori	Pacific	Indian	Chinese	European
	n (%) or mean (SD)	% of known data or mean				
n	111,081	13,406	13,668	7,895	7,702	68,410
Medical history, %						
Total ischaemic CVD	9.4	11.7	8.6	6.9	4.4	9.2
Ischaemic heart disease	4.3	6.3	4.2	4.2	2.5	4.1
Stroke/TIA	2.0	3.3	2.3	1.2	1.3	1.9
Peripheral vascular disease	1.2	1.8	1.2	0.8	0.2	1.3
PCI or CABG	1.3	1.6	1.1	1.4	0.7	1.4
Haemorrhagic stroke	0.3	0.6	0.5	0.3	0.2	0.3
Heart failure	2.5	4.2	3.5	2.2	0.5	2.1
Atrial fibrillation	1.8	2.9	2.2	0.7	0.8	1.7

ProCare MEN, aged 35-74 years

	TOTAL	Māori	Pacific	Indian	Chinese	European
	n (%) or mean (SD)	% of known data or mean				
n (% of total)	144,447	14,940	15,679	10,944	8,250	94,634
Medical history, %						
Total ischaemic CVD	10.4	12.0	8.5	7.8	6.0	11.3
Ischaemic heart disease	5.8	5.9	5.0	7.0	3.2	6.1
Stroke/TIA	1.9	2.2	1.8	1.4	1.3	2.0
Peripheral vascular disease	1.4	1.7	1.3	1.1	0.6	1.4
PCI or CABG	3.5	2.6	2.4	4.6	1.7	3.9
Haemorrhagic stroke	0.3	0.4	0.4	0.2	0.2	0.2
Heart failure	1.8	4.0	2.7	1.4	0.6	1.4
Atrial fibrillation	2.6	3.7	2.2	0.8	1.2	2.9

Age-standardisation performed against the WHO standard for ages 35-74 inclusive.

* Analyses provided by Dr K. Poppe, University of Auckland.

Total Ischaemic CVD (heart attack, stroke and peripheral vascular disease) was highest for Māori men and women compared to all other ethnic groups.

- CVD (heart attack, stroke and PVD) was highest for Māori women and men
- A history of haemorrhagic stroke was highest among Māori and Pacific women, followed by Māori and Pacific men (in order)
- A history of heart failure was highest among Māori women and men, followed by Pacific women and men (in order)
- To summarise, the PREDICT data confirm that CVD inequitably burdens the lives of Māori and Pacific people, their whānau and communities.

CVD Read coding in general practice records

The prevalence figures from PREDICT were compared to Read coded prevalence in the Clincal Intelligence System (CIS; 110 practices) for people over the age of 35 years (Table 20). Ischaemic heart disease (IHD) included all Read coded angina, myocardial infarction and coronary artery procedures including bypass grafting. Stroke coding included transient ischaemic attack (TIA) and peripheral vascular disease includes intermittent claudication, coded peripheral vascular disease and gangrene. The prevalence estimates from PREDICT are similar to other literature e.g. Thornley et al, 2011 estimated the overall crude prevalence of IHD to be 5.8%[13] and the Heart Foundation cites that one in 20 adults (https://www.heartfoundation.org.nz/statistics) have IHD. In Table 20, estimates of the expected prevalence of IHD were derived from PREDICT age standardised prevalence proportions and applied to the CIS proportions of men and women over 35 years.

Table 20. Expected prevalence of CVD and CVD subgroups derived from PREDICT and compared to Read coding in general practice records

Total CIS population aged >35	PREDICT Data prevalence	Estimated expected prevalence	Total patients with Read code in CIS	Māori	Pacific	Indian	Chinese	Euro/ Other
N= 292,198	%	N	N	N=21,631	N=27,033	N=14,844	N=18,747	N=209,943
IHD*	5.8% men 4.3% women	13,448	13,423 (4.6%)	954 (4.4%)	1,056 (3.9%)	799 (5.4%)	497 (2.7%)	10,117 (4.8%)
Ischaemic Stroke/TIA	1.9% men 2% women	5,229	1,052 (0.4%)	60	55	28	72	837
Peripheral Vascular Disease	1.4% men 1.2% women	3,472	153	9	12	6	3	123
Total Ischaemic CVD	10.4% men 9.4% women	22,149	14,628 (5%)	1,023 (4.7%)	1,123 (4.2%)	833 (5.6%)	572 (3.1%)	11,077 (5.3%)

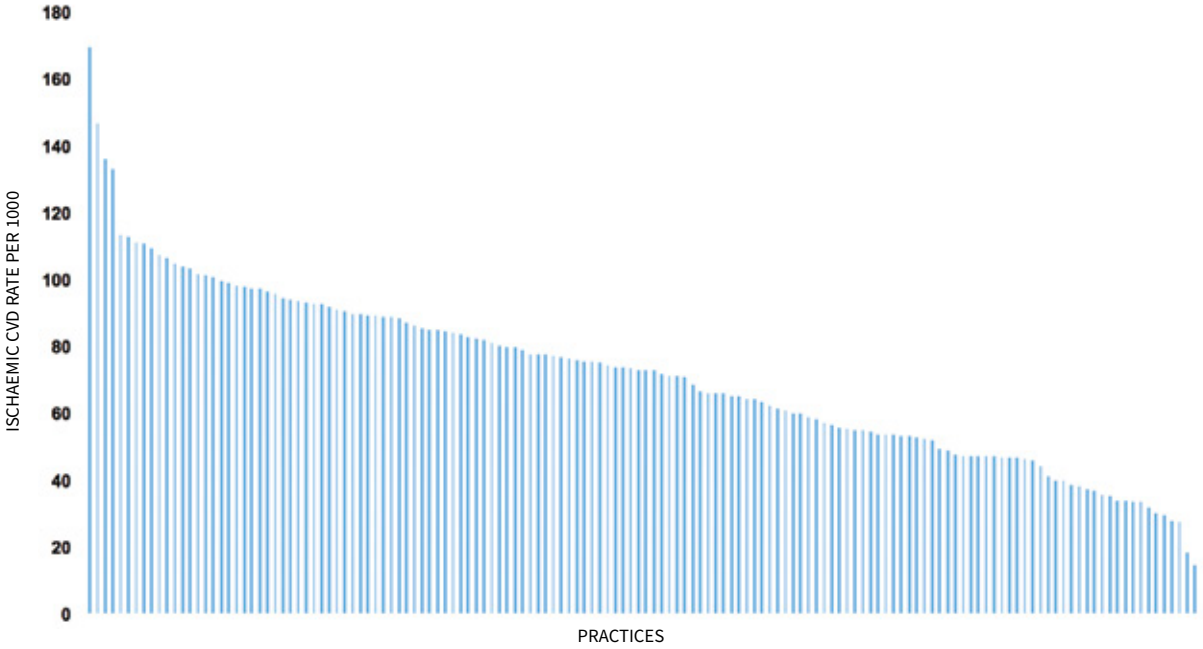
*Also known as coronary heart disease.

The overall prevalence estimate of IHD from Read coding closely matched the expected prevalence from PREDICT. However, there are large coding gaps between expected/observed prevalence for stroke/TIA and peripheral vascular disease. This is the main factor contributing to having over 7,000 less people than would be expected for total ischaemic CVD diagnosis via Read coding. Overall this indicates some differential miscoding since European/Other and Indian groups have higher Read coded prevalences than Māori and Pacific.

Ischaemic CVD from DrInfo (144 practices)

Another data source to estimate the prevalence of CVD in ProCare practices is DrInfo. DrInfo includes a mix of Read codes and other text word queries and generates an overall ischaemic CVD estimate inclusive of IHD, stroke/TIA and peripheral vascular disease. From DrInfo extracted data (144 practices) the number of patients with ischaemic CVD in patients aged over 35 years was 25,664 out of 358,588; a crude prevalence of 70/1000 patients. Practices vary from 14/1000 to 169/1000 (Fig 13).

Fig 13. Ischaemic CVD prevalence (DrInfo) recorded in general practice records for enrolled patients 35 years and over



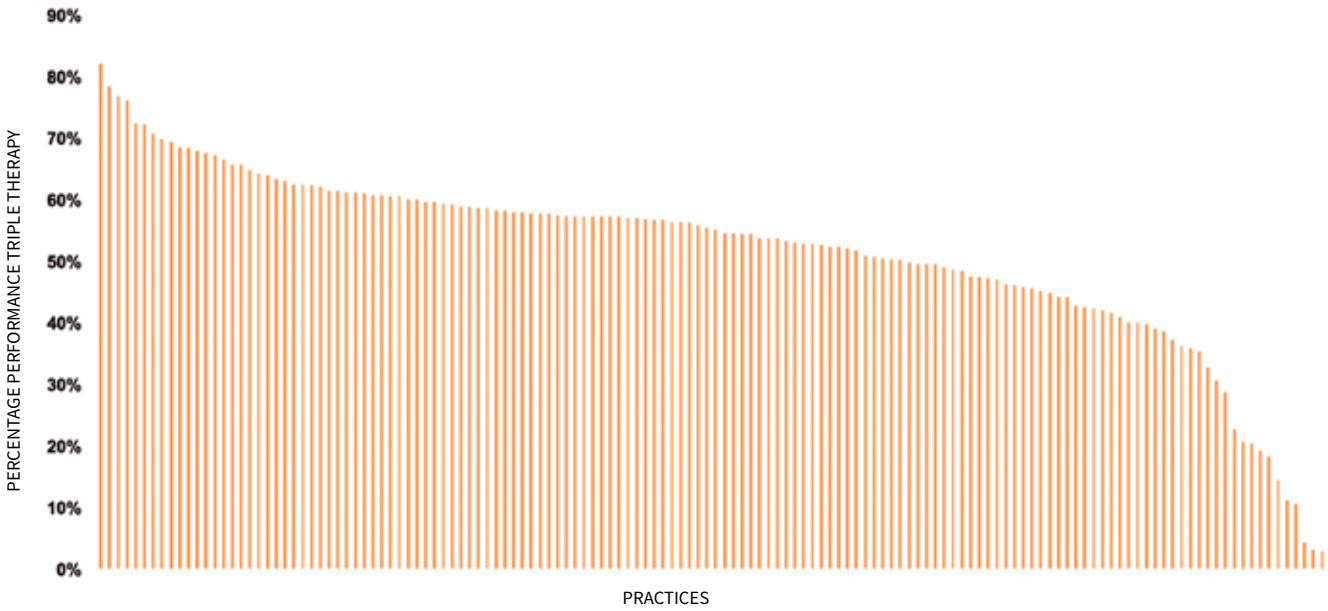
Medical management of Ischaemic CVD (triple therapy)

People who have suffered a prior CVD event are at very high risk of a subsequent event. National guidelines recommend that these people should be treated with BP lowering, lipid lowering and antiplatelet or anticoagulant medications.[8] This 'triple therapy' is a ProCare Outcomes and Quality Framework performance indicator. Overall as at May 2017:

- 55% of people classified as having CVD are receiving triple therapy
- 53% of those classified as being 'high needs' (Māori, Pacific and others residing in NZDepQ5) are are receiving triple therapy.

Using DrInfo extracts, triple therapy performance by practice for people with ischaemic CVD varies from 0-82% (Fig 14).

Fig 14. Medical management (triple therapy) of patients with prior CVD by practice



Other CVD conditions and renal failure Read coding

The expected prevalence of other CVD-related conditions were derived from PREDICT age standardised prevalence proportions and applied to the CIS proportions of men and women over 35 years (Table 21). From PREDICT data, Māori and Pacific have a higher history of heart failure, haemorrhagic stroke and atrial fibrillation than their European/Other counterparts.

Table 21. Expected prevalence of other CVD conditions and renal failure derived from PREDICT and compared to Read coding in general practice records

Total CIS population aged >35	PREDICT Data prevalence	Estimated expected prevalence	Total patients with Read code	Māori	Pacific	Indian	Chinese	Euro/ Other
N= 292,198	**%**	**N**	**N**	**21,631**	**27,033**	**14,844**	**18,747**	**209,943**
Haemorrhagic stroke	0.3% men and women	804	474	54 (0.3%)	36 (0.13%)	14	36	336 (0.16%)
Atrial Fibrillation	2.6% men 1.8% women	5,850	8,771	810 (3.7%)	719 (2.6%)	129	238	6,875 (3.2%)
Heart failure	1.8% men 2.5% women	5,796	2,998	461 (2.1%)	591 (2.2%)	118	54	1,774 (0.84%)
Renal failure	5% overall	8,840	3,879	363 (1.7%)	84 (3.1%)2	141	97	2,436 (1.1%)

Comparing expected prevalence with observed Read coding, overall there was significant under recording of haemorrhagic stroke, heart failure and renal failure. Note that while the definition of renal failure in CIS is Read coded endstage/chronic renal failure or renal failure unspecified (including renal impairment), the definition of renal impairment from PREDICT is related to an estimated glomerular filtration rate (eGFR) level of ≤60mls/min/1.73m2 and as yet is only available as an overall population prevalence.

Māori had the highest levels of Read coding for haemorrhagic stroke, heart failure and atrial fibrillation and Pacific people the highest Read coding for renal failure.

The estimate for atrial fibrillation in CIS requires more investigation as the Read coding was much higher than expected. The Read code query included include atrial fibrillation, atrial flutter and paroxysmal atrial fibrillation. Further investigation regarding appropriate management with anticoagulant therapy should also be considered.

Diabetes

As at 1 January 2017 the ProCare population (824,735) included 45,661 patients with diabetes; a prevalence of 6% (Table 22).

According to DHB of practice, the prevalence ranges from 4.7% in WDHB to 7.3% in CMDHB.

This is very close to expected prevalence derived from national statistics. Using Statistics New Zealand DHB population and the Virtual Diabetes Register (VDR), the estimated prevalence within the three DHBs is similar (ranging from 4.7% to 7.4%). The VDR is based on multiple national datasets (National Minimum Dataset, the National Non-admitted Patients Collection [outpatients], the Pharmaceutical Collection, the Laboratory Claims Collection and the Primary Health Organisation Enrolment Collection).

Table 22. Diabetes prevalence estimates from national data compared with ProCare datasets

		Stats NZ Total DHB Population (2016/17)		
		Auckland (2016/17) 510,450	**Waitemata (2016/17) 597,510**	**Counties (2016/17) 541,080**
National Virtual Diabetes Register (2016 estimates)*		24,508 (4.8%)	27,796 (4.7%)	40,266 (7.4%)
Diabetes estimate using Karo (CPI) by DHB of practice (total ProCare N= 824,735)	45,661 (6%)	18,985 (5.2%)	12,414 (4.7%)	14,262 (7.3%)
Diabetes estimate (Dr Info 144 practices; n=671,163)	34,674 (5.2%)	12,210 (4.5%)	8,923 (4.4%)	13,541 (7%)

* http://www.health.govt.nz/our-work/diseases-and-conditions/diabetes/about-diabetes/virtual-diabetes-register-vdr

DrInfo diabetes extract is provided on a monthly basis from ~144 practices although this changes monthly (e.g. if the PMS is turned off data might only be available from 142 practices). This source is used to derive clinical detail for patients with diabetes for ProCare's Outcomes and Quality Framework. Based on current enrolled patients identified as having diabetes in Diabetes Extracts (Dr Info) over the last two years (2015 and 2016), 34,674 patients were identified with diabetes; a prevalence of 5.2%.

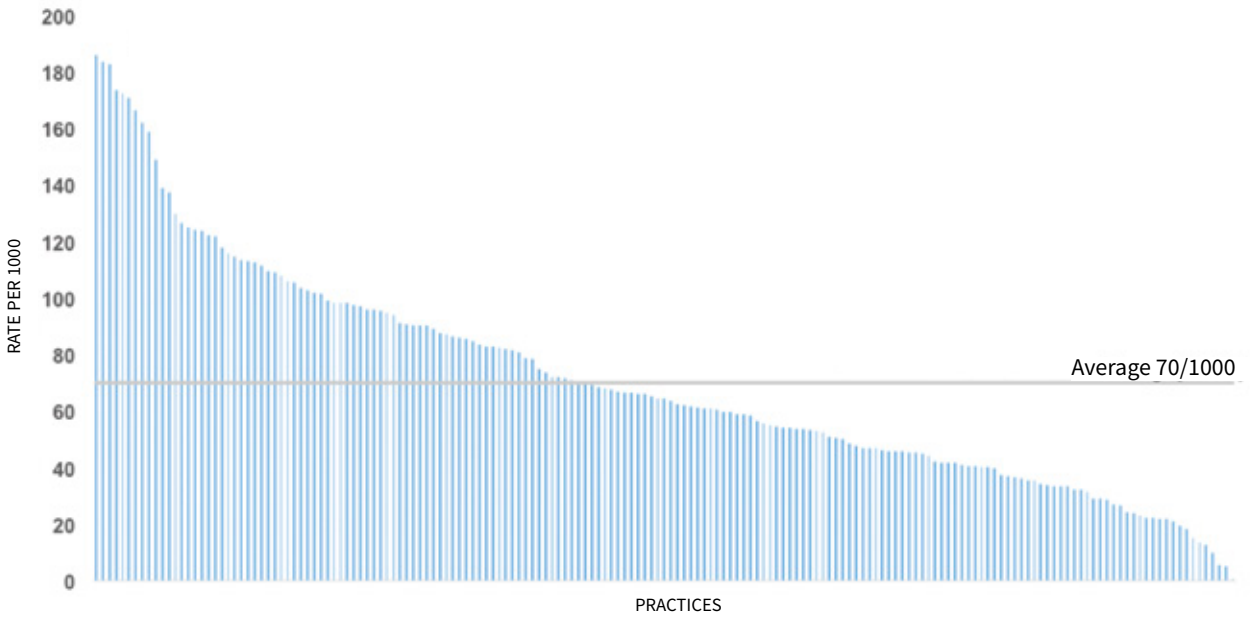
Table 23: ProCare population with diabetes by age group and ethnicity (Karo CPI extract)

Diabetes	Totals	Māori	Pacific	Indian	Chinese	Euro/Other
ProCare pop aged ≥15 years	**656,424**	**62,562**	**78,331**	**49,197**	**42,178**	**424,156**
	45,661 (6%)	**5,122 (8%)**	**11,185 (14%)**	**6,234 (13%)**	**2,565 (6%)**	**20,555 (5%)**
Age group						
15-24	562	100	139	35	5	283
25-44	5,346	846	1,725	950	146	1,679
45-64	20,853	2,758	5,913	3,144	1,078	7,960
65-74	10,739	965	2,261	1,415	784	5,314
75-84	6,272	401	964	611	451	3,845
85+	1,889	52	183	79	101	1,474

Overall by ethnicity, Pacific and Indian peoples have more than double the prevalence of diabetes than European/ Other group (Table 23). The majority (69%) of people with diabetes are aged between 45 to 64 years. A major inequity in prevalence occurs at age 25-44 years where of the total ethnic-specific burden of disease, 16.5% Māori, 15.4% Pacific and 15.2% Indian people have diabetes at this age group compared with 5.7% Chinese and 8.2% Euro/Other (column percentages).

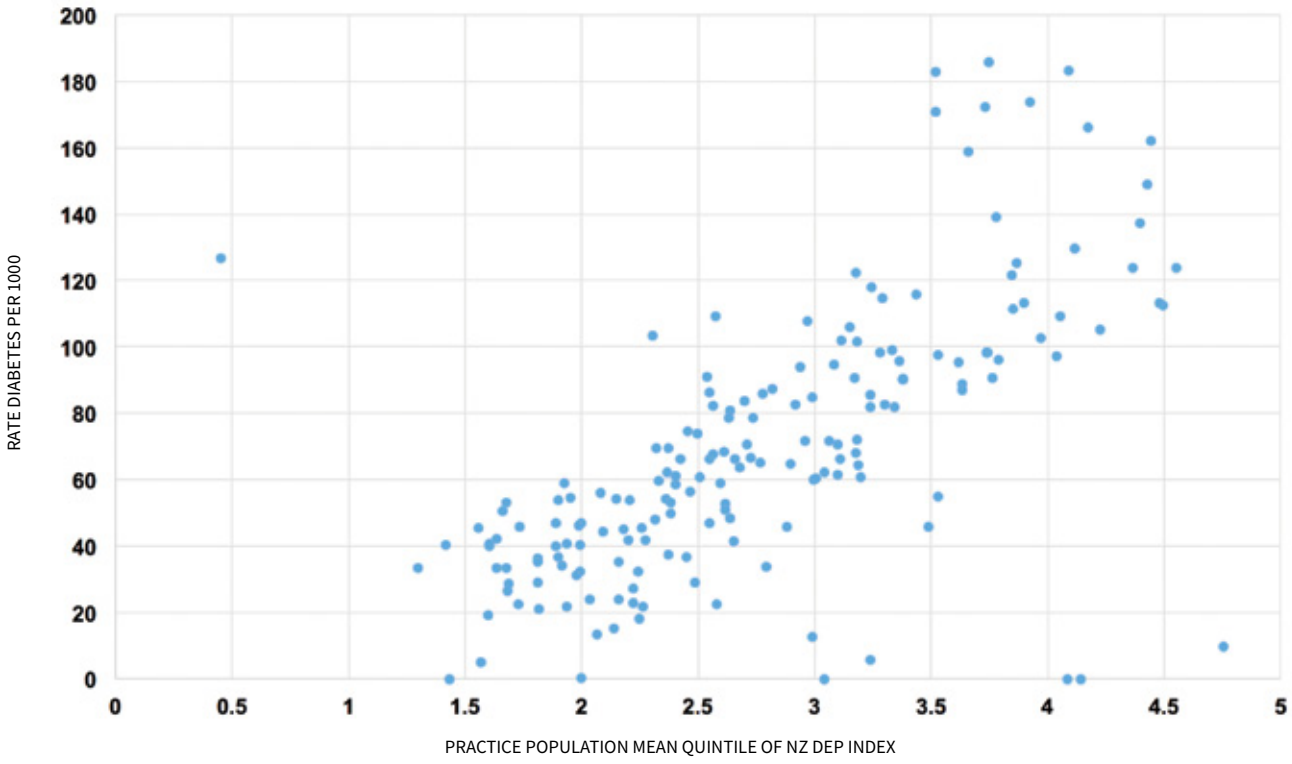
The histogram below (Fig 15) plots the prevalence of enrolled patients with diabetes by practice ranking from the highest to the lowest prevalence. The mean prevalence of diabetes by practice is 70 people per 1,000 but ranges from 185/1,000 patients to 0.3/1,000.

Fig 15. Prevalence of diabetes per 1,000 enrolled patients in ProCare practices



The graph (Fig 16) shows the prevalence of diabetes by the average quintile of NZDep Index score of the population in each ProCare practice. Each dot represents a ProCare practice. There is a marked positive correlation; as deprivation increases so too does the prevalence of diabetes in the practice. Note that of the enrolled ProCare population, 75% Pacific, 61% Māori and 48% Indian people live in the most deprived areas (NZDep Quintiles 4 and 5).

Fig 16. Practice prevalence of diabetes per 1,000 by average quintile of NZDep Index of practice population



Diabetes clinical indicators

Data on clinical indicators for people recorded as having diabetes over the last two years (2015 and 2016) has been derived from 144 practices using the DrInfo diabetes extract. The denominators provided below (total population and ethnic-specific populations) are from these DrInfo practices aged 15 years and over (Table 24).

A total of 34,674 patients with diabetes were identified from DrInfo extracts; 34,576 being 15 years or over.

Table 24. Clinical characteristics and management of patients with diabetes

DrInfo (age ≥15 years)	All recorded N=534,322	Māori 48,705 i	Pacific 55,110	Indian 31,828	Chinese 39,012	Euro/Other 359,667
Diabetes (age ≥15 years)	34,576 (8%)	3,972 (8%)	7,736 (14%)	4,116 (13%)	2, 334 (6%)	16,418 (5%)
% with BMI recorded last 5 years	83%	79%	87%	88%	85%	82%
% with BMI record (ever recorded)	91%	88%	92%	94%	89%	90%
BMI<25 (normal/underweight)	17%	6%	4%	23%	47%	19%
BMI=25-29 (overweight)	30%	17%	18%	43%	41%	34%
BMI=30-39 (obese)	40%	51%	51%	30%	11%	39%
BMI>40 (morbidly obese)	13%	27%	27%	3%	1%	8%
Current smoker	10.9%	25.4%	14.3%	4.2%	7.7%	7.9%
% Offered cessation						
(15-74 years smokers N=3,743)	36%	38%	36%	31%	23%	37%
Systolic BP N=34,314						
<140mmHg	23,844 (69%)	2,716 (69%)	5,365 (70%)	2,941 (72%)	1,746 (75%)	11,076 (68%)
≥140 to 169mmHg	9,667 (28%)	1,123 (28%)	2,135 (28%)	1,058 (26%)	528 (23%)	4,823 (30%)
≥170mmHg	803 (2%)	109 (3%)	190 (2%)	100 (2%)	43 (2%)	361 (2%)
Invalid/no record identified	262	24	46	17	17	158
HbA1c result absent last 2 years**	10,083 (29%)	1,333 (34%)	2,251 (29%)	1,229 (30%)	630 (27%)	4,640 (28%)
HbA1c						
≤55 mmol/mol	13,177 (54%)	1,207 (46%)	2,303 (42%)	1,534 (53%)	1,112 (65%)	7,021 (60%)
56-64 mmol/mol	4,828 (20%)	485 (18%)	1,094 (20%)	643 (22%)	346 (20%)	2,260 (19%)
65-89 mmol/mol	5,047 (21%)	649 (25%)	1,485 (27%)	599 (21%)	203 (12%)	2,111 (18%)
≥90 mmol/mol	1,441 (6%)	298 (11%)	603 (11%)	111 (4%)	43 (3%)	386 (3%)
Renal function						
eGFR test result absent	1421 (4%)	273 (7%)	555 (7%)	97 (2%)	51 (2%)	445 (3%)
eGFR						
eGFR≥90	10,088 (30%)	1,286 (35%)	2,004 (28%)	1,665 (41%)	825 (36%)	4308 (27%)
eGFR 61-89	15,505 (47%)	1,556 (42%)	3,316 (46%)	1,743 (43%)	1,106 (48%)	7,784 (49%)
eGFR ≤60 CKD	7,562 (23%)	857 (23%)	1,861 (26%)	611 (15%)	352 (15%)	3,881 (24%)
ACR test age 15-74yrs result absent	2,181 (8%)	395 (11%)	686 (10%)	201 (5%)	90 (5%)	809 (7%)
Microbuminuria (ACR ≥2.5mmol/mol men, ACR ≥3.5mmol/mol women)	6,326 (18%)	957 (24%)	1,893 (24%)	825 (20%)	343 (15%)	2,308 (14%)
If Microalbuminuria, % on ACE or ARB	4,472 (71%)	654 (68%)	1,343 (71%)	611 (74%)	200 (58%)	1,664 (72%)
Overt diabetic nephropathy (ACR≥30)	1,026 (3%)	213 (5%)	491 (6%)	102 (2%)	37 (2%)	183 (1%)
If Overt nephropathy, % on ACE or ARB	761 (74%)	151 (71%)	362 (74%)	86 (84%)	29 (78%)	133 (73%)

* Smoking Cessation: This was defined as the enrolled population aged 15-74 years who had a smoking status of current smoker within the last 15 months and who have been recorded as having been referred to cessation services or prescribed medication.

** Caution needs to be applied to HbA1c testing status due to a change in laboratory coding. Further investigation is needed.

Key clinical findings

- Overall diabetes prevalence was highest among Pacific and Indian people aged 15 years and older
- Approximately one in five patients with diabetes have not had their BMI recorded in the last five years
- 78% of Māori and Pacific adults with diabetes are obese or morbidly obese compared to 47% European/Other and 33% Indian. Despite these high rates 8% Pacific and 12% Māori have not had a BMI recorded
- Although smoking prevalence was highest (25%) among Māori patients with diabetes over 15 years of age, they were offered smoking cessation with the same frequency as their European/Other counterparts. The overall proportion of being offered cessation is low and this needs to be communicated to our ProCare network to be more proactive in referring to cessation programmes
- About 70% of people with diabetes have adequate blood pressure control
- 29% of people with diabetes had not had an HbA1c test in the last two years; however, caution needs to be applied to this figure due to a change in laboratory coding. Further investigation is needed regarding this variable
- Fewer than half of Māori and Pacific men and women with known diabetes had a HbA1c < 55mmol/L
- Across average measurements for HbA1c, eGFR and ACR including overt diabetic nephropathy (ACR≥30) Māori and Pacific patients had the least favourable clinical indicators
- If microalbuminuria or overt diabetic nephropathy were recorded as present, over a quarter of patients were not receiving ACE or ARB therapy.

Cancer

Cancer accounts for nearly one third of all deaths in New Zealand. Alongside cardiovascular disease, cancer is an important cause of preventable mortality and illness.[9, 10] Smoking, nutrition, obesity, alcohol and lack of exercise are significant risk factors. For Māori and people living in socioeconomically deprived areas, the burden of cancer is much higher than for the general population.

Expected or predicted cancer over five years

The most commonly registered cancers in New Zealand are colorectal, melanoma, lung, breast and prostate cancer.[10] Less than 1% of total cancer cases are in children less than 15 years. (Gala 2009 Northern Cancer Network). ProCare has approximately 346,433 enrolled female patients and 309,991 enrolled male patients over the age of 15 years. Age-standardised rates have been applied to these numbers to estimate number of people expected or predicted to be diagnosed with these cancers over five years (Table 25). The total expected or predicted five year incident cancer rate for ProCare equates to approximately 1,405 patients.

Table 25. Commonly registered cancers, by sex, 2008–2012, age-standardised rates and expected or predicted numbers of ProCare men and women with cancers

Cancer	NZ Males (count) 2008-2012	Age standardised rates/5yr	Expected or predicted ProCare men with cancer	Cancer	NZ Females (count) 2008-2012	Age standardised rates/5yr	Expected or predicted ProCare women with cancer
Prostate	15,581	106/100,000	328	Breast	14,188	96/100,000	333
Colorectal	7,629	50/100,000	155	Colorectal	7,075	40/100,000	139
Melanoma	6,052	42/100,000	130	Melanoma	5,295	35/100,000	121
Lung	5,274	34/100,000	105	Lung	4,661	27/100,000	94

Read coding for cancer

Using CIS data (110 practices) and approximately 50% of total enrolled population, there were 751 patients classified as having a Read code of one of the top five cancers. The major gaps identified were Read coding for lung cancer (zero recorded) and colorectal cancers. This may be a systems/extraction issue and requires further investigation.

Table 26. Read coding of the top five cancers

	Total	Māori	Pacific	Indian	Chinese	Euro/Other
All CIS Population >15 years	409,129	36,878	45,119	25,325	25,207	276,600
Breast cancer	284	38	36	7	5	198
Colorectal cancer	96	3	8	3	1	81
Lung cancer	0	0	0	0	0	0
Melanoma	253	7	1	0	0	245
Prostate cancer	118	7	6	1	1	103
TOTAL	751	55	51	11	7	627

Gout

In 2014, 5% of the New Zealand population aged 20 and over were identified as having gout (161,600 people).[14] According to Atlas of Healthcare Variation,[14] the prevalence of gout for Māori ranges from 6.2% in ADHB to 9.7% in CMDHB. Pacific people have nearly double the Māori rate; ranging from 12.7% (ADHB) to 15% (CMDHB).

Practice Read coding for gout

We interrogated the Clinical Intelligence System (CIS; 110 practices) for Read codes for gout and found 14,788 (5%) of the population with a Read code (Table 27).

Table 27. Read coding for gout compared to expected prevalence

Total CIS population aged >20	NZ gout prevalence (5-6%)	Total recorded	Māori	Pacific	Indian	Chinese	Euro/Other
293,630			25,693	30,947	14,779	7,679	214,532
Gout	**14,682 to 17,617**	**14,788 (5%)**	2,126 (8%)	3,892 (12.5%)	476 (3%)	420 (6%)	7,874 (4%)

If the CIS data is representative of all ProCare practices, then Read coding of gout is a reasonable estimate of prevalence for Māori but slightly lower than we would expect for Pacific people.

Further analyses are suggested to look at the proportion of people with gout who receive allopurinol and the proportion of people who have had a prescription for colchicine without being prescribed regular allopurinol.

Asthma

New Zealand has a high prevalence of asthma, with one in seven children (15%) aged 2–14 years (120,000 children) and one in nine adults (11%, 401,000 adults) reporting taking current asthma medication.[15]

The CIS data (110 practices) had 56,869 (10.4%) patients recorded with a Read code for asthma. The table below shows the Read coded proportions by age group and ethnicity.

Table 28. Read coding for asthma by age group and ethnicity.

Age Group	Read coded	Māori	Pacific	Indian	Chinese	Euro/Other	Grand Total
0-1 yrs	AsthmaRecorded	22	13	8	2	22	67
	TotalPop	2,174	2,062	1,087	1,007	6,647	12,977
	%	1.0%	0.6%	0.4%	0.1%	1.0%	3.1%
2-4 yrs	AsthmaRecorded	263	256	70	24	372	985
	TotalPop	3,729	4,001	1,580	1,887	11,698	22,895
	%	7%	6%	4%	1%	3%	4%
5-14 yrs	AsthmaRecorded	2,042	2,072	593	326	4,669	9,702
	TotalPop	11,463	13,276	4,144	4,017	40,583	73,483
	%	18%	16%	14%	8%	12%	13%
15+ yrs	AsthmaRecorded	6,357	5,549	2,150	1,112	30,947	46,115
	TotalPop	40,262	48,299	26,074	28,897	295,910	439,442
	%	16%	11%	8%	4%	10%	10%
Grand Total	**AsthmaRecorded**	**8,684**	**7,890**	**2,821**	**1,464**	**36,010**	**56,869**
Grand Total	**TotalPop**	**57,628**	**67,638**	**32,885**	**35,808**	**354,838**	**548,797**

As of January 2017, 17% of 2-14 year old were Read coded with asthma and 10% of adults aged 15 years and over. This is very close to national prevalence estimates. Notably, Māori have the highest proportions of asthma for those aged 2-4 years, 5-14 years and 15+ years followed by Pacific patients.

Further analyses are suggested to look at the proportion of people with asthma on a preventer and reliever or reliever by age and ethnicity given the disproportionate ambulatory sensitive hospitalisations for respiratory conditions for Māori and Pacific peoples.

Chronic obstructive pulmonary disease

Chronic obstructive pulmonary disease (COPD) is permanent, disabling and frequently progressive. Over 85% of cases of COPD are caused by inhalation of tobacco smoke. The condition is under diagnosed and often presents late. A person has irreversibly lost about 50% of lung function, equivalent to one lung, by the time they develop symptoms.

Chronic obstructive pulmonary disease (COPD) is estimated to affect between 9-14% of all New Zealanders aged over 40 years although New Zealand-specific data is sparse and prevalence varies according to how COPD is defined. The estimate for COPD prevalence based on a doctor diagnosis in the over 40 age group is 10.5% (95% CI, 7.8 to 13.2).[16] The prevalence increases with age affecting up to 30% of those aged over 70 years.

COPD is the fourth leading cause of death in New Zealand behind cancer, heart disease and stroke and the third leading cause of avoidable hospitalisation. Māori and Pacific peoples are three to four times more likely to be admitted to hospital for COPD than people in other ethnic groups in New Zealand.[10]

ProCare has 319,942 enrolled patients over 45 years. Therefore we would expect approximately 40,000 people to be affected by COPD, on average 223 patients per practice.

Table 29. Expected prevalence of COPD and Read coding of COPD

	Total ProCare enrolled pop 824,735 (1 January, 2017)
ProCare enrolled pop over 40 years	375,779
Expected prevalence based on national estimates (10.5% over 40 years)	39,456
Estimated prevalence per practice	223
Estimated prevalence by practice size*	
Practice A 2,500 enrolled patients	110
Practice B 5,000 enrolled patients	220
Practice C 7,500 enrolled patients	330
Practice D 10,000 enrolled patients	440
CIS population over 40 years (110 practices)	197,967
Expected prevalence based on national estimates (10.5% over 40 years)	20,786
Coded COPD	992

*Assumes that on average, 42% of ProCare patients are over 40 years and 10.51% will have COPD.

There is a very large gap in coding of COPD.

Systematic recording of COPD in general practice is needed.

For Māori the impact of smoking and socioeconomic status on symptoms, lung function, and other indices of COPD morbidity and mortality is great. The association is important because it represents risk factors that are at least partly modifiable.

Mental Health

50%

Almost half of all New Zealanders will experience mental health or addiction issues at some point in their lives.

1 in 5 New Zealanders every year

For the ProCare population, this means about **160,000** people who will have a mental health issue annually.

We estimated the prevalence of mental health issues based on the CIS (110 practices) and Read coding. Population prevalence estimates were derived from the 2015/16 New Zealand Health Survey;[15] bipolar disorder 0.9%, depression 15.4% and anxiety 9.5% reported by patients as ever diagnosed by a doctor. While it is difficult to interpret the Read coded prevalence, it appears that for ProCare patients depression is half the expected prevalence and anxiety, a third less than that expected (Table 30).

Table 30. Read coding for mental health conditions compared to expected prevalence

Total CIS population aged >15	Estimate of expected prevalence	Total recorded	Māori	Pacific	Indian	Chinese	Euro/Oth
313,937			36,878	45,119	25,325	25,207	276,600
Serious mental illness (bipolar and schizophrenia)	**2,825 (bipolar only 0.9%)**	**2,708**	495	330	81	94	1,708
Paranoia		**64**	<10	10	<10	<10	39
Other disorders eg personality, obsessive compulsive, phobic, somatoform disorders)		**4,546**	511	1,364	130	65	3,527
On antipsychotics* drug list in Appendix		**4,418**	461	268	145	192	3,352
Depression	**48,346 (15.4%)**	**26,478 (8.4%)**	3,233 (8.7%)	1,364 (3%)	820 (3.2%)	470 (1.9%)	20,591 (7.4%)
Anxiety	**29,824 (9.5%)**	**9,324 (3%)**	774	391	269	211	7,679
Addiction disorder		**3,181**	808	196	63	14	2,100

*NB: patients may have more than one mental health condition. For those Read coded with paranoia, the numbers less than 10 are not included.

Global measure of mental distress

In order to capture a more sensitive measure of mental distress, we identified patients enrolled in ProCare 1 July 2015 who had 'mental distress' ever recorded in the last 10 years. This was defined as any recording of the following:

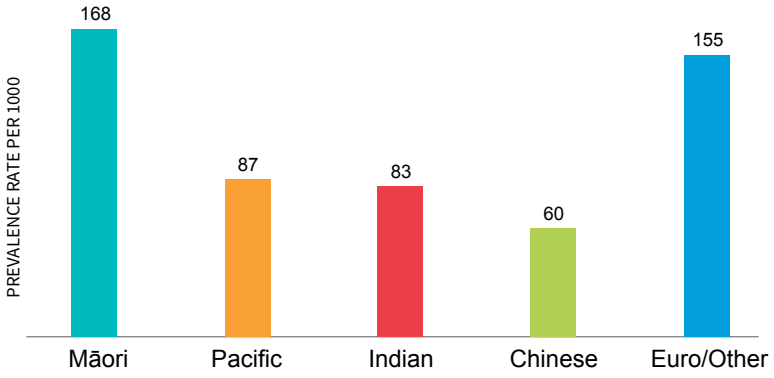
- Mental health Read code as recorded in CIS extracts as above (Table 30)
- Prescribed antipsychotic/antidepressive/longer acting anxiolytic medications as recorded in CIS extracts
- Referral to or seen by ProCare Psychological Services (PPS)
- Had a recorded Kessler score or a funded mental health consultation.

History of mental distress was then summarised in two ways:

1) Age-standardised prevalence per 1,000 of mental health distress by ethnicity (Fig 17)

2) Age-specific rates/1,000 by ethnicity (Fig 18).

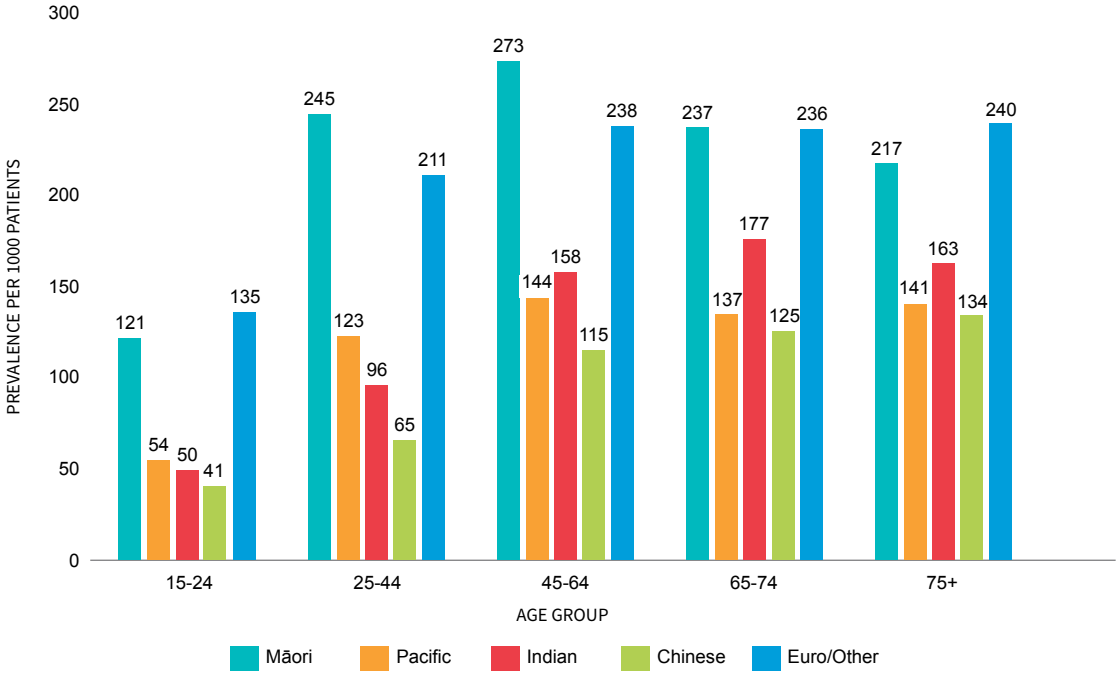
Fig 17. Age Standardised rates of mental health distress prevalence per 1,000 patients aged 15 years and over by ethnicity



* Age standardised to the WHO population using the direct method.

The prevalence of being seen or receiving services/medication with some indication of mental health distress in the last 10 years was 168/1,000 for Māori and 155/1,000 for European/Other ethnic group. These rates were approximately twice those of all the other age standardised ethnic groups.

Fig 18. Age-specific rates of mental health distress prevalence per 1,000 patients aged 15 years and over by ethnicity



For each age group, Māori and Euro/Other have the highest rates of recorded mental health distress with Pacific, Indian and Chinese less likely to seek advice and support from general practices (Fig 18). Mental health distress recorded in general practices was lowest in the 15-24 year age group, increasing up to 45-64 years and remaining at a similar age-specific rate in the older age groups.

It is possible that rates are lower than expected for 15-24 years as younger people might access school based clinics and student health centres for care. While Pacific people may seek advice and support from places other than general practice e.g. church ministers, peers, it appears that mental health services may not be offered or may not be as acceptable to the enrolled Pacific population.

Polypharmacy

Polypharmacy means that a person has been prescribed (and is taking) multiple long term medicines. It can be beneficial ('appropriate polypharmacy') or harmful ('problematic polypharmacy'). Adverse drug reactions and drug interactions are more frequent in older people due to altered pharmacokinetic and pharmacodynamic handling of medicines[17 18] and are a frequent cause of avoidable hospital admissions.[19 20] The single greatest predictor of adverse drug events is the number of medications a person takes.[21 22]

The frequency of adverse drug events increases from 13% with two medicines, 58% with five medicines to 82% when seven or more medicines are taken.[23]

National prevalence estimates have been taken from the Atlas of Health Care Variation.[14]

The following analysis (Table 31) provides estimates of the number of long term medications that have been prescribed for older people in three age groups; 65-74 years, 75-84 years and 85+ years. It was estimated using the subset of CIS practices which also have MedTech as their patient management system. The methodology is as close as possible to the HQSC Atlas of Healthcare Variation but used the long term medication field in MedTech to determine numbers. Compared with the Atlas, there is the same pattern of prescribing with increasing number of medications with advancing age. The CIS estimates will be an overestimate relative to the Atlas because we were unable to exclude prescriptions for needles, blood test strips, dermatological products, eye drops and respiratory devices. Therefore we have used Atlas proportions to calculate the numbers of older people in the total ProCare population over 65 years.

Table 31. Observed polypharmacy in ProCare older populations compared to expected polypharmacy using HQSC Atlas proportions

	CIS and MedTech; observed polypharmacy	HQSC ATLAS rates from national Pharms warehouse	Entire ProCare population>65	Expected polypharmacy using Atlas proportions to ProCare populations>65 years
65-74yrs 5+ Long Term Meds	35.6%	26.0%	62,058	16,135
75-84yrs 5+ Long Term Meds	54.9%	44.5%	31,959	14,222
85 and over 5+ Long Term Meds	63.5%	56.6%	12,876	7,288
65-74 5-7 Long Term Meds	20.8%	16.8%	62,058	10,426
75-84 5-7 Long Term Meds	28.3%	25.9%	31,959	8,277
85 and over 5-7 Long Term Meds	30.3%	30.4%	12,876	3,914
65-74 8-10 Long Term Meds	9.1%	6.5%	62,058	4,034
75-84 8-10 Long Term Meds	16.0%	12.9%	31,959	4,123
85 and over 8-10 Long Term Meds	20.5%	18.1%	12,876	2,331
65-74 11+ Long Term Meds	5.7%	2.7%	62,058	1,676
75-84 11+ Long Term Meds	10.7%	5.7%	31,959	1,822
85 and over 11+ Long Term Meds	12.7%	8.0%	12,876	1,030

Overall there were more than 35,000 patients aged 65 years or older who were estimated to be on five or more long term medications; 10,500 of whom were on 8-10 medications and more than 4,500 on 11+ medications. Although this analysis did not look at ethnic specific differences, the Atlas of Health Care Variation found that Māori and Pacific peoples were dispensed five or more long term medications at a younger age (65-74 and 75-84 years old) compared to those patients who identify as Asian or European/Other.

Suggested further analyses are to stratify by ethnicity as well as identify practices with high rates of polypharmacy in the elderly and consider conducting a literature review on the evidence for medication reviews by clinical pharmacists in primary care.

Domain 6: Preventive care - immunisations

Eight month immunisation target

The eight month immunisation target is 95% of infants to have completed their primary course of immunisations (six weeks, three months and five month immunisations) on time. The eligible population are those who turned eight months old during the three month period of Q4 December 2016.

Indian and Chinese babies had the highest rates of immunisation completion (97%) with Māori babies at about 88% (Table 32).

Table 32. Completion of all immunisations at 8 months of age by ethnicity

	Total recorded	Māori	Pacific	Indian	Chinese	Euro/Other
Completed all immunisations up to eight months	**2,533**	401	407	238	269	1,218
Total eligible for immunisations up to eight months	**2,727**	457	437	244	277	1,312
% completion	**92.9%**	87.7%	93.1%	97.5%	97.1%	92.8%

Can we close this gap? Reaching this composite target depends on primary care processes and parental willingness for children to be immunised. Table 33 shows that overall 3.1% of eligible children had one or more immunisations declined with the highest rates of declining for Māori babies (4.6%). This gap threatens the health of our Māori children. Given that an estimated 1-2% of the enrolled population are overseas at any point in time then the chances of reaching the 95% target is difficult. To achieve 95% immunisation completion for Māori babies means being able to immunise every one of the remaining 35 children and will require persistent and focused effort.

Table 33. Proportion of infants at eight months of age where one or more immunisations has been declined by ethnicity

	Total recorded	**Māori**	**Pacific**	**Indian**	**Chinese**	**Euro/Other**
Children where one or more immunisation has been declined	**85**	21	5	1	3	55
Total eligible for immunisations up to eight months	**2,727**	457	437	244	277	1,312
% declined	**3.1%**	4.6%	1.1%	0.4%	1.1%	4.2%

Two year immunisations

The eight month target superceded a 2011/12 target that 95% of two year old children would be fully immunised by July 2012. As at the last quarter of 2016, Indian (95%) and Chinese (93%) babies had the highest rates of immunisation at two years with Māori babies at about 87% (Table 34).

Table 34. Completion of all immunisations at two years of age by ethnicity

	Total recorded	Māori	Pacific	Indian	Chinese	Euro/Other
Completed all immunisations up to two years	**2,836**	419	490	270	342	1,315
Total eligible for immunisations up to two years	**3,096**	483	523	284	369	1,437
% completion	**91.6%**	86.8%	93.7%	95.1%	92.7%	91.5%

Overall 3.2% of eligible children had one or more immunisation declined with the highest rates of declining for Māori babies (5%).

Table 35. Proportion of infants at two years of age where one or more immunisations has been declined by ethnicity

	Total recorded	Māori	Pacific	Indian	Chinese	Euro/Other
Children where one or more immunisation has been declined	**100**	24	9	5	5	57
Total eligible for immunisations up to two years	**3,096**	483	523	284	369	1,437
% declined	**3.2%**	5%	1.7%	1.8%	1.4%	4%

Flu vaccination

A funded influenza vaccine is available each year for all patients over 65 years, and those under 65 years with one or more chronic condition, if pregnant or for children aged four or younger who have been hospitalised for respiratory illness or who have a history of significant respiratory illness. A reliable denominator is only available for those over 65 years. Pacific elders have the highest uptake of the influenza vaccine as well as the lowest rate of declining this immunisation (Table 36).

Table 36. Uptake of influenza vaccination by people aged 65 years and over by ethnicity

Influenza immunisations > 65years	Total recorded	Māori	Pacific	Indian	Chinese	Euro/Other
Received Flu Vac	67,222	2,935	5,047	2,931	3,307	53,002
Eligible for Flu vac	106,217	4,683	7,577	4,622	5,839	83,496
% eligible vaccinated	63%	63%	67%	63%	57%	63%
Declined Flu Vac	9,535	460	422	378	527	7,748
% eligible declined	9%	10%	6%	8%	9%	9%

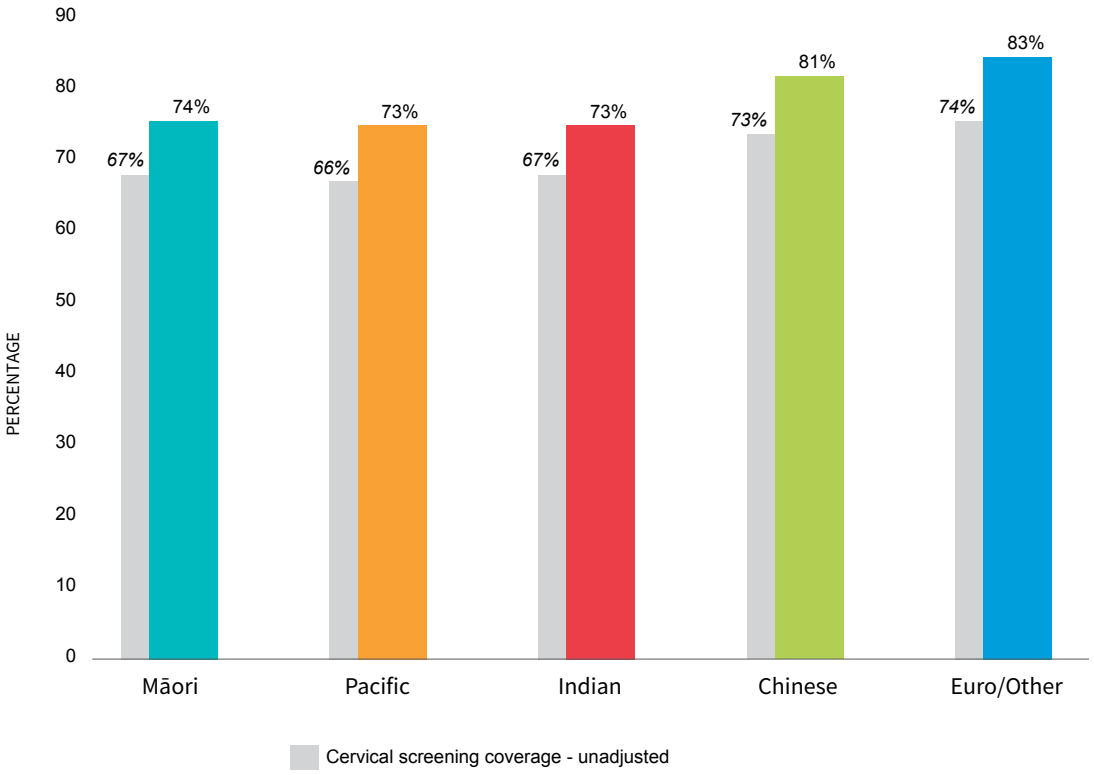
Cervical screening

Overall there were 250,667 women aged 25-69 years eligible for cervical screening of which 180,192 (72%) were completed on time. After adjusting for those with known hysterectomy overall 224,609 (83%) of the eligible total had completed cervical screening.

Suboptimal rates were seen for Māori (74%), Pacific (73%) and Indian (73%) women (Fig 19).

Māori women have higher rates of cervical cancer than non-Māori women, and are four times more likely to die from cervical cancer than European women. Part of this is likely to be due to continued suboptimal rates of screening.[24]

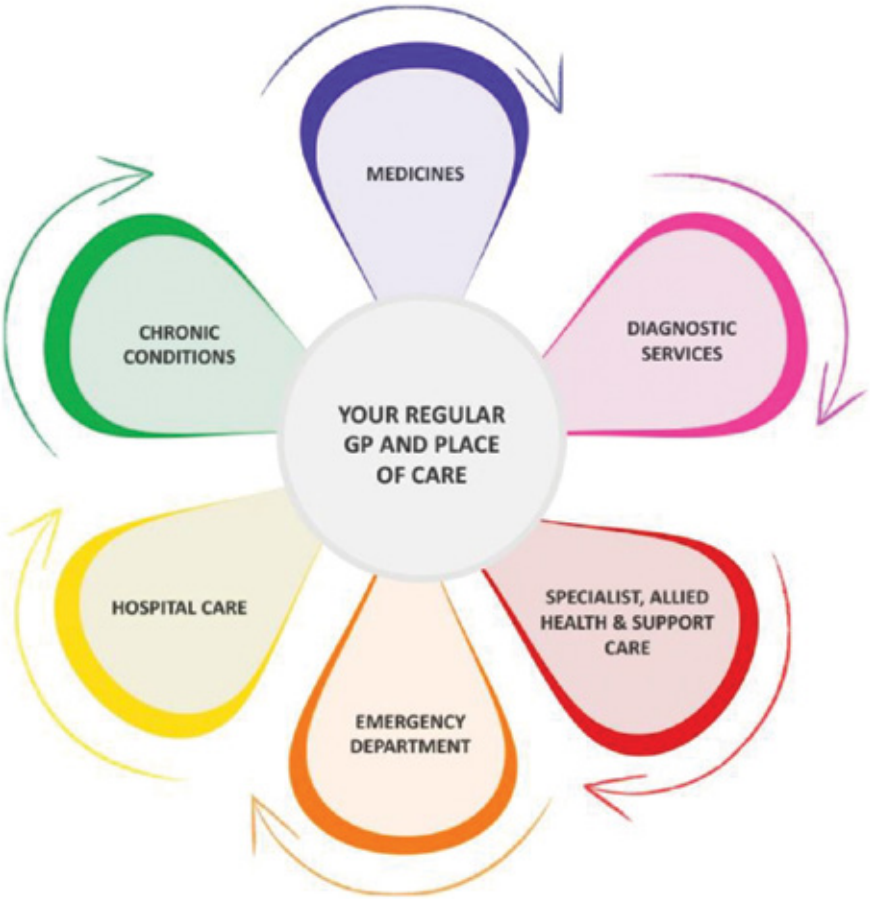
Fig 19. Proportion of women with completed cervical screening by ethnicity



Domain 7: Patient experience and engagement in health care

Patient experience survey

The primary care patient experience survey is a voluntary anonymous online survey developed by the Health Quality and Safety Commission to find out what patients' experience in primary care is like and how their overall care is managed between their general practice, diagnostic services, specialists, and/or hospital staff. The information will be used to improve the quality of service delivery and patient safety. The survey has had a phased roll out and is dependent on the National Enrolment Service (NES).



Picture Source: Health Quality and Safety Commission https://www.hqsc.govt.nz

All practices will eventually be participating as it will be part of the PHO Services Agreement. The survey is conducted at three monthly intervals and samples patients aged 15 years and over seen in the practice over one week. The survey looks at a patient's experience of the whole health care system using primary care as a window. It focuses on the coordination and integration of care, rather than just the last visit to a GP's surgery.

Anonymous patient responses are available to practices and PHOs via a secure online report portal.

The survey is divided into four domains; co-ordination, partnership, physical and emotional needs and each domain is reported by PHO average score, the national average and Māori and non-Māori average scores as well as including some free text 'patient stories'.

By quarters, 38 ProCare practices were participating in Q4 2016, 48 in Q1 2017 and 51 in Q2 2017. Enrolled patient numbers for 51 practices in the last survey (week of 17 May) was 263,051. The summary scores are given for the three rounds so far (Table 37).

Table 37. Three early results of patient experience scores for ProCare general practices compared to national mean scores

	Co-ordination domain score	Partnership domain score	Physical and emotional needs domain score	Communication domain score
ProCare 38 practices Nov 2016	8.7	7.9	8.0	8.6
National mean	8.6	7.6	8.0	8.5
Māori national mean	7.7	7.2	7.7	8.1
Non-Māori national mean	8.6	7.6	8.0	8.5
ProCare 48 practices Feb 2017	8.6	7.9	8.0	8.6
National mean	8.6	7.7	7.9	8.5
Māori national mean	8.0	7.5	7.7	8.5
Non-Māori national mean	8.7	7.7	8.0	8.5
ProCare 51 practices May 2017	8.7	7.9	8.1	8.7
National mean	8.6	7.7	7.9	8.6
Māori national mean	8.1	7.6	8.1	8.6
Non-Māori national mean	8.7	7.7	7.9	8.6

Thus far ProCare practices have scored the same as or above national average scores. The lowest scoring domain across all New Zealand participating practices/patients is the partnership domain.

Further analyses to investigate these scores for ProCare's Māori patients is required. A link between Māori experiences of poor care and reduced access to general practice has been proposed as a cause of the inequities in health outcomes.[25] Regular reporting on surveys of patient experiences can assist health providers to track improvements to their services for Māori. This is an area of work that ProCare needs to invest in.

Patient portals

Patient portals represent a new means of patient engagement with practices. These web-based e-tools allow a patient to interact with their practice in a number of ways; book an appointment, request a repeat prescription, securely message their practice, view their laboratory results, see their health summary, medications, allergies, immunisations, and their visit notes. In general, patients need to enrol with their practice to be able to use whatever functionality the practice has 'turned on'. There are three main portal products, ManageMyHealth that is integrated with MedTech, Health365 that is integrated with MyPractice and MedTech and ConnectMed that is integrated with MedTech (MedTech and MyPractice are practice electronic management systems). A patient is considered a portal user if they have enrolled and have gone into their portal at least once.

Portal access is described in Table 38. As of the second quarter of 2017, 124,531 (15.1%) patients in ProCare have enrolled. Uptake of portals in South Auckland practices has been slower than other areas but has accelerated markedly this year. Overall about 20% of practice populations (with portals) have enrolled so far.

Table 38. Portal implementation and patient portal enrolment by District Health Board

Practice Portal Access Q2 2017		ADHB	WDHB	CMDHB
Total population of ProCare	824,735	366,689	262,644	195,402
Total population of enrolled practices with portals	640,556	291,003	211,738	137,815
Total population with potential to access	78%	79%	81%	71%
Patients using portal	124,531	63,436	42,298	18,797
% Enrolled pop in practices with portal using portal	19.4%	21.8%	20.0%	13.6%
% Total ProCare using portal	15.1%	17.3%	16.1%	9.6%

Enrolments for the different portals

As of 1 June 2017 the two products that are most used are ConnectMed and Health365.

Table 39. Patient portal enroment according to portal product

Practice Portal Access	ConnectMed	Health365	ManageMyHealth
Total population of ProCare access to a portal	224,710	249,751	161,765
Patients using portal (1 June 2017)	54,063	51,059	19,409
Percentage of enrolled patients in portal market (1 June 2017)	43%	41%	16%
Percentage enrolled in portal	24.1%	20.4%	12.0%

Currently there is very limited visibility on the sociodemographic characteristics of people who are accessing/not accessing portals.

ConnectMed has provided the following data on usage and who is using a portal.

Of the total enrolled with ConnectMed:

- 66% women
- 75% aged 16-54 years
- 1,091 people 75-84 years
- 36 people over 90 years old.

In the last six months:

- 10,364 new enrolments (approximately 350/week)
- 76,271 appointments booked
- 10,632 prescription requests.

Health365 has provided the following data:

- 60,000 unique users accessed the Health365 site at least once last month. (This is from 100,000 registered patients)
- Male/female ratio nearly 50/50 (different from ConnectMed and ManageMyHealth where significantly more females accessed the portal)
- Health365 has been accessed from many places outside of New Zealand. Patients use it while travelling
- Lab results and appointments are the most used functionalities.

Domain 8: Hospitalisations - acute and elective services

Inpatient volumes

We obtained anonymised ProCare enrolled patient hospital admission data for two calendar years; 2015 and 2016 (Table 40). These can be divided in acute and elective admissions and as expected, length of stay (LOS) is shorter for elective admissions of which 84% are surgical procedures.

Table 40. Total acute and elective hospitalisations for ProCare enrolled patients in 2015 and 2016

			Year of event	
Admit Type group	**Admit Type group**		**2015**	**2016**
Acute (including Arranged Acute)	Acute (including Arranged Acute)	Admissions	140,539	146,389
		LOS (SD=1)	440,868	495,251
		Avg. LOS (SD=1)	3.1	3.4
Elective	Elective	Admissions	39,557	42,268
		LOS (SD=1)	77,264	84,771
		Avg. LOS (SD=1)	2.0	2.0
Grand Total		Admissions*	180,096	188,657
		LOS (SD=1)	518,132	580,022
		Avg. LOS (SD=1)**	2.9	3.1

* Total inpatient volumes (> 3 hours) for patients discharged 2015 and 2016. Volumes include all specialties and funded activity (casemix and non casemix events). Casemix is DRG funded services. Non casemix events includes some specialist procedures (eg chemotherapy day stay or gastroscopy) or per diem funded activity (e.g Mental Health and Assessment Treatment and Rehabilitation [ATR] and aged care facilities).

** Length of stay (LOS) is a calculated difference in days between start date and discharge date (i.e. the number of overnights) with same day (SD) admission & discharges = 1.

Table 41 includes casemix funded activity only for acute and elective services, categorised by medical, surgical, maternity and dental services and ordered by discharge volume and LOS. Almost half the acute ProCare inpatient volume (46%) comes into general internal medicine (22%), general surgery (8%) and maternity services(16%). Note that admissions for severe mental illness are not included in this data.

Table 41. Casemix funded activity for acute and elective services, categorised by medical, surgical, maternity and dental services

		ACUTE			ELECTIVE		
PUC Clinical Division	**PU DESCRIPTION (group)**	**Hospitalisation**	**LOS - Bed days**	**Av LOS**	**Hospitalisation**	**LOS - Bed days**	**Av LOS**
Medical	General Internal Medical Services - Inpatient Services (DRGs)	27,951 (22%)	89,152 (26%)	3.2	54 (0%)	214 (0%)	4.0
	Emergency Medicine - Inpatient Services (DRGs)	26,599 (21%)	26,685 (8%)	1.0	1 (0%)	1 (0%)	1.0
	Paediatric Medical - Inpatient Services (DRGs)	5,753 (4%)	13,095 (4%)	2.3	35 (0%)	45 (0%)	1.3
	Cardiology - Inpatient Services (DRGs)	4,065 (3%)	15,457 (4%)	3.8	1,201 (4%)	1,547 (3%)	1.3
	Renal Medicine - Inpatient Services (DRGs)	2,020 (2%)	7,387 (2%)	3.7	249 (1%)	638 (1%)	2.6
	Respiratory - Inpatient Services (DRGs)	1,500 (1%)	6,812 (2%)	4.5	115 (0%)	195 (0%)	1.7
	Neurology - Inpatient Services (DRGs)	1,083 (1%)	3,434 (1%)	3.2	10 (0%)	24 (0%)	2.5
	Oncology - Inpatient Services (DRGs)	1,060 (1%)	2,965 (1%)	2.8	18 (0%)	26 (0%)	1.4
	Haematology - Inpatient Services (DRGs)	1,035 (1%)	4,886 (1%)	4.7	10 (0%)	27 (0%)	2.7
	Gastroenterology - Inpatient Services (DRGs)	965 (1%)	3,103 (1%)	3.2	866 (3%)	996 (2%)	1.2
	Rheumatology (incl Immunology) - Inpatient Services (DRGs)	965 (1%)	1,190 (0%)	1.2	53 (0%)	53 (0%)	1.0
	Specialist Paediatric (DRGs)	749 (1%)	4,008 (1%)	5.4	231 (1%)	644 (1%)	2.8
	Endocrinology & Diabetic - Inpatient Services (DRGs)	381 (0%)	746 (0%)	2.0	7 (0%)	8 (0%)	1.2
	Infectious Diseases (incl Venereology) - Inpatient Services (DRGs)	158 (0%)	937 (0%)	5.9	1 (0%)	1 (0%)	1.0
	Dermatology - Inpatient Services (DRGs)	60 (0%)	291 (0%)	4.9	91 (0%)	91 (0%)	1.0
	Metabolic Services - Inpatient Services (DRGs)	22 (0%)	47 (0%)	2.2			
Surgical	General Surgery - Inpatient Services (DRGs)	10,926 (8%)	38,410 (11%)	3.5	4,752 (17%)	10,158 (20%)	2.1
	Orthopaedics - Inpatient Services (DRGs)	7,427 (6%)	34,013 (10%)	4.6	3,598 (13%)	10,894 (21%)	3.0
	Gynaecology - Inpatient Services (DRGs)	4,452 (3%)	7,291 (2%)	1.6	2,754 (10%)	4,249 (8%)	1.5
	Plastic & Burns - Inpatient Services (DRGs)	2,338 (2%)	6,173 (2%)	2.6	1,635 (6%)	2,566 (5%)	1.6
	Ophthalmology - Inpatient Services (DRGs)	1,325 (1%)	1,849 (1%)	1.4	3,804 (14%)	3,881 (8%)	1.0
	Ear Nose and Throat - Inpatient Services (DRGs)	1,268 (1%)	2,812 (1%)	2.2	3,624 (13%)	4,459 (9%)	1.2
	Urology - Inpatient Services (DRGs)	1,224 (1%)	2,851 (1%)	2.3	1,428 (5%)	2,540 (5%)	1.8
	Paediatric Surgical Services (DRGs)	926 (1%)	2,153 (1%)	2.3	580 (2%)	0,822 (2%)	1.4
	Neurosurgery - Inpatient Services (DRGs)	474 (0%)	3,782 (1%)	8.0	262 (1%)	1,374 (3%)	5.3
	Cardiothoracic - Inpatient Services (DRGs)	346 (0%)	3,713 (1%)	10.7	327 (1%)	2,761 (5%)	8.5
	Vascular Surgery - Inpatient Services (DRGs)	300 (0%)	2,370 (1%)	7.9	409 (1%)	1,071 (2%)	2.6
	Anaesthesiology and Pain Management - Inpatient Services (DRGs)	7 (0%)	7 (0%)	1.0	3 (0%)	3 (0%)	1.0
Maternity / neonatal	Maternity Inpatient (DRGs)	21216 (16%)	42693 (12%)	2.0	330 (1%)	904 (2%)	2.7
	Neonatal Inpatient (DRGs)	2137 (2%)	15120 (4%)	7.1			
Dental	Inpatient Dental treatment (DRGs)	317 (0%)	519 (0%)	1.6	1,235 (4%)	1,274 (2%)	1.0

PUC = Purchase Unit Code, DRG= Diagnosis-related group

Age standardised admission rates

Overall ProCare enrolled patient acute admissions (age standardised rates) were 227/1,000 in 2015 and 229/1,000 in 2016. Figure 20 has age standardised rates/1,000 by DHB and by year with rates being lower for practices in ADHB than the other two DHB catchments.

Fig 20. Age standardised acute hospitalisations by year and by DHB of practice

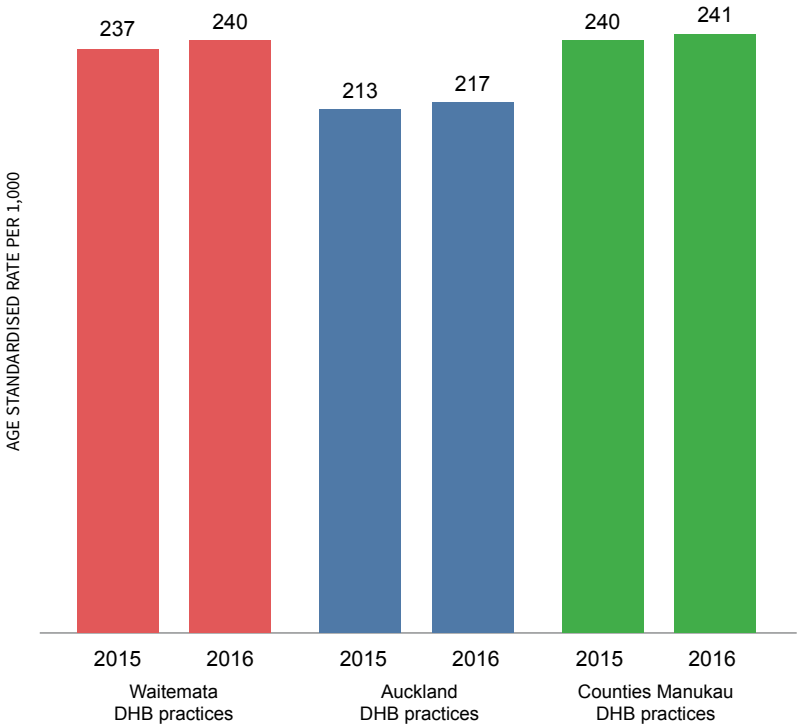
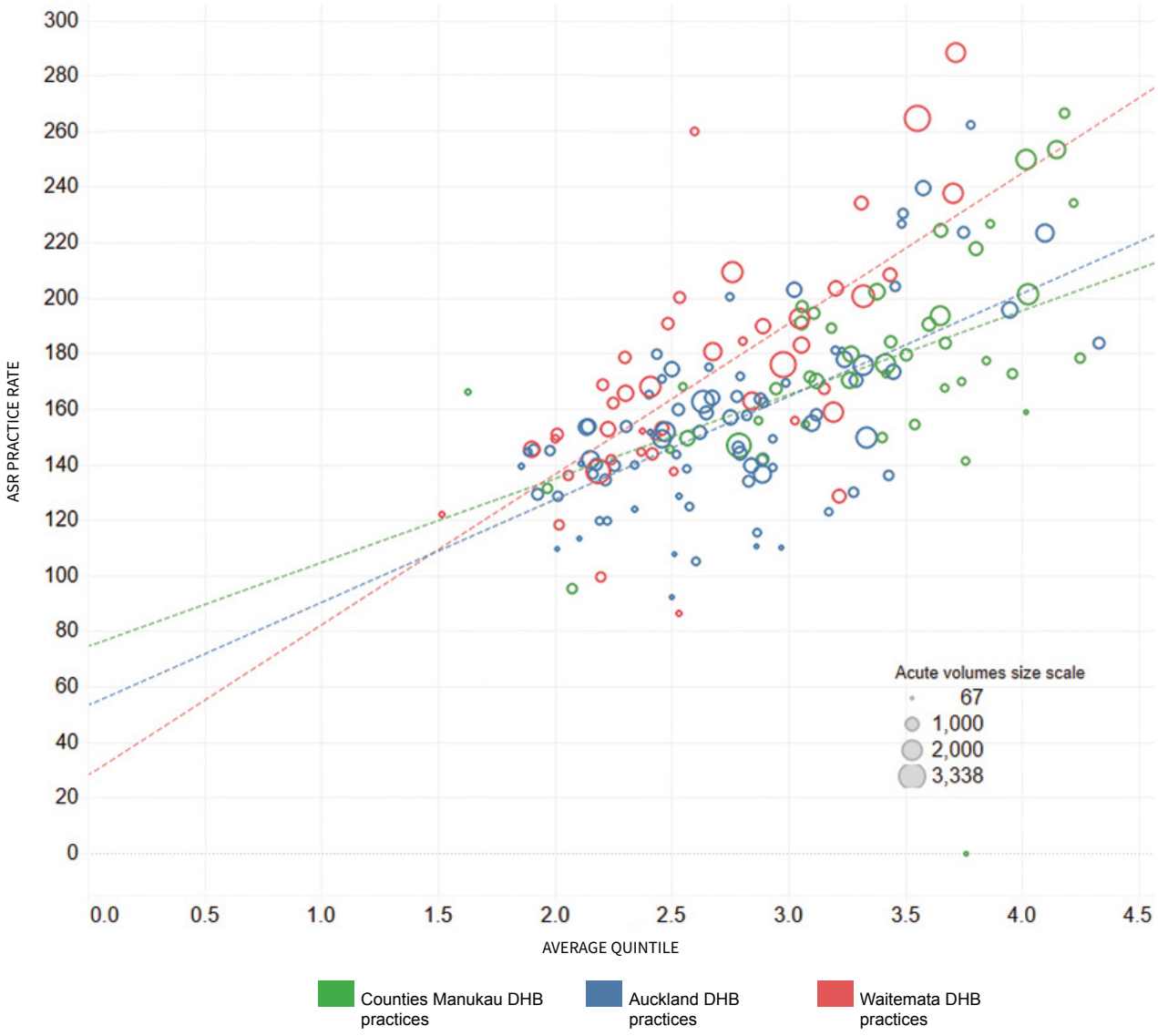


Figure 21 describes the age standardised admission rates for ProCare practices according to DHB of practice and average practice population quintile of deprivation. Practices that are aged residential care facilities or 'exceptional' (e.g. Unitec) have been excluded.

There are three main observations in this figure:

- Acute admissions are positively correlated with socioeconomic deprivation
- There is marked practice variation in acute admissions even when controlling for deprivation
- Practices within WDHB catchment appear to have higher overall acute admissions. This observation was unexpected and warrants further investigation into underlying causes.

Fig 21. Age standardised acute admission rates per practice per 1000 by DHB of practice and average practice population NZDep Index quintile



By age group, zero to four years and those 75+ are the most likely to have an acute admission (Fig 22).

Fig 22. Age specific acute hospitalisations in 2016 per 1,000 enrolled patients by DHB of practice

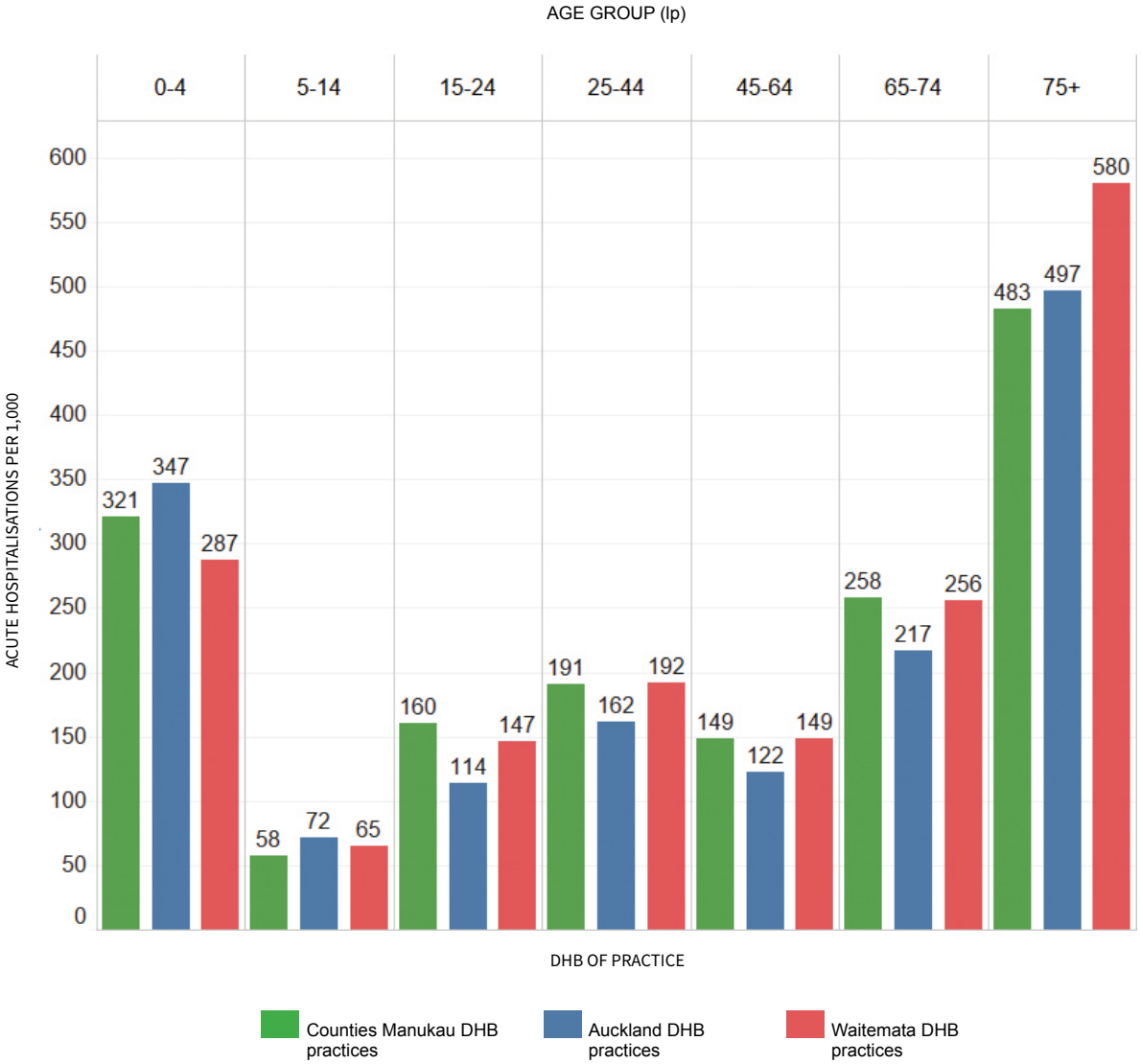
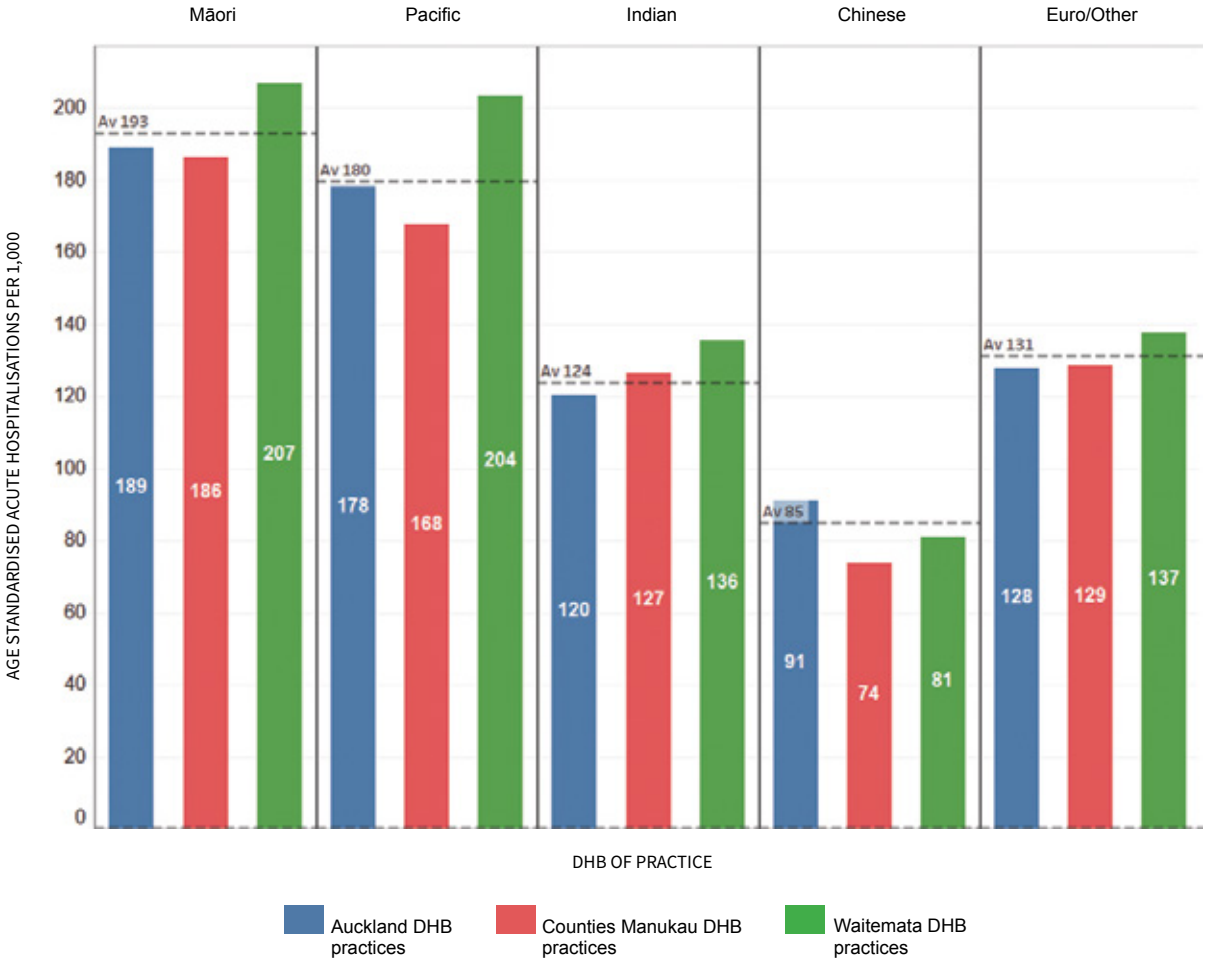


Figure 23 describes age standardised acute admission rates by DHB and by ethnicity. The average age standardised rate for ProCare as a whole is given for each ethnic group with coloured bars by DHB catchment. Māori and Pacific rates are much higher than European/Other. Note also the excess of WDHB acute admissions in all ethnicity groups except for Chinese.

Fig 23. Age standardised acute hospitalisation rates by DHB of practice and by ethnicity



Ambulatory Sensitive Hospitalisations (ASH)

According to the Health Quality & Safety Commission, ambulatory sensitive hospitalisations (ASH) are mostly acute admissions that are considered potentially reducible or avoidable through prophylactic or therapeutic interventions delivered in the wider primary care setting.[26] Reasons for high or low rates are complex and it is a 'whole of system' sensitive measure. Not all admissions would be preventable. It has been suggested that ASH admission rates can serve as proxy markers for primary care access and quality, with high admission rates indicating difficulty in accessing care in a timely fashion, poor care coordination or care continuity, or structural constraints such as limited supply of primary care workers.[27] ASH rates are also determined by other factors, such as hospital emergency departments and admission policies, health literacy and underlying determinants of health such as housing quality, exposure to second-hand cigarette smoke, household crowding and poverty. This measure can also highlight variation between different population groups that will assist with planning to reduce inequities.

ASH annual volumes and length of stay

The table below describes a 'heat map' by age group and ethnicity for ASH rates per 1,000 (and associated two year average LOS) for all ProCare patients enrolled as at 1 October 2017 (Table 42). There is a U-shaped curve with higher rates at 0-4, reducing between 2-44 years and then increasing from 45 years with highest rates in those 75+ years. Across all age groups, Māori and Pacific had almost twice the ASH rates of European/Other. Pacific children (0-4 years) and Māori and Pacific elders (65 years+) have very high ASH rates. Chinese have the lowest ASH rates.

Table 42. Average annual ambulatory sensitive hospitalisations (2015 and 2016) for ProCare patients enrolled at quarter 4 (1 October) 2017

Uses averages from 2015 and 2016 anonymised NMDS inpatient event data from ADHB, WDHB and CMDHB for ProCare patients enrolled at quarter 4 (1 October) 2017.

	Age group	Grand Total	Māori	Pacific	Indian	Chinese	European / Other
ASH per 1,000 (av frm 2 years)	Total	39	54	57	32	19	35
ASH count per year (av of 2 yr)	Total	31,625	4,762	6,242	1,958	981	17,684
Population	Total	819,681	88,967	108,716	60,735	52,230	509,033
Av Annual LOS (SD = 1) ASH events	Total	84,024	12,023	15,936	4,557	2,079	49,430
ASH per 1,000 (av frm 2 years)	0-4	69	82	118	65	49	52
	5-14	22	29	34	22	18	16
	15-24	19	29	25	11	7	17
	25-44	20	38	35	15	7	17
	45-64	38	76	74	45	15	30
	65-74	69	150	140	77	31	59
	75+	145	229	214	154	74	141
ASH count per year (av of 2 yr)	0-4	3,934	771	1,177	325	245	1,417
	5-14	2,527	524	738	174	110	982
	15-24	2,069	465	491	79	39	996
	25-44	4,603	872	1,021	364	115	2,232
	45-64	8,005	1,339	1,596	559	207	4,304
	65-74	4,213	478	674	233	112	2,717
	75+	6,275	314	545	226	154	5,037
Population	0-4	56,666	9,413	9,949	5,031	5,048	27,225
	5-14	113,629	18,074	21,641	7,714	6,076	60,124
	15-24	107,138	16,163	19,308	6,859	5,228	59,580
	25-44	227,216	23,248	28,843	24,109	16,767	134,249
	45-64	210,934	17,507	21,602	12,532	13,417	145,876
	65-74	60,803	3,189	4,821	3,021	3,606	46,166
	75+	43,295	1,373	2,552	1,469	2,088	35,813
Av Annual LOS (SD = 1) ASH events	0-4	6,011	1,232	1,919	467	324	2,070
	5-14	4,387	942	1,580	267	155	1,444
	15-24	3,659	795	1,023	148	56	1,637
	25-44	8,643	1,818	2,125	611	186	3,904
	45-64	20,987	4,231	4,665	1,321	486	10,284
	65-74	14,063	1,704	2,356	841	298	8,865
	75+	26,276	1,302	2,269	903	576	21,227

While Table 42 has age-specific rates, age standardised ASH rates per 1,000 by ethnicity using the standard WHO population were also calculated. These are plotted below in the two graphs (Figs 24 and 25); by ethnicity and by ethnicity and practice location according to DHB catchment. Māori, Pacific and then Indian have the highest ASH rates. Note that as for acute hospitalisations, there appears to be more ASH admissions for patients enrolled in practices within the WDHB catchment.

Fig 24. Age standardised ASH rates by ethnicity

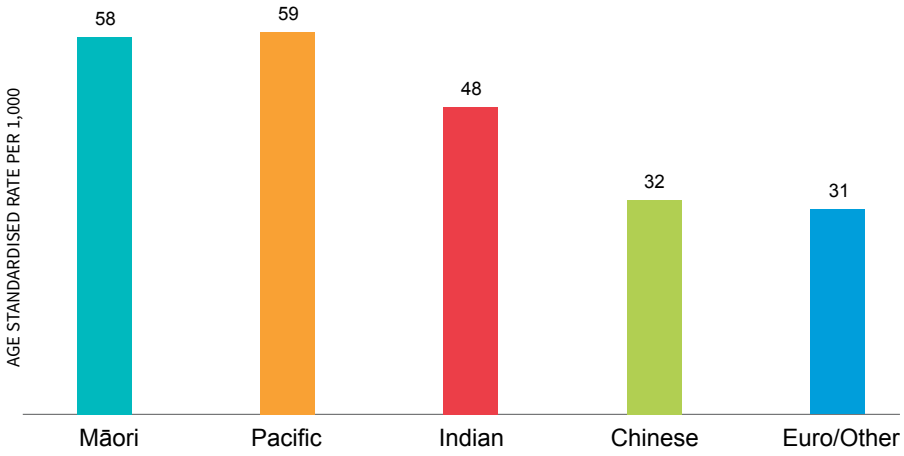
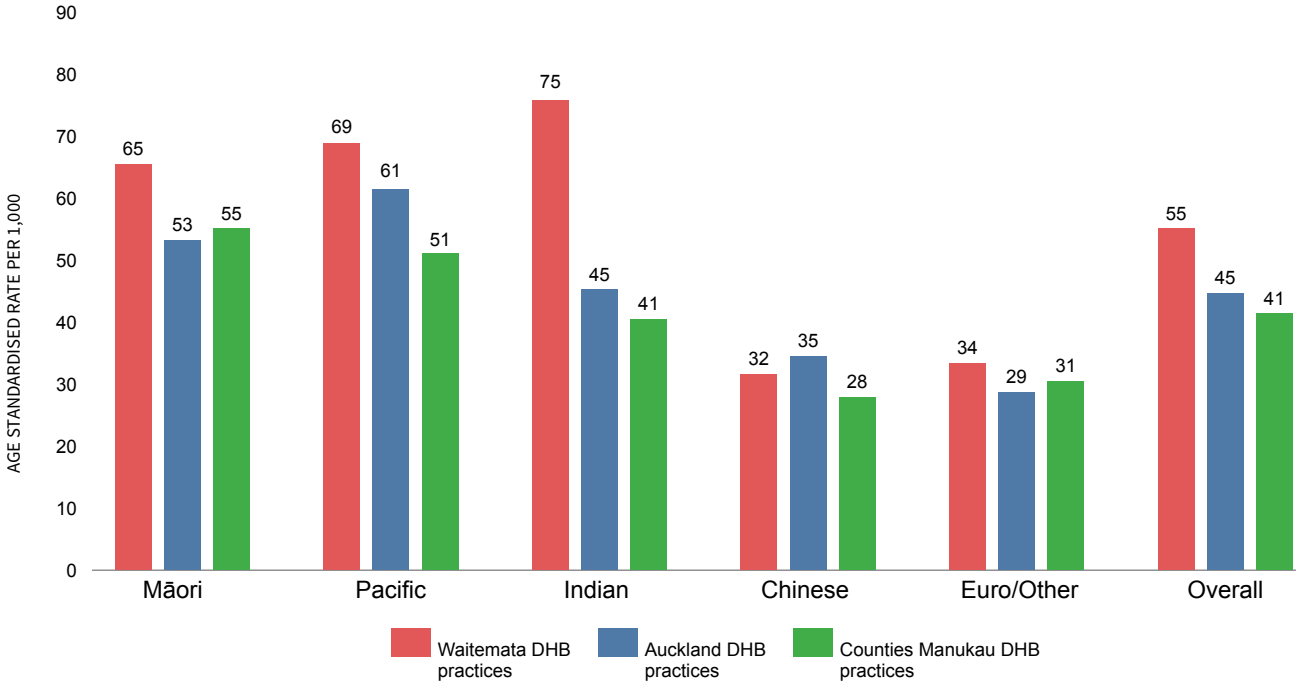


Fig 25. Age standardised ASH rates by ethnicity and DHB of practice



ASH rates per 1,000 by condition and age group

Table 43 shows ASH rates per 1,000 by condition and age group. For the zero to four age group respiratory conditions are the biggest causes for ASH admissions. Cardiovascular disease (heart disease and stroke), kidney disease, respiratory infections and COPD dominate ASH rates for older age groups.

Table 43. ASH rates per 1,000 by condition and age group

(Total average annual volumes in brackets)

		Age group (lp)							
ASH FLAG (group)	ASH FLAG	0-4	5-14	15-24	25-44	45-64	65-74	75+	Grand Total
Cardiovascular	Angina and chest pain			1.5 (158)	3.8 (855)	11.2 (2,354)	15.9 (968)	23.4 (1,011)	6.5 (5,345)
	Congestive heart failure			0.1 (9)	0.2 (43)	1.1 (223)	3.3 (200)	14.0 (606)	1.3 (1,082)
	Hypertensive disease			0.1 (6)	0.2 (43)	0.5 (100)	1.0 (60)	2.1 (92)	0.4 (300)
	Myocardial infarction			0.0 (3)	0.4 (82)	2.9 (607)	6.4 (392)	10.2 (440)	1.9 (1,523)
	Other ischaemic heart disease			0.0 (1)	0.0 (10)	0.5 (101)	1.3 (82)	1.0 (43)	0.3 (236)
	Rheumatic fever/heart disease	0.0 (1)	0.4 (44)	0.2 (22)	0.1 (12)	0.1 (16)	0.2 (11)	0.1 (5)	0.1 (109)
Dental conditions	Dental conditions	3.5 (196)	5.6 (640)	0.4 (47)	0.2 (55)	0.3 (55)	0.1 (7)	0.1 (5)	1.2 (1,003)
Dermatological	Cellulitis	6.1 (346)	3.3 (378)	3.1 (337)	3.3 (746)	3.9 (823)	4.7 (287)	10.2 (441)	4.1 (3,356)
	Dermatitis & eczema	2.0 (111)	0.4 (51)	0.4 (40)	0.3 (57)	0.3 (70)	0.3 (17)	0.5 (24)	0.4 (369)
Diabetes	Diabetes	0.0 (3)	0.0 (3)	0.8 (82)	0.5 (124)	0.9 (195)	2.0 (123)	2.6 (111)	0.8 (640)
Epilepsy	Epilepsy	2.9 (164)	0.7 (78)	1.4 (147)	1.0 (223)	1.1 (224)	1.2 (70)	2.0 (89)	1.2 (994)
Gastrointestinal	Constipation	1.1 (64)	1.2 (137)	0.6 (63)	0.5 (113)	0.8 (177)	2.1 (127)	4.6 (201)	1.1 (881)
	Gastroenteritis/dehydration	11.2 (632)	2.4 (273)	3.1 (330)	2.8 (629)	2.8 (594)	4.3 (262)	9.4 (406)	3.8 (3,124)
	GORD	0.5 (30)	0.0 (3)	0.2 (18)	0.4 (80)	1.0 (205)	2.0 (121)	2.8 (122)	0.7 (578)
	Nutrition deficiency and anaemia	0.2 (13)	0.1 (11)	0.4 (45)	0.8 (175)	1.0 (216)	1.4 (83)	4.0 (173)	0.9 (715)
	Peptic Ulcer			0.1 (7)	0.1 (33)	0.3 (70)	0.8 (48)	1.2 (51)	0.3 (208)
Kidney/urinary infection	Kidney/urinary infection	4.3 (242)	1.0 (111)	2.7 (285)	1.9 (425)	2.3 (493)	4.2 (258)	15.2 (656)	3.0 (2,472)
Other	Cervical cancer			0.0 (2)	0.0 (7)	0.0 (2)	0.0 (2)	0.0 (2)	0.0 (14)
	Sexually transmitted infections	0.0 (1)		0.2 (26)	0.1 (23)	0.0 (7)	0.0 (2)	0.1 (3)	0.1 (60)
	Vaccine-preventable disease – MMR	0.0 (1)							0.0 (1)
	Vaccine-preventable disease – Other*	0.0 (1)		0.0 (1)	0.0 (5)	0.0 (9)	0.0 (3)	0.0 (1)	0.0 (18)
Respiratory	Asthma	15.0 (851)	3.6 (406)	1.3 (141)	1.2 (270)	1.1 (223)	0.9 (55)	1.4 (63)	2.4 (2,007)
	Bronchiectasis			0.1 (13)	0.1 (23)	0.2 (45)	0.8 (48)	2.1 (93)	0.3 (220)
	COPD			0.0 (4)	0.1 (12)	1.8 (372)	6.8 (412)	10.9 (474)	1.6 (1,272)
	Respiratory infections – Pneumonia	8.1 (461)	1.7 (199)	0.7 (74)	1.1 (242)	2.0 (430)	5.2 (314)	14.9 (647)	2.9 (2,366)
	Unsp acute lower respitatory infection	3.4 (190)							0.2 (190)
	Upper respiratory tract and ENT infections	11.1 (632)	1.7 (197)	2.0 (210)	1.3 (285)	0.7 (150)	0.9 (57)	1.3 (55)	1.9 (1,584)
Stroke	Stroke			0.0 (4)	0.2 (40)	1.2 (250)	3.5 (210)	10.7 (462)	1.2 (965)
Grand Total		69.4 (3,934)	22.2 (2,527)	19.3 (2,069)	20.3 (4,603)	37.9 (8,005)	69.3 (4,213)	144.9 (6,275)	38.6 (31,625)

*Vaccine preventable disease Other includes Meningitis, Whooping cough, Hepatitis B, Pneumococcal disease, other.

ASH rates per 1,000 by condition, age group and ethnicity

Further analysis (Table 44) has stratified ASH conditions for 0-4 years by ethnicity as this is a System Level Measure (SLM). This includes the average annual admissions (count) over 2015 and 2016. The top categories for admissions are respiratory conditions, gastroenteritis and then cellulitis. Note the high rates of cellulitis in Māori and Pacific infants, gastroenteritis for Indian infants and asthma and other respiratory illnesses particularly for Pacific infants.

Table 44. Age specific ASH rates per 1,000 by condition and ethnicity: 0-4 years

(Total average annual volumes in brackets)

		Ethnicity Group					
ASH FLAG (group)	ASH FLAG	Māori	Pacific	Indian	Chinese	Euro / Other	Grand Total
Cardiovascular	Rheumatic fever/heart disease					0.0 (1)	0.0 (1)
Dental conditions	Dental conditions	5.1 (48)	6.3 (63)	3.0 (15)	2.6 (13)	2.1 (57)	3.5 (196)
Dermatological	Cellulitis	10.6 (100)	14.3 (143)	4.5 (23)	3.0 (15)	2.4 (66)	6.1 (346)
	Dermatitis & eczema	3.9 (37)	4.2 (42)	0.8 (4)	0.9 (5)	0.9 (24)	2.0 (111)
Diabetes	Diabetes		0.1 (1)	0.1 (1)		0.1 (2)	0.0 (3)
Epilepsy	Epilepsy	3.1 (29)	4.4 (44)	2.1 (11)	2.3 (12)	2.5 (69)	2.9 (164)
Gastrointestinal	Constipation	0.8 (8)	1.0 (10)	0.8 (4)	0.7 (4)	1.4 (39)	1.1 (64)
	Gastroenteritis/dehydra..	11.0 (104)	12.7 (127)	15.4 (78)	7.0 (36)	10.6 (289)	11.2 (632)
	GORD	0.3 (3)	0.3 (3)	0.2 (1)	0.3 (2)	0.8 (22)	0.5 (30)
	Nutrition deficiency and anaemia	0.2 (2)	0.3 (3)	0.3 (2)	0.1 (1)	0.2 (6)	0.2 (13)
Kidney/urinary infection	Kidney/urinary infection	4.0 (38)	6.5 (65)	2.9 (15)	6.2 (32)	3.4 (93)	4.3 (242)
Other	Sexually transmitted infections					0.0 (1)	0.0 (1)
	Vaccine-preventable disease – Other*	0.1 (1)				0.0 (1)	0.0 (1)
	Vaccine-preventable disease – MMR			0.1 (1)			0.0 (1)
Respiratory	Asthma	17.5 (165)	26.0 (259)	15.2 (77)	9.8 (50)	11.1 (302)	15.0 (851)
	Respiratory infections – Pneumonia	9.5 (89)	17.4 (173)	5.0 (25)	5.2 (26)	5.4 (148)	8.1 (461)
	Unsp acute lower respitatory infection	4.2 (40)	7.0 (70)	1.8 (9)	1.7 (9)	2.3 (63)	3.4 (190)
	Upper respiratory tract and ENT infections	11.5 (109)	17.8 (178)	12.4 (63)	8.8 (45)	8.8 (239)	11.1 (632)
Grand Total		81.9 (771)	118.3 (1,177)	64.5 (325)	48.5 (245)	52.0 (1,417)	69.4 (3,934)

At ages 5-14 years, dental conditions become a greater issue particularly for Māori and Pacific children (Table 45).

Table 45. Age specific ASH rates per 1,000 by condition and ethnicity: 5-14 years

(Total average annual volumes in brackets)

		Ethnicity Group					
ASH FLAG (group)	ASH FLAG	Māori	Pacific	Indian	Chinese	Euro / Other	Grand Total
Cardiovascular	Rheumatic fever/heart disease	0.6 (10)	1.5 (32)			0.0 (2)	0.4 (44)
Dental conditions	Dental conditions	9.0 (162)	7.6 (166)	3.6 (26)	5.7 (35)	4.2 (250)	5.6 (640)
Dermatological	Cellulitis	4.7 (86)	6.6 (143)	1.8 (14)	1.6 (10)	2.1 (125)	3.3 (378)
	Dermatitis & eczema	0.4 (8)	1.0 (23)	1.1 (9)	0.2 (2)	0.2 (11)	0.4 (51)
Diabetes	Diabetes		0.0 (1)			0.0 (2)	0.0 (3)
Epilepsy	Epilepsy	0.9 (16)	0.7 (15)	0.6 (5)	0.6 (4)	0.6 (39)	0.7 (78)
Gastrointestinal	Constipation	1.5 (27)	0.8 (17)	1.6 (12)	0.4 (3)	1.3 (79)	1.2 (137)
	Gastroenteritis/dehydra..	2.3 (41)	2.3 (50)	4.1 (32)	3.0 (18)	2.2 (132)	2.4 (273)
	GORD	0.0 (1)	0.0 (1)	0.1 (1)		0.0 (1)	0.0 (3)
	Nutrition deficiency and anaemia	0.1 (2)	0.2 (4)	0.2 (2)	0.2 (1)	0.0 (2)	0.1 (11)
Kidney/urinary infection	Kidney/urinary infection	1.2 (21)	1.3 (26)	0.6 (5)	0.2 (1)	0.9 (57)	1.0 (111)
Respiratory	Asthma	4.9 (89)	6.3 (136)	4.8 (37)	2.3 (14)	2.2 (131)	3.6 (406)
	Respiratory infections – Pneumonia	1.6 (30)	2.9 (63)	1.4 (11)	2.2 (14)	1.4 (83)	1.7 (199)
	Upper respiratory tract and ENT infections	1.9 (34)	2.8 (62)	2.7 (21)	1.7 (11)	1.2 (71)	1.7 (197)
Grand Total		29.0 (524)	34.1 (738)	22.5 (174)	18.1 (110)	16.3 (982)	22.2 (2,527)

At age 15-24 years Pacific youth suffer a disproportionate burden of cellulitis admissions (Table 46).

Table 46. Age specific ASH rates per 1,000 by condition and ethnicity: 15-24 years

(Total average annual volumes in brackets)

		Ethnicity Group					
ASH FLAG (group)	ASH FLAG	Māori	Pacific	Indian	Chinese	Euro / Other	Grand Total
Cardiovascular	Rheumatic fever/heart disease	0.2 (4)	0.8 (15)			0.0 (3)	0.2 (22)
	Angina and chest pain	2.3 (37)	1.2 (23)	1.0 (7)	0.3 (2)	1.5 (90)	1.5 (158)
	Congestive heart failure	0.2 (3)	0.3 (6)			0.0 (1)	0.1 (9)
	Hypertensive disease	0.1 (2)	0.1 (1)	0.3 (2)		0.0 (1)	0.1 (6)
	Myocardial infarction	0.1 (2)	0.0 (1)				0.0 (3)
	Other ischaemic heart disease					0.0 (1)	0.0 (1)
Dental conditions	Dental conditions	0.6 (9)	0.3 (7)	0.1 (1)	0.1 (1)	0.5 (30)	0.4 (47)
Dermatological	Cellulitis	4.4 (71)	6.7 (129)	1.7 (12)	0.3 (2)	2.1 (124)	3.1 (337)
	Dermatitis & eczema	0.6 (9)	0.7 (13)	0.3 (2)	0.7 (4)	0.2 (12)	0.4 (40)
Diabetes	Diabetes	1.2 (20)	0.7 (14)	0.6 (4)	0.2 (1)	0.7 (43)	0.8 (82)
Epilepsy	Epilepsy	2.1 (35)	1.7 (33)	0.9 (6)	0.3 (2)	1.2 (73)	1.4 (147)
Gastrointestinal	Constipation	0.8 (14)	0.6 (12)	0.6 (4)		0.6 (34)	0.6 (63)
	Gastroenteritis /dehydration	3.5 (57)	2.1 (42)	2.6 (18)	2.2 (12)	3.4 (203)	3.1 (330)
	GORD	0.2 (4)	0.2 (4)			0.2 (11)	0.2 (18)
	Nutrition deficiency and anaemia	0.4 (7)	0.5 (10)	0.4 (3)	0.3 (2)	0.4 (24)	0.4 (45)
	Peptic Ulcer	0.1 (2)	0.1 (2)		0.1 (1)	0.1 (4)	0.1 (7)
Kidney/urinary infection	Kidney/urinary infection	4.7 (76)	2.4 (46)	1.0 (7)	1.5 (8)	2.5 (148)	2.7 (285)
Other	Sexually transmitted infections	0.6 (10)	0.5 (9)	0.1 (1)	0.1 (1)	0.1 (6)	0.2 (26)
	Vaccine-preventable disease – Other*			0.1 (1)			0.0 (1)
	Cervical cancer	0.1 (2)					0.0 (2)
Respiratory	Asthma	2.7 (43)	2.2 (43)	0.4 (3)	0.3 (2)	0.8 (51)	1.3 (141)
	Respiratory infections – Pneumonia	1.1 (18)	1.1 (21)	0.4 (3)	0.4 (2)	0.5 (31)	0.7 (74)
	Upper respiratory tract and ENT infections	2.2 (35)	2.9 (56)	0.9 (6)	0.7 (4)	1.8 (109)	2.0 (210)
	Bronchiectasis	0.3 (5)	0.4 (8)			0.0 (1)	0.1 (13)
	COPD	0.1 (1)	0.0 (1)			0.0 (2)	0.0 (4)
Stroke	Stroke	0.2 (3)	0.0 (1)	0.1 (1)			0.0 (4)
Grand Total		28.8 (465)	25.4 (491)	11.4 (79)	7.4 (39)	16.7 (996)	19.3 (2,069)

At 25-44 years the age-specific rates of angina and chest pain for Māori and Pacific are nearly twice that of their European/ Other counterparts and cellulitis is still an issue (Table 47).

Table 47. Age specific ASH rates per 1,000 by condition and ethnicity: 25-44 years

(Total average annual volumes in brackets)

		Ethnicity Group					
ASH FLAG (group)	ASH FLAG	Māori	Pacific	Indian	Chinese	Euro / Other	Grand Total
Cardiovascular	Rheumatic fever/heart disease	0.1 (2)	0.3 (10)				0.1 (12)
	Angina and chest pain	5.0 (116)	6.4 (186)	4.0 (97)	1.1 (18)	3.3 (438)	3.8 (855)
	Congestive heart failure	0.6 (15)	0.5 (14)	0.0 (1)		0.1 (13)	0.2 (43)
	Hypertensive disease	0.3 (7)	0.6 (17)	0.2 (4)	0.2 (3)	0.1 (12)	0.2 (43)
	Myocardial infarction	0.4 (10)	0.7 (20)	0.5 (12)	0.0 (1)	0.3 (40)	0.4 (82)
	Other ischaemic heart disease	0.0 (1)	0.1 (3)	0.1 (2)		0.0 (4)	0.0 (10)
Dental conditions	Dental conditions	0.4 (10)	0.3 (8)	0.1 (2)		0.3 (35)	0.2 (55)
Dermatological	Cellulitis	7.3 (171)	7.2 (209)	1.4 (34)	0.8 (14)	2.4 (319)	3.3 (746)
	Dermatitis & eczema	0.3 (8)	0.5 (16)	0.1 (3)	0.1 (2)	0.2 (29)	0.3 (57)
Diabetes	Diabetes	1.2 (28)	0.8 (23)	0.2 (6)	0.0 (1)	0.5 (68)	0.5 (124)
Epilepsy	Epilepsy	2.5 (57)	1.4 (40)	0.7 (17)	0.1 (2)	0.8 (108)	1.0 (223)
Gastrointestinal	Constipation	1.0 (23)	0.6 (18)	0.3 (8)	0.1 (3)	0.5 (62)	0.5 (113)
	Gastroenteritis /dehydration	4.2 (97)	2.4 (70)	2.3 (57)	1.3 (22)	2.9 (384)	2.8 (629)
	GORD	0.5 (12)	0.5 (16)	0.5 (13)	0.1 (1)	0.3 (39)	0.4 (80)
	Nutrition deficiency and anaemia	0.8 (19)	1.5 (45)	0.6 (14)	0.4 (7)	0.7 (90)	0.8 (175)
	Peptic Ulcer	0.3 (8)	0.3 (10)	0.0 (1)	0.2 (3)	0.1 (12)	0.1 (33)
Kidney/urinary infection	Kidney/urinary infection	3.4 (79)	3.4 (98)	1.2 (30)	1.0 (17)	1.5 (202)	1.9 (425)
Other	Sexually transmitted infections	0.3 (8)	0.1 (4)	0.0 (1)	0.1 (1)	0.1 (9)	0.1 (23)
	Vaccine-preventable disease – Other*	0.0 (1)	0.0 (1)		0.1 (1)	0.0 (2)	0.0 (5)
	Cervical cancer	0.1 (2)				0.0 (5)	0.0 (7)
Respiratory	Asthma	3.4 (80)	2.5 (72)	0.6 (16)	0.2 (4)	0.7 (99)	1.2 (270)
	Respiratory infections – Pneumonia	2.0 (46)	2.2 (64)	0.6 (16)	0.3 (6)	0.8 (111)	1.1 (242)
	Upper respiratory tract and ENT infections	2.2 (51)	2.2 (64)	1.2 (29)	0.7 (12)	1.0 (130)	1.3 (285)
	Bronchiectasis	0.5 (12)	0.1 (4)	0.0 (1)		0.0 (7)	0.1 (23)
	COPD	0.2 (5)	0.1 (4)	0.0 (1)		0.0 (2)	0.1 (12)
Stroke	Stroke	0.3 (8)	0.4 (11)	0.2 (5)	0.1 (1)	0.1 (15)	0.2 (40)
Grand Total		37.5 (872)	35.4 (1,021)	15.1 (364)	6.8 (115)	16.6 (2,232)	20.3 (4,603)

At 45-64 years, heart disease rates triple in all ethnic groups from the 25-44 year age group and are highest for Pacific, Indian and Māori in that order (Table 48). Note also the rise of heart failure and COPD for Māori and Pacific peoples compared to their European/Other counterparts.

Table 48. Age specific ASH rates per 1,000 by condition and ethnicity: 45-64 years

(Total average annual volumes in brackets)

		Ethnicity Group					
ASH FLAG (group)	ASH FLAG	Māori	Pacific	Indian	Chinese	Euro / Other	Grand Total
Cardiovascular	Rheumatic fever/heart disease	0.2 (3)	0.4 (10)			0.0 (3)	0.1 (16)
	Angina and chest pain	16.9 (295)	19.0 (410)	17.2 (215)	4.9 (66)	9.4 (1,369)	11.2 (2,354)
	Congestive heart failure	4.7 (83)	3.4 (75)	0.6 (8)		0.4 (58)	1.1 (223)
	Hypertensive disease	1.1 (19)	1.4 (30)	0.5 (6)	0.2 (3)	0.3 (43)	0.5 (100)
	Myocardial infarction	5.6 (98)	4.3 (93)	5.5 (69)	1.0 (14)	2.3 (333)	2.9 (607)
	Other ischaemic heart disease	1.0 (18)	0.9 (19)	1.0 (13)	0.1 (2)	0.3 (49)	0.5 (101)
Dental conditions	Dental conditions	0.4 (8)	0.1 (3)	0.1 (1)	0.0 (1)	0.3 (44)	0.3 (55)
Dermatological	Cellulitis	9.4 (164)	9.0 (195)	2.2 (28)	0.8 (11)	2.9 (426)	3.9 (823)
	Dermatitis & eczema	0.7 (12)	0.4 (8)	0.2 (3)	0.2 (3)	0.3 (44)	0.3 (70)
Diabetes	Diabetes	2.3 (41)	2.2 (47)	0.9 (12)	0.2 (3)	0.6 (93)	0.9 (195)
Epilepsy	Epilepsy	2.3 (41)	1.1 (24)	0.7 (9)	0.1 (2)	1.0 (149)	1.1 (224)
Gastrointestinal	Constipation	1.7 (30)	1.1 (25)	0.6 (8)	0.3 (5)	0.8 (110)	0.8 (177)
	Gastroenteritis /dehydration	4.2 (73)	5.0 (108)	3.4 (42)	2.2 (29)	2.3 (342)	2.8 (594)
	GORD	1.5 (27)	1.2 (26)	1.4 (18)	0.7 (10)	0.9 (125)	1.0 (205)
	Nutrition deficiency and anaemia	1.3 (23)	1.5 (33)	1.4 (18)	0.5 (7)	0.9 (136)	1.0 (216)
	Peptic Ulcer	0.9 (16)	1.1 (23)	0.1 (1)	0.5 (7)	0.2 (24)	0.3 (70)
Kidney/urinary infection	Kidney/urinary infection	3.6 (64)	4.4 (96)	2.6 (33)	1.3 (18)	1.9 (284)	2.3 (493)
Other	Sexually transmitted infections	0.0 (1)	0.0 (1)			0.0 (5)	0.0 (7)
	Vaccine-preventable disease – Other*	0.1 (1)	0.1 (2)		0.0 (1)	0.0 (6)	0.0 (9)
	Cervical cancer	0.0 (1)	0.0 (1)			0.0 (1)	0.0 (2)
Respiratory	Asthma	3.0 (53)	2.5 (55)	1.4 (18)	0.2 (3)	0.7 (95)	1.1 (223)
	Respiratory infections – Pneumonia	4.3 (75)	5.5 (119)	1.5 (19)	0.6 (8)	1.4 (209)	2.0 (430)
	Upper respiratory tract and ENT infections	1.3 (22)	1.7 (36)	0.9 (12)	0.5 (7)	0.5 (74)	0.7 (150)
	Bronchiectasis	0.9 (17)	0.7 (16)	0.3 (4)	0.0 (1)	0.1 (9)	0.2 (45)
	COPD	6.7 (117)	4.6 (99)	0.6 (7)	0.0 (1)	1.0 (150)	1.8 (372)
Stroke	Stroke	2.5 (44)	2.2 (48)	1.4 (17)	0.9 (12)	0.9 (130)	1.2 (250)
Grand Total		76.5 (1,339)	73.9 (1,596)	44.6 (559)	15.4 (207)	29.5 (4,304)	37.9 (8,005)

At age 65-74 years, heart disease is still the highest age-specific cause of an ASH admission (Table 49). However, age specific rates of COPD admissions for Māori have increased four fold, for Pacific three fold from ages 45-64 years.

Table 49. Age specific ASH rates per 1,000 by condition and ethnicity: 65-74 years

(Total average annual volumes in brackets)

		Ethnicity Group					
ASH FLAG (group)	ASH FLAG	Māori	Pacific	Indian	Chinese	Euro / Other	Grand Total
Cardiovascular	Rheumatic fever/heart disease	0.8 (3)	0.6 (3)			0.1 (6)	0.2 (11)
	Angina and chest pain	25.2 (81)	25.5 (123)	23.7 (72)	9.8 (36)	14.2 (657)	15.9 (968)
	Congestive heart failure	14.7 (47)	8.4 (41)	5.6 (17)		2.1 (96)	3.3 (200)
	Hypertensive disease	1.4 (5)	2.0 (10)	2.3 (7)	0.8 (3)	0.8 (36)	1.0 (60)
	Myocardial infarction	9.7 (31)	11.2 (54)	7.9 (24)	3.1 (11)	5.9 (272)	6.4 (392)
	Other ischaemic heart disease	2.2 (7)	2.4 (12)	2.3 (7)	1.0 (4)	1.1 (53)	1.3 (82)
Dental conditions	Dental conditions	0.2 (1)				0.1 (6)	0.1 (7)
Dermatological	Cellulitis	10.0 (32)	11.1 (54)	2.5 (8)	1.1 (4)	4.1 (190)	4.7 (287)
	Dermatitis & eczema	0.6 (2)	0.6 (3)	0.5 (2)	0.1 (1)	0.2 (10)	0.3 (17)
Diabetes	Diabetes	6.3 (20)	6.0 (29)	2.8 (9)	0.4 (2)	1.4 (64)	2.0 (123)
Epilepsy	Epilepsy	0.9 (3)	1.3 (7)	1.0 (3)	0.3 (1)	1.2 (57)	1.2 (70)
Gastrointestinal	Constipation	3.4 (11)	4.4 (21)	1.3 (4)	0.6 (2)	1.9 (89)	2.1 (127)
	Gastroenteritis /dehydration	8.5 (27)	9.2 (45)	5.1 (16)	1.7 (6)	3.7 (169)	4.3 (262)
	GORD	2.2 (7)	1.7 (8)	4.1 (13)	1.4 (5)	1.9 (89)	2.0 (121)
	Nutrition deficiency and anaemia	1.6 (5)	1.8 (9)	0.8 (3)	1.0 (4)	1.4 (64)	1.4 (83)
	Peptic Ulcer	3.0 (10)	2.2 (11)	0.7 (2)	1.0 (4)	0.5 (22)	0.8 (48)
Kidney/urinary infection	Kidney/urinary infection	6.3 (20)	8.2 (40)	6.1 (19)	1.9 (7)	3.7 (173)	4.2 (258)
Other	Sexually transmitted infections		0.2 (1)			0.0 (1)	0.0 (2)
	Vaccine-preventable disease – Other*	0.2 (1)			0.1 (1)	0.0 (2)	0.0 (3)
	Cervical cancer	0.2 (1)			0.1 (1)	0.0 (1)	0.0 (2)
Respiratory	Asthma	3.3 (11)	3.1 (15)	0.7 (2)	0.1 (1)	0.6 (27)	0.9 (55)
	Respiratory infections – Pneumonia	15.1 (48)	11.9 (58)	3.3 (10)	2.2 (8)	4.1 (191)	5.2 (314)
	Upper respiratory tract and ENT infections	1.1 (4)	3.6 (18)	0.8 (3)	0.8 (3)	0.7 (31)	0.9 (57)
	Bronchiectasis	2.0 (7)	3.1 (15)		0.3 (1)	0.5 (24)	0.8 (46)
	COPD	26.5 (85)	14.1 (68)	3.5 (11)	1.0 (4)	5.3 (245)	6.8 (412)
Stroke	Stroke	4.4 (14)	7.1 (34)	2.0 (6)	2.1 (8)	3.2 (149)	3.5 (210)
Grand Total		149.7 (478)	139.7 (674)	77.1 (233)	30.9 (112)	58.9 (2,717)	69.3 (4,213)

Over 75 years, kidney/urinary infections and stroke become an issue as well as heart disease and COPD/respiratory infections (Table 50).

Table 50. Age specific ASH rates per 1,000 by condition and ethnicity: 75+ years

(Total average annual volumes in brackets)

		Ethnicity Group					
ASH FLAG (group)	ASH FLAG	Māori	Pacific	Indian	Chinese	Euro / Other	Grand Total
Cardiovascular	Rheumatic fever/heart disease			0.3 (1)		0.1 (5)	0.1 (5)
	Angina and chest pain	26.9 (37)	22.9 (59)	31.7 (47)	13.9 (29)	23.5 (840)	23.4 (1,011)
	Congestive heart failure	29.5 (41)	21.7 (56)	16.7 (25)	6.7 (14)	13.2 (474)	14.0 (608)
	Hypertensive disease	1.8 (3)	2.2 (6)	2.7 (4)	2.6 (6)	2.1 (75)	2.1 (92)
	Myocardial infarction	13.5 (19)	8.6 (22)	14.6 (22)	3.8 (8)	10.3 (370)	10.2 (440)
	Other ischaemic heart disease	1.1 (2)	1.2 (3)	1.7 (3)		1.0 (36)	1.0 (43)
Dental conditions	Dental conditions		0.2 (1)			0.1 (4)	0.1 (5)
Dermatological	Cellulitis	13.5 (19)	15.3 (39)	7.8 (12)	3.8 (8)	10.2 (364)	10.2 (441)
	Dermatitis & eczema	1.1 (2)	2.7 (7)	0.3 (1)	0.5 (1)	0.4 (14)	0.5 (24)
Diabetes	Diabetes	4.4 (6)	7.8 (20)	3.1 (5)	2.2 (5)	2.1 (76)	2.6 (111)
Epilepsy	Epilepsy	4.0 (6)	2.7 (7)	2.0 (3)	1.2 (3)	2.0 (71)	2.0 (89)
Gastrointestinal	Constipation	3.3 (5)	6.7 (17)	5.8 (9)	2.4 (5)	4.6 (166)	4.6 (201)
	Gastroenteritis /dehydration	9.8 (14)	12.7 (33)	10.2 (15)	3.4 (7)	9.4 (338)	9.4 (406)
	GORD	2.2 (3)	3.1 (8)	3.1 (5)	2.2 (5)	2.8 (102)	2.8 (122)
	Nutrition deficiency and anaemia	3.6 (5)	2.9 (8)	3.7 (6)	1.2 (3)	4.3 (153)	4.0 (173)
	Peptic Ulcer	2.5 (4)	2.5 (7)	1.4 (2)	0.5 (1)	1.1 (38)	1.2 (51)
Kidney/urinary infection	Kidney/urinary infection	17.8 (25)	19.0 (49)	14.3 (21)	6.2 (13)	15.4 (551)	15.2 (658)
Other	Sexually transmitted infections		0.6 (2)	0.3 (1)		0.0 (1)	0.1 (3)
	Vaccine-preventable disease – Other*	0.4 (1)				0.0 (1)	0.0 (1)
	Cervical cancer	0.4 (1)				0.0 (1)	0.0 (2)
Respiratory	Asthma	2.9 (4)	4.7 (12)	4.1 (6)	1.0 (2)	1.1 (39)	1.4 (63)
	Respiratory infections – Pneumonia	27.3 (38)	32.7 (84)	13.3 (20)	8.1 (17)	13.7 (489)	14.9 (647)
	Upper respiratory tract and ENT infections	1.5 (2)	2.0 (5)	2.4 (4)	1.0 (2)	1.2 (43)	1.3 (55)
	Bronchiectasis	15.7 (22)	6.5 (17)	0.7 (1)	0.5 (1)	1.5 (53)	2.1 (93)
	COPD	33.9 (47)	22.1 (57)	3.4 (5)	1.4 (3)	10.1 (363)	10.9 (474)
Stroke	Stroke	11.7 (16)	12.5 (32)	9.9 (15)	11.3 (24)	10.5 (376)	10.7 (462)
Grand Total		228.7 (314)	213.6 (545)	153.5 (226)	73.8 (154)	140.6 (5,037)	144.9 (6,275)

ED visits

ED visit volumes by discharge type

On average Auckland regional EDs had 165,940 attendances from ProCare patients of which nearly 60% were routinely discharged from care (Table 51).

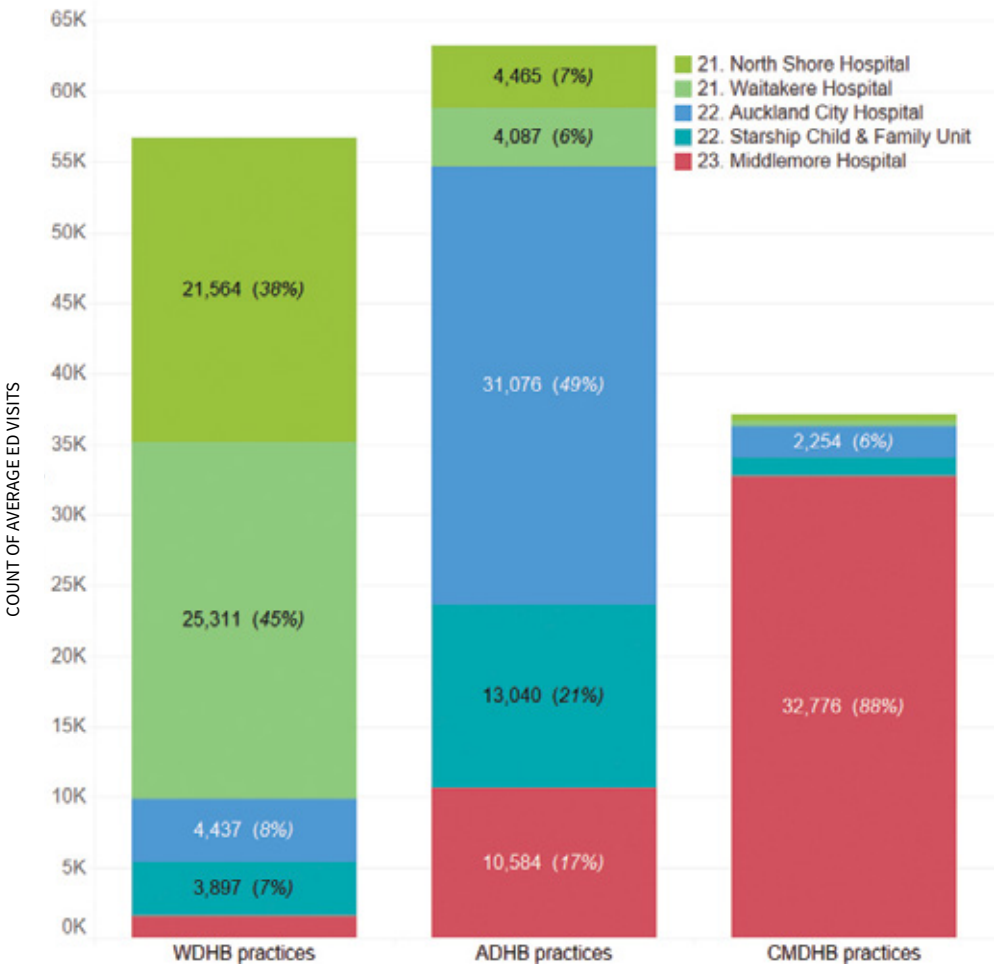
Table 51. ED visit volume by discharge type

Description	Av of two years ED attendances	As %
Routine discharge from an emergency department acute facility	97,758	59%
Discharge to other service within same facility	44,813	27%
Discharge from ED acute facility to another healthcare facility	19,789	12%
Self discharge from an ED acute facility without indemnity	1,660	1%
Self discharge from an ED acute facility with indemnity signed	1,649	1%
Discharge from ED acute to specialist facility (neonates and burns only)	238	0%
Died while still in emergency department acute facility	33	0%

ED visit volumes by DHB of practice and ED service

Patients enrolled in central Auckland (ADHB catchment) practices were more likely to utilise all regional ED services compared with those enrolled in Waitemata or Counties DHB catchments (Fig 26). This is likely a reflection that patients enrolled in Auckland DHB practices are spread widely by domicile.

Fig 26. Average annual ED visit volumes (2015 and 2016) by DHB of practice and ED facility



Age specific rates of ED visits by ethnicity

Table 52 describes a 'heat map' image of age specific rates of ED attendance by ethnic group for ProCare enrolled patients. The darker the blue the higher the age specific rates. On average, there were 20 ED attendances per 100 ProCare enrolled patients per year. Across all age groups Māori and Pacific patients attended ED more frequently than patients of other ethnic groups. ED attendance was particularly high for Pacific children aged 0-4 years (50%) and Māori and Pacific elders aged 75+ (60%).

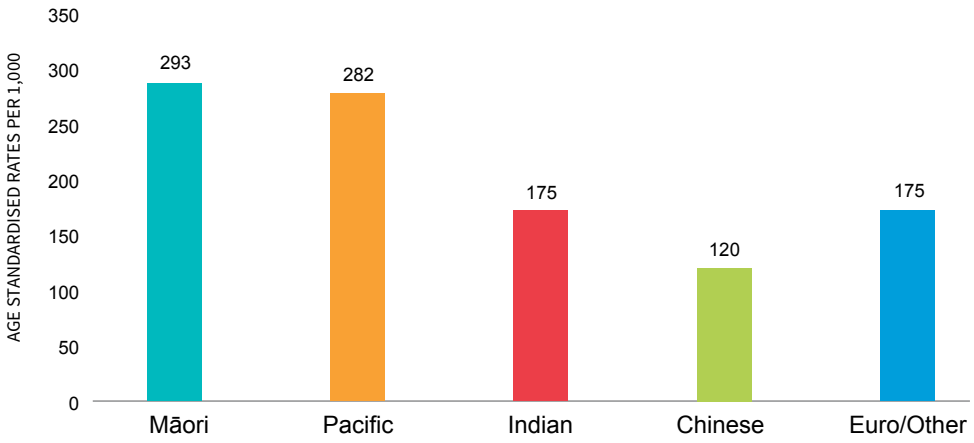
Table 52. Age-specific rates of ED visits by ethnicity and age group

Age group		Māori	Pacific	Indian	Chinese	European / Other	Grand Total
0-4	Av. ED attends per 1,000	436	564	365	325	310	382
	Avg. of two years ED atten..	4,101	5,613	1,836	1,640	8,439	21,628
	pop_count	9,413	9,949	5,031	5,048	27,225	56,666
5-14	Av. ED attends per 1,000	170	196	149	141	137	155
	Avg. of two years ED atten..	3,076	4,232	1,148	859	8,247	17,561
	pop_count	18,074	21,641	7,714	6,076	60,124	113,629
15-24	Av. ED attends per 1,000	286	229	128	70	176	194
	Avg. of two years ED atten..	4,616	4,417	881	364	10,463	20,740
	pop_count	16,163	19,308	6,859	5,228	59,580	107,138
25-44	Av. ED attends per 1,000	275	234	133	83	141	162
	Avg. of two years ED atten..	6,387	6,757	3,217	1,386	18,993	36,739
	pop_count	23,248	28,843	24,109	16,767	134,249	227,216
45-64	Av. ED attends per 1,000	286	265	161	85	144	165
	Avg. of two years ED atten..	5,008	5,720	2,014	1,136	20,964	34,841
	pop_count	17,507	21,602	12,532	13,417	145,875	210,933
65-74	Av. ED attends per 1,000	429	392	232	124	216	237
	Avg. of two years ED atten..	1,369	1,890	702	446	9,987	14,393
	pop_count	3,189	4,821	3,021	3,606	46,166	60,803
75+	Av. ED attends per 1,000	609	615	414	268	460	463
	Avg. of two years ED atten..	837	1,570	608	559	16,464	20,037
	pop_count	1,373	2,552	1,469	2,088	35,813	43,295
Grand Total	Av. ED attends per 1,000	285	278	171	122	184	202
	Avg. of two years ED atten..	25,393	30,197	10,404	6,389	93,556	165,938
	pop_count	88,967	108,716	60,735	52,230	509,032	819,680

Age standardised rates by ethnicity

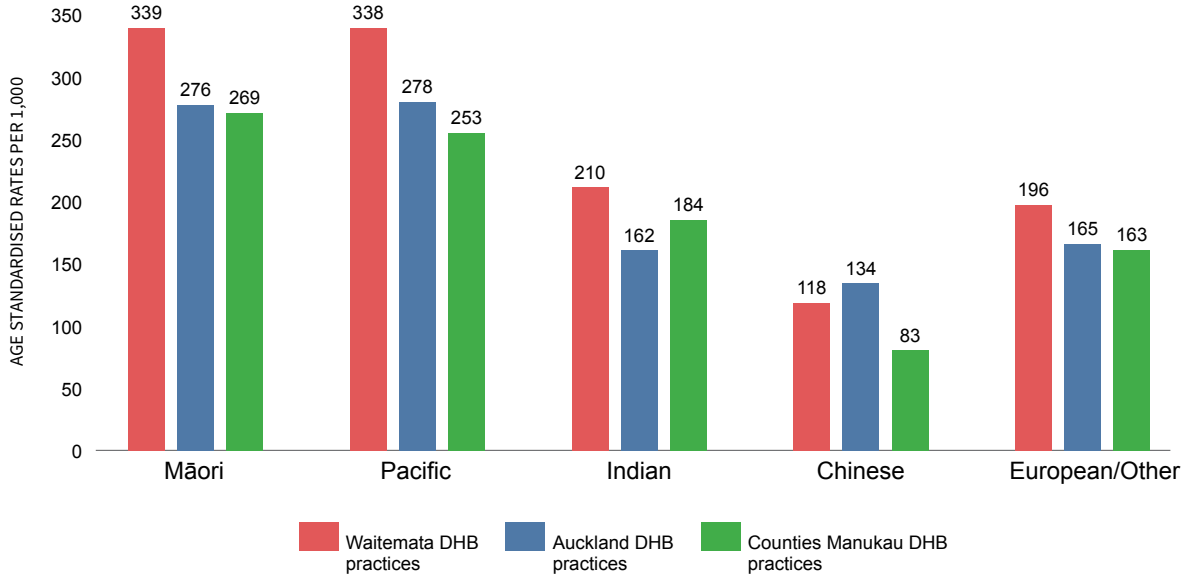
Māori and Pacific had the highest age standardised rates of ED visits, Chinese the lowest (Fig 27).

Fig 27. Age standardised rates per 1,000 enrolled patients of ED visits by ethnicity



Similar to total hospitalisations and ASH, ED attendance by patients enrolled in practices within Waitemata DHB was higher than the other catchments (with the exception of those of Chinese ethnicity).

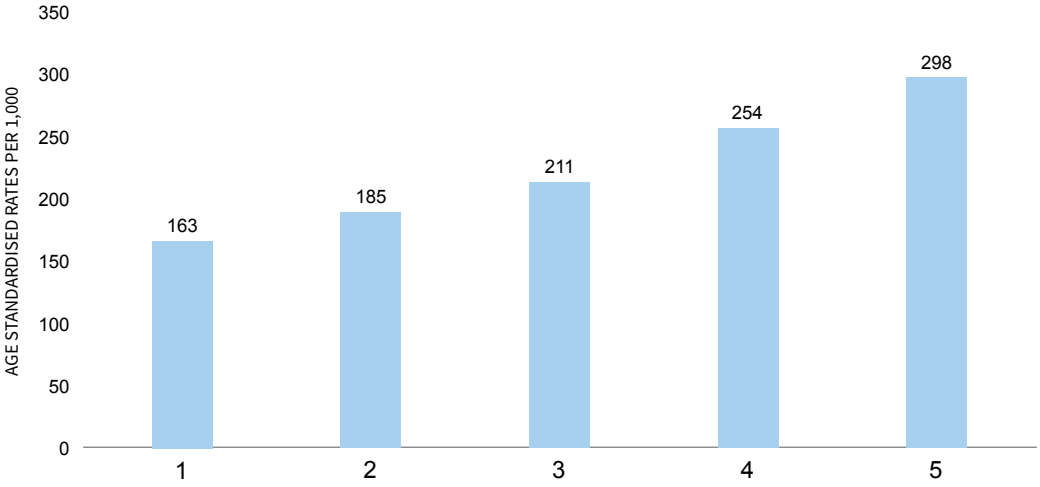
Fig 28. Age standardised rates per 1,000 enrolled patients of ED visits by ethnicity and DHB of practice



Age standardised rates of ED attendance by NZDep quintile

As patient domicile according to quintile of New Zealand Deprivation Index increases so too does ED attendance (Fig 29).

Fig 29. Age standardised rates per 1,000 enrolled patients of ED visits by NZDep quintile



This is similar across all ethnicity groups (see Table 53 heat map). However, the most socio economically deprived Māori and Pacific people had far higher ED attendance than the most deprived European/Other, Indian or Chinese people.

Table 53. Heat map of age standardised rates per 1,000 enrolled patients of ED visits by ethnicity and NZDep quintile

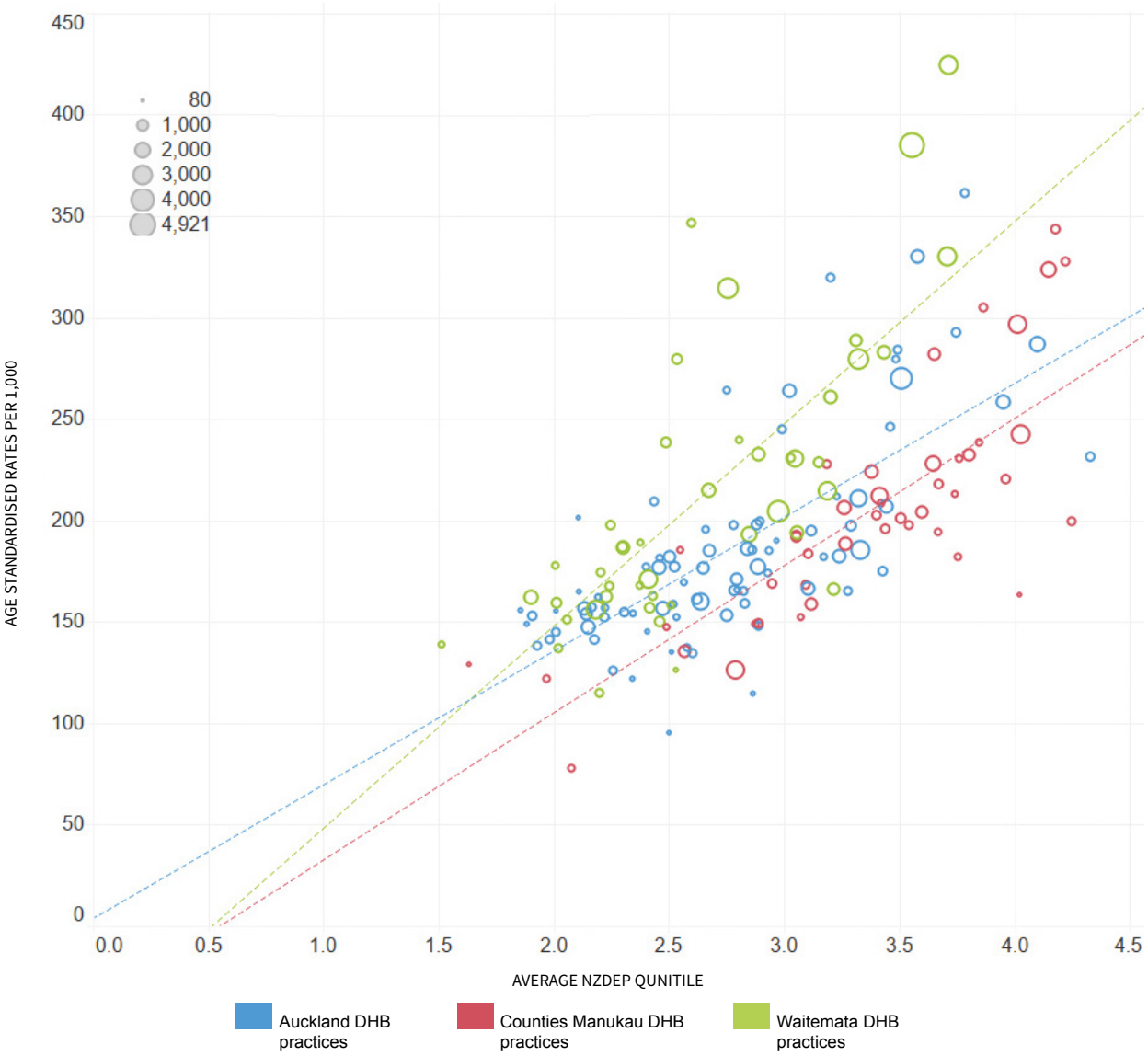
QUINTILE	Māori	Pacific	Indian	Chinese	Euro/Other
1	205	201	143	106	147
2	248	238	166	118	163
3	278	268	159	125	183
4	311	296	185	135	209
5	329	294	209	140	238

Practice age standardised ED attendance rate by deprivation and DHB catchment of practice

The findings here (Fig 30) reflect the findings seen with 2015/2016 acute hospital admissions:

- ED visits are positively correlated with socioeconomic deprivation
- There is marked practice variation in enrolled patients' ED visits even when controlling for deprivation
- Practices within WDHB catchment appear to have higher overall patient ED visits.

Fig 30. Age standardised ED visit rate per 100 enrolled patients by practice, DHB of practice and average practice population NZDep quinitile



Population risk modelling

In 2014 the Sapere Research Group developed an algorithm to stratify patients by their risk of acute hospitalisation in six months.[28] This algorithm has been used for the Counties Manukau At Risk Individual (ARI) programme for whom the intervention is called 'Planned ProActive Care'. To help GPs decide who to enrol in this programme a list of enrolled patients ranked according to their six month risk of an acute hospital admission was given to each practice.

Table 54 shows the application of the algorithm to eligible ProCare enrolled patients and divided them into risk categories. A risk category of <5% means that an individual has less than 1 in 20 chance of an admission in the next six months. The majority of people (87%) are in this risk category.

Table 54. ProCare population risk of acute hospitalisation in six months

	Less than 1 in 20 chance of an admission in the next six months		At least 1 in 10 chance of an admission in the next six months		More than 1 in 5 chance of an admission in the next six months
Total ProCare	<5%	5-9%	10-14%	15-19%	20%+
771,691	667,999 (87%)	65,989 (9%)	17,910 (2%)	7,773 (1%)	12,020 (2%)

Note: percentages have been rounded.

The population risk model has been applied by ethnicity group. The model estimates that Māori and Pacific will have 7% of the population with more than 1 in 10 chance of an admission in the next six months compared with 5% European/Other, 2.5% Indian and 1.8% Chinese.

Table 55. ProCare population risk of acute hospitalisation in six months by ethnicity

		Risk of an acute hospital admission in the next six months				
	Total ProCare	<5%	5-9%	10-14%	15-19%	20%+
	771,691	667,999 (87%)	65,989 (9%)	17,910 (2%)	7,773 (1%)	12,020 (2%)
Ethnicity		N (%)	N (%)	N (%)	N (%)	N (%)
Māori	83,863	68,538 (82%)	9,872 (12%)	2,998 (4%)	1,092 (1%)	1,362 (2%)
Pacific	103,631	83,228 (80%)	12,739 (12%)	4,020 (4%)	1,535 (1%)	2,109 (2%)
Indian	60,793	55,823 (92%)	3,516 (6%)	773 (1%)	279 (0.5%)	402 (1%)
Chinese	47,573	44,821 (94%)	1,907 (4%)	460 (1%)	194 (0.4%)	191 (0.4%)
Euro/Oth	475,832	415,589 (87%)	37,955(8%)	9,659 (2%)	4,673 (1%)	7,956 (2%)

Note: percentages have been rounded.

Note: The Sapere group noted in their report that for people aged under 40 years and for Māori and Pacific subgroups the model shows relatively low discrimination (ROC 0.639); that is, it does not perform as well. However, discrimination is about ranking people according to risk and must not be confused with calibration; the predicted event rate compared to observed (actual events).

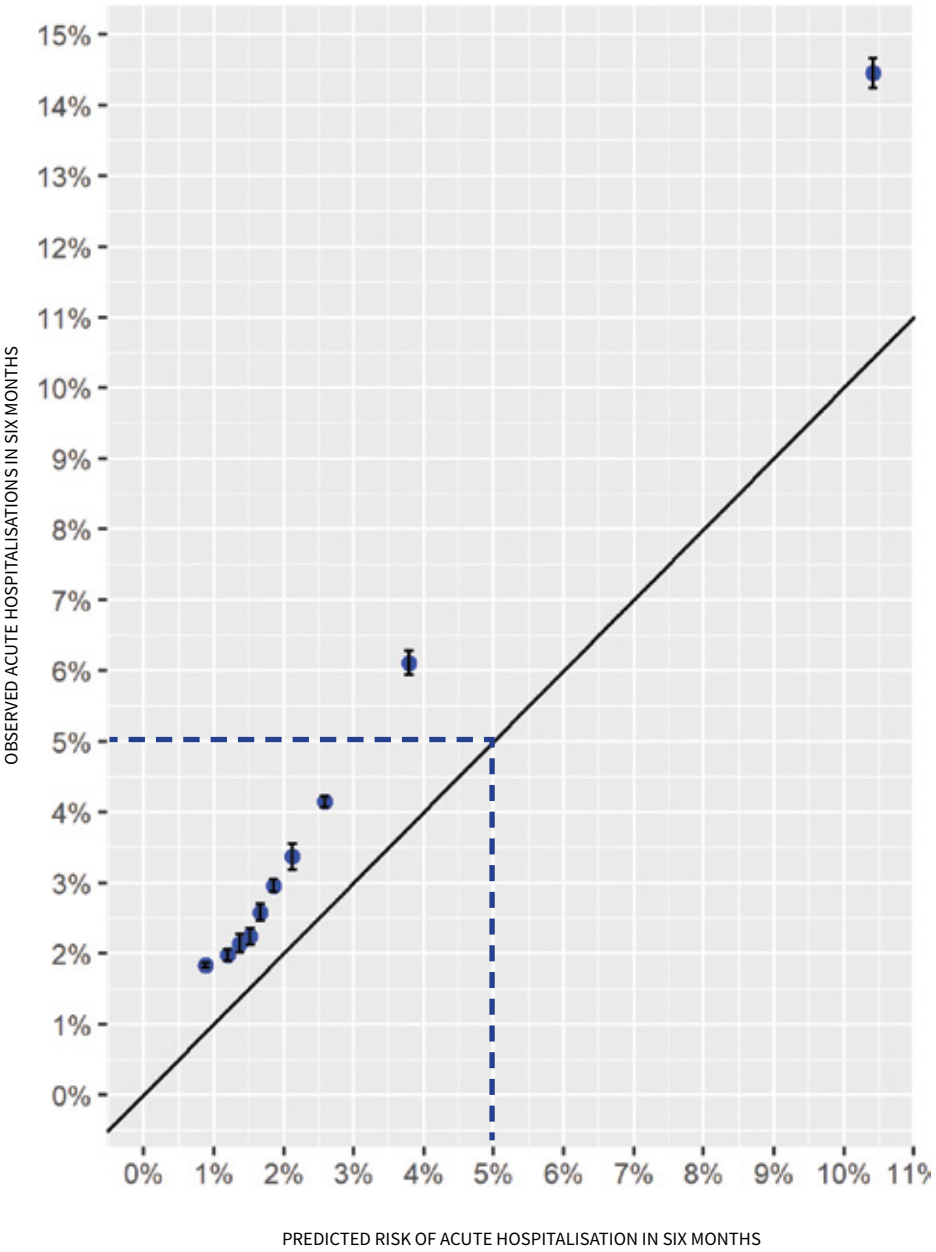
Calibration of the population risk model

We investigated how closely the risk of a hospital admission (predicted) was to the actual observed events (actual hospitalisations in six months) for all ProCare enrolled patients. The population has been divided into deciles of risk so there are 10 groups.

If perfectly calibrated a predicted risk would equate to actual observed acute hospital admissions (the straight line). We have plotted 5% predicted events and 5% actual events (dotted lines). As shown in Table 54, around 90% of the population are less than 5% predicted risk.

Overall, the model underestimates actual acute hospitalisations- with the under estimate increasing with decile of risk; actual hospitalisations are 1-4% more than the predicted event rates.

Fig 31. Calibration plot of population risk model



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Our Picture of Health

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