

# The enrolment gap: who is not enrolling with primary health organizations in Aotearoa New Zealand and what are the implications? An exploration of 2015-2019 administrative data

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## Research

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1 **Title: The enrolment gap: who is not enrolling with primary health**  
2 **organizations in Aotearoa New Zealand and what are the**  
3 **implications? An exploration of 2015-2019 administrative data**

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9 **Key words:** primary health care, patient enrolment, health equity, primary health organization, New Zealand.

10

11 **Abstract**

12 **Background** - Primary Health Care (PHC) is the entry point to accessing health services in many countries. Having  
13 a high proportion of the population enrolled with a PHC provider is key to ensuring PHC fulfils this role and that  
14 it contributes to achieving better equity in health. We aimed to understand the extent to which people in  
15 Aotearoa New Zealand are enrolling with Primary Health Organisations (PHOs), how enrolment rates have  
16 evolved over time, variations across District Health Boards (DHBs), and socio-demographic groups.

17 **Methods** - We analysed administrative data on the proportion of people enrolled in PHOs and breakdowns  
18 across DHBs, and by age, ethnicity and deprivation, for the years 2015-2019.

19 **Results** - About 6% of the population was not enrolled in 2019. There are persistent differences across socio-  
20 demographic groups as well as geographically. Māori have lower enrolment rates than New Zealand  
21 European/Other groups. Young people (15-24 years) are the least likely to be enrolled. The most affluent areas  
22 have the highest enrolment rates. Auckland DHB shows the lowest enrolment rates.

23 **Conclusions** - Enrolments remain below full population coverage and inequities exist between socio-  
24 demographic and geographic groups. Potential reasons explaining these trends include methodological  
25 limitations as well as real issues in accessing services. We recommend (a) work towards minimising data issues  
26 in relation to this indicator to improve its accuracy and value in signalling trends in access to PHC services, and

27 (b) investigating the reasons for the potential widening of the inequities identified, in particular issues  
28 preventing Māori and younger people from enrolling. This study deepens our understanding of the enrolment  
29 system and its potential pitfalls specially in relation to equity. Other countries can learn from the Aotearoa New  
30 Zealand case to draw lessons for improving equity in health care.

31

## 32 List of abbreviations

DHB	District Health Board
GP	General Practitioner
MoH	Ministry of Health (New Zealand)
NES	National Enrolment System
NZ	New Zealand
NZDep	New Zealand Deprivation Index
NZHS	New Zealand Health Survey
PHC	Primary Health Care
PHCS	Primary Health Care Strategy (New Zealand, 2001)
PHO	Primary Health Organization

## 33 Declarations

34 Ethics approval and consent to participate – not applicable

35 Consent for publication- not applicable

36 Availability of data and materials- the datasets analysed in the current study are publicly available from New  
37 Zealand Ministry of Health ([https://www.health.govt.nz/our-work/primary-health-care/about-primary-health-](https://www.health.govt.nz/our-work/primary-health-care/about-primary-health-organisations/enrolment-primary-health-organisation)  
38 [organisations/enrolment-primary-health-organisation](https://www.health.govt.nz/our-work/primary-health-care/about-primary-health-organisations/enrolment-primary-health-organisation))

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42 study.

43 Authors' contributions-

44 MIL: conceptualization, data analysis; writing first draft

45 MJ: conceptualization, review, writing- review & editing

46 JC : conceptualization, writing- review & editing, funding acquisition

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49

## 50 Background

51 Primary Health Care (PHC) is the entry point to accessing health services in many countries. PHC embraces  
52 essential services, typically imbedded in local communities and should be provided at an affordable cost<sup>1</sup>. Not  
53 only does PHC help improve population health but, unlike specialty care, better access to and use of PHC is  
54 associated with improved health equity<sup>2</sup>. PHC also plays a gatekeeper role in preventing and reducing the need  
55 for more costly specialised care and hospitalizations, thus having the potential to lower health expenditures<sup>3</sup>.

56

57 Some countries like Italy, Netherlands, Aotearoa New Zealand, Norway, Portugal, Spain, and the United Kingdom  
58 have chosen to formalise the relationship between the PHC provider and the population through an enrolment  
59 system, also called registration or patient list. The design of the enrolment system differs across countries. For  
60 example, the patient enrolment can take place with a General Practitioner (GP), practice, primary care  
61 organization, local government or insurance company<sup>4</sup>. Enrolment can also be voluntary with patients choosing  
62 their own GP (e.g. Aotearoa New Zealand and Norway), while incentivising practices to enrol patients, or  
63 enrolment can be compulsory where a patient is assigned to a GP or practice, usually by geographic area (e.g.  
64 the U.K. and the Netherlands) with some possibility of opting out or changing the allocated affiliation<sup>4 5</sup>. For the

65 patient, formal enrolment might mean an obligation or commitment to use the provider with whom they are  
66 enrolled as their preferred service. Benefits for patients who enrol vary by country and can include, for example,  
67 lower costs of consultations (Aotearoa New Zealand), guaranteed access to GPs and access to afterhours services  
68 (Ontario, Canada), and priority access to GPs (Norway). The registration system often sits alongside and has  
69 synergies with a capitation scheme that funds providers according to the number and characteristics of their  
70 enrolled population<sup>5</sup>. Funding schemes are often mixed, including capitation payments, fee for service and out-  
71 of-pocket payments<sup>5</sup>.

72

73 It is internationally recognised that having the population enrolled with PHC providers has many benefits  
74 favourable towards PHC values<sup>6 4 5 7</sup>. First, enrolments, along with capitation funding, allow a shift in provider  
75 responsibility from just treating sick patients to being responsible for and actively promoting health for a well-  
76 defined population. Second, through its associated incentives for both providers and users (e.g. lower  
77 consultation fees for patients and capitation payments for practices) it promotes early access. Third, enrolment  
78 enhances continuity of care with the same provider by formally linking up patients to a specific provider and  
79 establishing a provider's responsibilities to be pro-active with respect to health promotion (e.g., for regular  
80 screening). Enrolment can further enhance continuity of care by formalising the PHC provider's role in  
81 coordinating information and care for the enrolled population (e.g., with GPs taking responsibility for referral  
82 processes and follow-up). Although continuity of care can exist without an enrolment system, through patient  
83 loyalty, the enrolment system enhances the nature and extent of the interaction between the provider and the  
84 enrollee. Fourth, because the enrolment system designates one place - the main provider - where a patient's  
85 information is stored and managed, it promotes information coordination. This synchronization serves to  
86 provide an overview of all that is happening with a patient's health, supporting better diagnosis and care. Fifth,  
87 enrolment supports health planning by allowing health providers to clearly identify the population they are  
88 supporting, including the number of enrollees and knowing their health and socio-demographic characteristics.  
89 Leading to the creation of specifically targeted health services serves to specifically meet enrolled population's  
90 health needs. Sixth, enrolment brings gains in value-for-money as it enhances access to and continuity of PHC,  
91 and supports the PHC gatekeeping role, thus reducing the need for more costly specialised care<sup>5</sup>. It also brings  
92 economic gains through the efficiencies associated with coordination of information, and by encouraging cost-  
93 effective prevention and health promotion. Seventh, regarding equity, enrolment may support equal access by

94 reaching marginal groups and supporting economically disadvantaged users through economic incentives such  
95 as lower costs of services for those enrolled compared to those not enrolled. On the other hand, it may decrease  
96 equity when providers may want to avoid registering high need patients if they are not sufficiently compensated  
97 for meeting their needs. This issue has led to some funding systems designed to ensure adequate funding of  
98 perceived health complex and more 'costly' cases, providing financial coverage and reaching marginal groups  
99 through financial incentives. An enrolment system may also be beneficial for equity when it includes  
100 complementary measures to promote public trust and reaching out to those usually left out of the system.  
101 Finally, enrolment is likely to bring about accountability gains. With an enrolment system, the contracts between  
102 PHC providers and the funding agency define the nature and extent of the responsibility of providers towards  
103 their enrolled population regarding health promotion, ongoing care, information management, etc. Without this  
104 formal relationship, the basis for accountability of providers towards enrolees would be obscure. In fact, the  
105 literature suggests that the clearer the responsibilities of providers towards their enrolled population, the more  
106 gains in health outcomes induced by enrolment system<sup>5</sup>. All in all, the absence of an enrolment system would  
107 mean losing opportunities to define an enrolee population and its needs, jeopardizing the potential for proactive  
108 population health approaches to PHC services in an accountable way. It is also important to acknowledge that  
109 the features and potential benefits of an enrolment system are mutually reinforced by a capitation funding  
110 mechanism and the formal gatekeeping role of PHC, as well as dependant on the specific country context<sup>5</sup>.

111

112 In Aotearoa New Zealand, the 2001 PHC Strategy (PHCS)<sup>8</sup> established Primary Health Organisations (PHOs)<sup>i</sup> to  
113 provide essential PHC services to their enrolled populations. Having the full eligible population enrolled is  
114 essential for the PHCS to succeed, as stated at its inception<sup>8</sup>, and reiterated in a later evaluation report<sup>9</sup>. People  
115 usually enrol with a PHO through their usual GP. PHO enrolment is voluntary but encouraged by incentives for  
116 both practices and users. Enrolling allows people to benefit from lower consultation co-payments and reduced  
117 costs of prescription medicines<sup>10</sup>, and to benefit from health promotion programmes via reminders for  
118 vaccination, cervical cancer testing, for example. Accurate enrolments are important for funding PHOs through  
119 the capitation formula, which pays a per capita rate for the enrolled population and relative need based on a  
120 PHO's socio-demographic profile. This, in turn, supports equity in that funding is then available to support all of

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<sup>i</sup> PHOs are local, non-governmental, not-for-profit organisations, funded by their local District Health Boards to manage primary health services for their enrolled populations<sup>8</sup>.

121 those who are enrolled, in contrast to a fee-for-service payment system that provides funding only for those  
122 using services. Providers then become responsible for the PHC of the population enrolled, and accountable  
123 through contracts. The contracts between PHOs and their District Health Boards (DHBs) detail both funding and  
124 specific targets for PHOs.

125

126 However, when not all the population is enrolled, the system may place some groups at a disadvantage,  
127 perpetuating inequities in health. International literature warns of the challenge of existing low and late  
128 enrolment coverage together with poor acceptability of services, particularly among specific population groups<sup>5</sup>.  
129 For example, if the capitation payments to practices for high need patients are perceived to be lower than the  
130 actual costs of delivering services to them, capitation may lead to ‘cream skimming’ of patients with higher  
131 needs, i.e. discouraging practices from enrolling high needs patients<sup>11 4</sup>. A recent study in Ontario (Canada) found  
132 that enrolment rates in new comprehensive PHC models were consistently lower amongst immigrant groups  
133 than long-term residents, making it difficult to achieve equitable access to integrated PHC services for immigrant  
134 populations<sup>12</sup>. Consequently, the authors recommend ensuring enrolment by all population groups, taking into  
135 consideration social diversity, inequality and disadvantage to overcome low enrolment challenges by immigrant  
136 populations, such as outreach or drawing support from social networks<sup>5</sup>. In the case of Aotearoa New Zealand,  
137 data suggests that not all people in Aotearoa New Zealand are enrolled, and that there are significant differences  
138 depending on population characteristics<sup>13</sup>. By analysing who is not enrolled with PHOs in Aotearoa New Zealand  
139 and how this has changed over time, we aim to achieve a better understanding of the equity implications of the  
140 enrolment system in PHC. Other countries employing patient registration systems in PHC may benefit from  
141 learning from the Aotearoa New Zealand case by drawing lessons that could be applied to improve their own  
142 enrolment systems and its monitoring.

143

144 Consequently, it is crucial to examine enrolment rates across population groups in Aotearoa New Zealand.  
145 Achieving full enrolment is key for the success of the PHCS and promoting equity in PHO enrolments may serve  
146 to decrease persistent inequities in health access. We investigate the extent and composition of populations  
147 enrolled in PHOs, addressing the following questions:

- 148 1. What proportion of people in Aotearoa New Zealand are enrolled in a PHO?
- 149 2. How did this change between 2015 and 2019?

150 3. What do we know about the socio-demographic profile of the population not enrolled?

## 151 Methods

152 We analyse annual data on the proportion of people enrolled in a PHO. Data aggregated by District Health Boards  
153 (DHB) are updated quarterly at the Ministry of Health (MoH) website. Data are labelled 'Access to Primary Care'<sup>14</sup>  
154 and defined as per the formula:

155

$$156 \quad \textit{Enrolment rate} = \textit{Proportion of people enrolled} = \left( \frac{\textit{No. of people enrolled}}{\textit{Total population}} \right) * 100$$

157

158 The complexity associated with this indicator is that there are two different sources of data for the numerator  
159 and denominator. The numerator comes from administrative data passed from PHOs to the Ministry of Health  
160 (MoH) through the National Enrolment Service (NES)<sup>ii</sup>. The launch of a real-time NES system in 2015 served to  
161 better harmonize national data, although still there may be differences associated with progressive adoption of  
162 the NES<sup>iii</sup> and data collection by PHOs. There are limitations also from using the DHB of domicile, as an individual  
163 may choose to enrol with a PHO outside his/her DHB area<sup>15</sup>, leading to a mismatch between numerator and  
164 denominator at DHB level. A person can only be enrolled in one PHO at a time; the system de-enrols patients  
165 when they enrol in a different PHO or three years following their last visit<sup>16</sup>. Each of these factors would affect  
166 reported enrolment rates.

167

168 The denominator is based on population projections from Statistics New Zealand<sup>17</sup> based on the 2013 Census,  
169 and provided in November 2017 for 2018 reporting, and in November 2018 for 2019 reporting<sup>iv</sup>. Although a new  
170 Census took place in 2018, delays with analysis and concerns around data quality<sup>18 19</sup> have hindered its use. The  
171 potential misalignment between the two sources affects the accuracy of the indicator; for example,  
172 underestimation of population growth would lead to 'false' high enrolment rates.

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<sup>ii</sup> The ENS is an IT enhanced system that enables real-time patient enrolment status data from all GPs and centralised<sup>ii</sup>. It allows calculations for capitation funding based on updated enrolled users. It also contains National Health Index (NHI) and patient demographics, which allows research into how demographic groups portray in different practices/PHOs/DHBs that inform equity analysis<sup>16</sup>.

<sup>iii</sup> Personal communication with Ministry of Health, Primary Care Department, 28 February 2020

<sup>iv</sup> This suggests that population projections are updated annually from Statistic New Zealand, though there are no notations for 2015-2017 data to confirm this.

173

174 We use annual enrolment rate aggregated data for all DHBs by ethnicity, age, deprivation and gender for all  
175 available years, 2015-2019, using fourth quarter data. Ethnicity is classified into three groups: Māori, Pacific and  
176 New Zealand (NZ) European/Other (representing around 17%, 8% and 75% of population<sup>20</sup>). There is a likely  
177 mismatch in the ethnicity composition, between the prioritized ethnicity from NES for the numerator, and from  
178 census prioritized data for the denominator<sup>21</sup>. The prioritization of ethnicity for analytical purposes (Māori, then  
179 Pacific, then NZ European/Other) means that those who identify as Māori and another ethnicity are categorized  
180 as Māori, so the NZ European/Other population is, more accurately, the non-Māori non-Pacific NZ  
181 European/Other population. As Pacific population enrolment rates often exceed 100%<sup>14</sup> due probably to  
182 inaccurate population projections, we present but do not discuss Pacific data in detail.

183

184 Deprivation classification is based on the New Zealand Deprivation Index 2013 (NZDep). It classifies each area  
185 according to its level of socioeconomic deprivation based on nine variables measured in the 2013 census. The  
186 resulting scores are ranked, then categorized into quintiles, where quintile 1 represents the least deprived areas  
187 and quintile 5 the most deprived ones<sup>22</sup>. Due to incomplete NZDep data, we adjust enrolment rates, when  
188 stratified by deprivation, by reducing the population numbers by an equal proportion across the five deprivation  
189 groups. The original and adjusted data are reported.

190

## 191 Results

### 192 a. Overall PHO enrolment rates

193 In 2019, about 6% of the population was not enrolled in a PHO. Enrolment rates decreased from 95% in 2015 to  
194 93% in 2018, recovering partially to 94% in 2019 (Figure 1).

195

196 **Figure 1: Evolution of percentage of population enrolled in a PHO, 2015-2019**

197

198 (INSERT FIGURE 1 HERE)

199

200 Note: Y axis starts at 80%.

201 Data source: Data compiled from MoH 2019<sup>14</sup>.

202

203 **b. PHO enrolment rates by ethnicity group**

204 Māori have lower enrolment rates than the NZ European/Other group (91% compared to 94% in 2019) (Figure  
205 2). There is a slight closing of this gap during the period, although this is related both to improvements for Māori  
206 as well as decreasing rates for NZ European/Other. Pacific enrolment rates over 100% cannot be usefully  
207 interpreted due to data limitations.

208

209 **Figure 2: Evolution of percentage of population enrolled in a PHO, per ethnicity groups, 2015-2019**

210

211 (INSERT FIGURE 2 HERE)

212

213 Note: Y axis starts at 80%.

214 Data source: Data compiled from MoH 2019<sup>14</sup>.

215

216 The breakdown by DHBs reinforces that Māori have lower enrolment rates than the NZ European/Other  
217 population, as it is the case in all DHBs except for Hawkes Bay and Northland DHBs (Table 1). The enrolment  
218 rate for Māori is particularly low in Auckland DHB (74%).

219

220 **Table 1: Percentage of population enrolled in a PHO, per ethnicity groups and DHBs, 2019.**

DHB OF DOMICILE	MĀORI	PACIFIC	NZ EUROPEAN/OTHER	TOTAL
Auckland	74%	98%	82%	83%
Bay of Plenty	98%	88%	100%	100%
Canterbury	86%	108%	93%	93%
Capital & Coast	88%	100%	93%	93%
Counties Manukau	92%	116%	93%	97%
Hawkes Bay	99%	93%	98%	98%
Hutt Valley	92%	99%	100%	98%
Lakes	97%	101%	98%	98%
Mid Central	83%	93%	97%	94%
Nelson Marlborough	89%	88%	100%	99%
Northland	104%	88%	98%	99%
South Canterbury	84%	141%	99%	98%
Southern	87%	102%	95%	95%
Tairāwhiti	98%	79%	99%	98%
Taranaki	87%	97%	98%	96%
Waikato	91%	93%	97%	95%
Wairarapa	99%	103%	100%	100%
Waitemata	82%	99%	93%	92%
West Coast	87%	79%	96%	95%
Whanganui	97%	99%	100%	99%
<b>NATIONAL</b>	<b>91%</b>	<b>105%</b>	<b>94%</b>	<b>94%</b>

221 Data source: Data compiled from MoH 2019<sup>14</sup>.

222

223 **c. PHO enrolment rates by age group**

224 It is young people (15-24 years old) followed by younger adults (25-44 years old) that experience the lowest  
 225 enrolment rates (85% and 91% respectively in July 2019). These groups also have had the largest decrease  
 226 between 2015 and 2019 (-2 and -3 percentage points respectively). The highest rates of enrolment are for  
 227 children aged 5-14 years (100% in 2019). The differences across age groups widened over the study period  
 228 (Figure 3).

229

230 **Figure 3: Evolution of percentage of population enrolled in a PHO, by age group, 2015-2019**

231

232

(INSERT FIGURE 3 HERE)

233

234 Note: Y axis starts at 80%.

235 Data source: Data compiled from MoH 2019<sup>14</sup>.

236

237 The differences among age groups are echoed in the results stratified by DHB. Most DHBs have the lowest rates

238 of enrolment for the 15-24 years old group (Table 2). Auckland DHB has the lowest rates for most age groups;

239 one in three people aged 15-24 years in Auckland DHB is not enrolled (Table 2).

240

241 **Table 2: Percentage of population enrolled in a PHO for age groups and DHBs, 2019**

DHB OF DOMICILE	0-4 YRS	5-14 YRS	15-24 YRS	25-44 YRS
Auckland	95%	96%	67%	74%
Bay of Plenty	99%	103%	94%	96%
Canterbury	95%	97%	85%	92%
Capital & Coast	92%	98%	83%	91%
Counties Manukau	101%	106%	92%	94%
Hawkes Bay	99%	101%	98%	100%
Hutt Valley	100%	101%	95%	101%
Lakes	100%	102%	90%	97%
Mid Central	99%	100%	82%	90%
Nelson Marlborough	99%	99%	99%	98%
Northland	97%	99%	96%	98%
South Canterbury	93%	97%	101%	104%
Southern	97%	98%	82%	95%
Tairāwhiti	97%	97%	95%	98%
Taranaki	99%	97%	94%	92%
Waikato	98%	99%	88%	93%
Wairarapa	101%	99%	101%	97%
Waitemata	97%	100%	83%	89%
West Coast	88%	87%	92%	91%
Whanganui	97%	100%	98%	95%
<b>NATIONAL</b>	<b>97%</b>	<b>100%</b>	<b>85%</b>	<b>91%</b>

242 Data source: Data compiled from MoH 2019<sup>14</sup>.

243

#### 244 d. PHO enrolment rates by deprivation level

245 The most affluent areas have the highest enrolment rates (97% for quintile NZDep 1) (Figure 4) and enrolments  
246 have increased over time. Interestingly, national enrolment rates are lowest not for people living in the most  
247 deprived areas (NZDep 5), but for those in the middle-lower end (NZDep 4) (90% and 88% respectively in 2019).

248 Data suggests that the differences in enrolment levels across deprivation quintiles have widened over time.

249

250 **Figure 4: Evolution of percentage of population enrolled in a PHO, per deprivation quintiles, 2015-2019**

251

252 (INSERT FIGURE 4 HERE)

253

254

255 Note: Y axis starts at 80%.

256 Data source: Data compiled from MoH 2019<sup>14</sup>.

257

258 Figure 5 shows enrolment rates by deprivation quintile after adjusting to include missing enrollees – those with  
259 no quintile assigned. Enrolment rates in the most affluent areas are highest and have increased over time,  
260 whereas those for other deprivation levels enrolments have dropped over the period. Differences in enrolment  
261 levels across deprivation quintiles has widened.

262

263 **Figure 5: Evolution of percentage of population enrolled in a PHO, per adjusted\* deprivation quintiles, 2015-**  
264 **2019.**

265

266 (INSERT FIGURE 5 HERE)

267

268 \*Based on an artificial weighted national average from five deprivation quintiles  
 269 Note: The NZDep 0, those with no deprivation data, have been assigned on equal basis across the five deprivation groups  
 270 to account for all population in both numerator and denominator.  
 271 Note: Y axis starts at 80%.  
 272 Data source: Data modified from MoH 2019<sup>14</sup>.  
 273

274 The decomposition by DHBs (Table 3) shows that enrolment rates for NZDep 1 exceed 100% for 14 DHBs in 2019,  
 275 which suggests some problems with the data quality, most likely due to population projections from the census  
 276 at a DHB level.

277

278 **Table 3: Percentage of population enrolled in a PHO, per deprivation group (NZDep) and DHBs, 2019.**

DHB OF DOMICILE	NZ DEP 1 - 2	NZ DEP 3 - 4	NZ DEP 5 - 6	NZ DEP 7 - 8
Auckland	84%	81%	80%	79%
Bay of Plenty	116%	97%	99%	93%
Canterbury	102%	89%	83%	81%
Capital & Coast	95%	92%	88%	83%
Counties Manukau	93%	93%	90%	95%
Hawkes Bay	102%	96%	92%	93%
Hutt Valley	99%	99%	94%	96%
Lakes	100%	93%	89%	91%
Mid Central	99%	95%	88%	88%
Nelson Marlborough	104%	94%	93%	91%
Northland	102%	98%	95%	97%
South Canterbury	102%	97%	93%	93%
Southern	105%	92%	89%	86%
Tairāwhiti	112%	98%	95%	94%
Taranaki	105%	92%	85%	84%
Waikato	104%	92%	91%	89%
Wairarapa	103%	101%	100%	96%
Waitemata	93%	91%	89%	88%
West Coast	112%	92%	86%	86%
Whanganui	100%	97%	91%	95%
<b>NATIONAL</b>	<b>97%</b>	<b>91%</b>	<b>89%</b>	<b>88%</b>

279 Data source: Data compiled from MoH 2019<sup>14</sup>.

280

281 e. PHO enrolment rates by DHB

282 The proportion of people enrolled in a PHO varies significantly across DHBs, ranging from 83% in Auckland DHB  
 283 to 100% in Wairarapa and Northland DHBs (2019) (Table 4). Auckland DHB persistently has the lowest rates as

284 well as the greatest decrease from 2015 to 2019 (-8 percentage points), quite different from the majority of  
 285 DHBs, as enrolment rates increased or remained similar for 14 DHBs over time.

286

287 **Table 4: Variation of PHO enrolment rates across DHBs, 2015-2019**

DHB of Domicile	2015	2016	2017	2018	2019	Change 2015-2019 (% points)
Auckland	91%	86%	84%	82%	83%	-8
Bay of Plenty	97%	99%	98%	99%	100%	2
Canterbury	94%	93%	93%	93%	93%	-1
Capital & Coast	94%	94%	94%	93%	93%	-2
Counties Manukau	99%	97%	97%	97%	97%	-1
Hawkes Bay	96%	97%	97%	97%	98%	2
Hutt Valley	97%	98%	98%	98%	98%	1
Lakes	99%	99%	98%	97%	98%	-1
Midcentral	93%	92%	93%	93%	94%	1
Nelson Marlborough	96%	96%	97%	97%	99%	3
Northland	98%	100%	100%	99%	99%	1
South Canterbury	98%	98%	97%	97%	98%	0
Southern	93%	92%	92%	92%	95%	2
Tairāwhiti	97%	98%	98%	98%	98%	1
Taranaki	92%	93%	94%	94%	96%	3
Waikato	95%	95%	95%	94%	95%	0
Wairarapa	97%	99%	100%	101%	100%	3
Waitemata	94%	93%	92%	91%	92%	-1
West Coast	84%	92%	93%	94%	95%	11
Whanganui	97%	98%	99%	99%	99%	2
<b>NATIONAL</b>	<b>95%</b>	<b>94%</b>	<b>94%</b>	<b>93%</b>	<b>94%</b>	<b>-1</b>

288 Data source: Data compiled from MoH 2019<sup>14</sup>.

289

## 290 Discussion

291 Our results show that a significant proportion of the population is not enrolled in any PHO, and trends have  
 292 slightly worsened since 2015. We observe striking inequities in PHC enrolment across sociodemographic groups  
 293 and DHBs. Here we discuss potential explanations behind these trends.

294

295 First, data limitations emanate from using registered enrolments in the numerator and population projections  
 296 in the denominator. Consequently, a 100% enrolment rate is unlikely to be achievable, as some people included  
 297 in the 'usually resident population' are not eligible for publicly funded health services and therefore cannot enrol

298 with PHOs<sup>23</sup>. Also, there may be people who are enrolled with a PHO but not currently living in the country (i.e.  
299 counted in the numerator but not the denominator).

300

301 Second, as Auckland DHB comprises around 21% of national enrolments, it highly influences national rates.  
302 Enrolment rates in Auckland DHB are particularly susceptible to methodological issues given differences in  
303 enrolments when considering different definitions of DHB: DHB of domicile or lead DHB<sup>v</sup>: 457,278 vs 894,147  
304 enrolees respectively in 2019<sup>13</sup>; some families may attend a GP in a location different to their domicile, resulting  
305 into enrolling in a different DHB; however, this does not seem to fully explain the low rates in Auckland DHB, as  
306 that the other two neighbouring DHBs serving Auckland area - Counties Manukau and Waitemata DHBs - have  
307 rates below 100% and that are decreasing. Other factors may relate to Auckland having a higher proportion of  
308 young people, a growing population through internal migration<sup>vi</sup> and a potential higher proportion of residents  
309 not qualifying for NZ public health services. These factors may contribute to underestimates of or true low  
310 enrolment rates particularly in Auckland DHB.

311

312 Beyond data and socio-demographic factors, there seem to be issues suggesting worsening in PHC access. It has  
313 been noted that some practices are not taking new enrolees as they reach their full capacity, in what is called  
314 'closed books'. About 11% of GPs reported that their practices did not accept new enrolments in 2018, up from  
315 10% in 2017. The percentage of practices with closed books was higher (17%) for GPs that identified their  
316 practices as not clearly urban or rural (2018)<sup>24</sup>, which suggests we need to identify the profile of population  
317 served by these practices. This relates to the recognised decreasing rate of GPs per population, and further  
318 shortages of GPs are expected following a likely upcoming surge in GP retirements as GPs reach retirement age<sup>25</sup>.  
319 The issue of closed books would suggest that people are willing but unable to enrol. Current and expected future  
320 GP shortages are a global issue, also reported in Australia<sup>26 27</sup> and the U.K<sup>28</sup> for example.

321

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<sup>v</sup> There are two categories of DHB used in health statistics in Aotearoa New Zealand: 'DHB of domicile' - based on the address of the enrolee, and 'lead DHB' - used for capitation funding transfers. A PHO can have agreements with several DHBs but receives all its funding from the lead DHB.

<sup>vi</sup> Assuming population projections account for these population movements and with a time lag in enrolling with a GP in a new location.

322 The lower enrolment rates for youth and younger adults seem reasonable given that people aged 15-24 are  
323 generally healthy and have a lower level of need for medical care. Yet, the New Zealand Health Survey (NZHS)  
324 reveals that about 24% of the 15-24 years old and 26% of the 25-44 years old groups recognise unmet need for  
325 PHC, compared to 18% by those 65+ years (pooled 2014-2017 data)<sup>29</sup>. Higher population mobility for the 15-24  
326 years group may be another factor, but the low rate for young people in Auckland DHB does not seem to be  
327 substantiated by over-enrolments in other DHBs. Another explanation is that young people tend to have lower  
328 incomes and consultation fees may deter them from visiting a GP, even with the lower fees for those aged 14-  
329 17. The low enrolment rates of young people suggest the need to monitor that their needs are being met.  
330 Promoting young people's enrolment in PHOs may be a way to support young people's connection with health  
331 services. Worldwide, it is widely recognised<sup>30</sup> that adolescents and youth face specific challenges in accessing  
332 health services around issues of staff attitudes, communication, age-appropriate environment, etc., and that  
333 promoting youth and adolescents-friendly health services is key to enhance their utilization by young  
334 populations. In addition, Zeratsion (2013)<sup>31</sup> advocates raising the age threshold for zero PHC fees based on the  
335 experience in Norway of increases in PHC use among adolescents following co-payment exemptions, and that  
336 late adolescents would have more health needs than younger ones.

337 We would expect newly born children be enrolled and remain so in their early years given the intensity of visits  
338 for follow ups and vaccinations, and because providers can pre-enrol new-borns before their full enrolment  
339 process is completed<sup>32</sup>. Standard consultations are also free for young children, also encouraging enrolment.  
340 Enrolment rates like 88% in West Coast DHB or 92% in Capital Coast DHB suggest potential data issues such as a  
341 potential higher birth rate projected in these two DHBs that would lead to underestimation of real enrolment  
342 rates.

343

344 Children aged 5-14 years have the highest enrolment rates attained for any age group, above 97% for nearly all  
345 DHBs. This backs up the positive effect of zero fees on enhancing access to health services for children.  
346 Moreover, if it is possible to achieve such high rates for those aged 5-14, it should be possible for other age  
347 groups also. A suggestion would be using these highest enrolment rates for children aged 5-14 as the benchmark  
348 for the rest of age groups to achieve, a more realistic target than 100%.

349

350 In relation to ethnicity, not only are Māori less likely to be enrolled than NZ European/Other population  
351 nationally (91% vs 94% in 2019), but this disparity persists throughout the period and it is reflected by all but  
352 two DHBs in 2019. This difference may be partly explained by the Māori population being younger. Other factors  
353 include barriers to accessing PHC services, such as financial, transport and child care costs; Māori children and  
354 adults are more likely than non-Māori to have unmet need and unfilled prescriptions<sup>33</sup>; in 2016/17, the  
355 prevalence of one or more types of unmet need<sup>vii</sup> reported by Māori adults was 38%, compared to 28% for non-  
356 Māori<sup>27</sup>; and about 22% of Māori aged 15+ years had unmet need for GP services due to cost in the last year,  
357 compared to 13% for NZ European/Other<sup>34 35</sup>. Nonetheless, the ethnicity breakdown is particularly susceptible  
358 to inconsistencies given that the percentage of people identified as Māori is likely to be higher in the numerator  
359 than the denominator, as argued by Chan et al. 2015<sup>21</sup>.

360

361 The deprivation analysis points at the widening gap between deprivation quintiles. We have identified a data  
362 caveat here, however: the contradictory trends between specific quintiles and the overall national picture  
363 (Figure 4). These may be due to the exclusion from the quintile breakdown of those not having a deprivation  
364 level assigned, but who are included in the national rate and population estimations<sup>viii</sup>; this problem may be  
365 more accentuated for year 2019 when automatic NES enrolment was fully functional and the proportion of  
366 people with missing NZDep scores went from 1.22% (2018) to 2.94% (2019). Our attempt to align enrolments  
367 with national figures helps to understand the time trends, though it remains imprecise in itself; missing data is  
368 probably not random, so applying it equally to the five groups introduces another bias same as missing data  
369 does. Further work is required to better understand the relationship between PHO enrolments and deprivation  
370 levels. All in all, the fact that enrolment rates are higher for the most deprived deciles than for those in the  
371 middle-lower end suggests the positive impact of targeted schemes in enhancing access of the most deprived  
372 areas. Still, NZHS suggests that unmet need for PHC remains highest for the most deprived quintile (34%) and  
373 fairly constant between 2011-2017, compared to 23% for the least deprived quintile.

374

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<sup>vii</sup> Unmet need for primary health care indicates whether people experience any of the following barriers to accessing primary health care in the past 12 months: Unmet need for a GP due to cost; Unmet need for an after-hours medical centre due to cost; Unmet need for a GP due to lack of transport; Unmet need for an after-hours medical centre due to lack of transport; Inability to get an appointment at their usual medical centre within 24 hours <sup>29</sup>.

<sup>viii</sup> Personal communication with Ministry of Health, Primary Care Department, 28 February 2020.

375 We have identified enrolment gaps across ethnicity, age, deprivation and geographic population groups, and  
376 reasons suggesting they may be associated to differences in unmet health need. Findings suggest the need to  
377 consider additional ways to ensure enrolment uptakes for specific groups, such as outreach or drawing support  
378 from social networks<sup>5</sup>. Our findings are consistent with international literature<sup>4 5 12</sup> in that PHC enrolment rates  
379 serve to identify inequities in health care access. Efforts should be made to reduce methodological flaws of the  
380 indicator as recommended in our deprivation analysis and more broadly by Chan et al.<sup>21</sup>. We recommend  
381 investigating differences in health outcomes between those enrolled and not enrolled, benefiting from ongoing  
382 analysis around health outcomes for the enrolled population<sup>36</sup> and as done in Canada<sup>12 37</sup>. We also suggest  
383 examining the relationship between enrolment data with other variables such as continuity of care and other  
384 health care usage (emergency department, hospitalization), to identify more accurately the population who is  
385 or not 'attached' to their primary care provider, as done in Canada<sup>32</sup>. Further analysis could also include  
386 understanding how promoting PHO enrolment may enhance continuity of care, starting with comparing  
387 administrative enrolments and NZHS data. Individual-level enrolment data would render more detail and allow  
388 to control for the effects of multiple variables. Finally, our understanding of how an enrolment system may serve  
389 to promote equity in health care would benefit from looking into the deeper relationship between enrolments  
390 and access to services, in a way that takes into account not only availability and affordability of services but also  
391 acceptability, in particular for Māori and young and adolescent potential users<sup>38</sup>. It would also benefit from  
392 considering a wider understanding of equity in health that considers the perceptions of potential users around  
393 equity and access, as recommended by Mooney (2009)<sup>39</sup>. These recommendations apply not only for Aotearoa  
394 New Zealand but for all countries using patient enrolment systems. For these countries, it is important to tease  
395 out and monitor over time the extent and composition of the populations not being enrolled and the reasons  
396 and implications for health access and outcomes in order to keep track of equity in PHC.

## 397 Conclusion

398 Having a high proportion of the population enrolled with a PHC provider is instrumental to maximising the full  
399 potential of PHC for all, and to enhancing equitable access to services. In Aotearoa New Zealand, PHO  
400 enrolments remain below desirable levels and inequities exist between socio-demographic and geographic  
401 groups. We have discussed potential reasons behind the enrolment gap, both methodological inconsistencies as

402 well as reasons pointing at worsening access to health care and inequities. We need to better understand why  
403 people are not enrolling with a PHO and its implications. We suggest using more intensively PHO enrolment  
404 rates as a proxy to monitor PHC access and equity and to track progress towards achieving the goals of the PHCS.  
405 We need to understand the reasons behind the potential enrolment gap and widening of inequities identified,  
406 the lower enrolments of Māori and young populations and widening gaps across deprivation areas. The research  
407 deepens our understanding of the enrolment system and its potential pitfalls specially in relation to equity in  
408 the case of Aotearoa New Zealand. Other countries can learn from Aotearoa New Zealand's differences in  
409 enrolments across districts, ethnicity and age to draw lessons for improving equity in health care. These equity  
410 concerns need to be considered when adapting PHC enrolment systems and associated funding models across  
411 countries.

412 The underlying motivation of this study is that we need good proxies to monitor the performance of PHC  
413 services; having a high proportion of the population enrolled is the starting point to examine both performance  
414 and equity in a system using patient enrolments. For countries with this system, having more robust indicators  
415 and data around the enrolment gap will provide more precise and evidence-based understanding of the equity  
416 challenges in PHC. This in turn will enable prioritizing the redress of inequities in health policy. PHC advocates  
417 need to promote improving these indicators and their use as a starting point to monitor and prioritize equity in  
418 health care.

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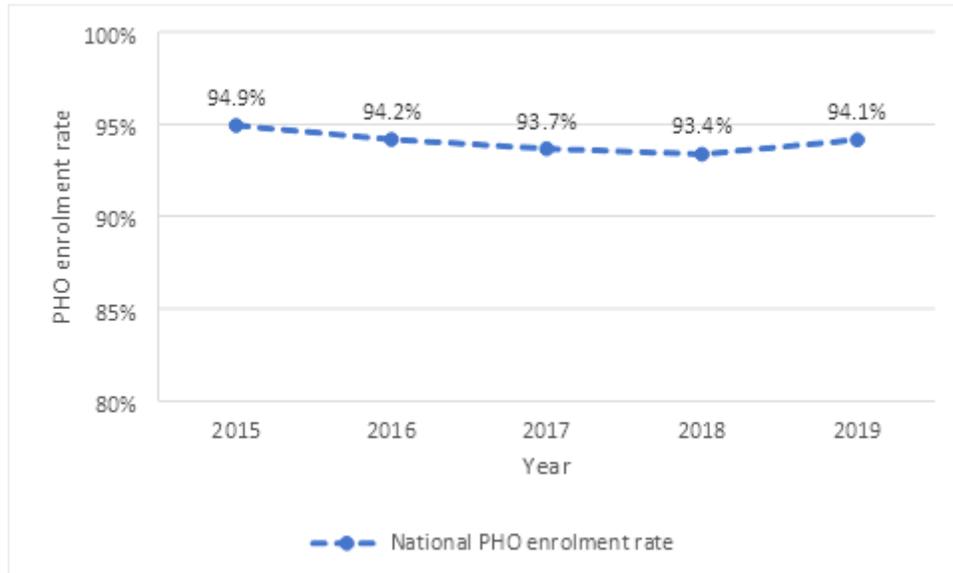
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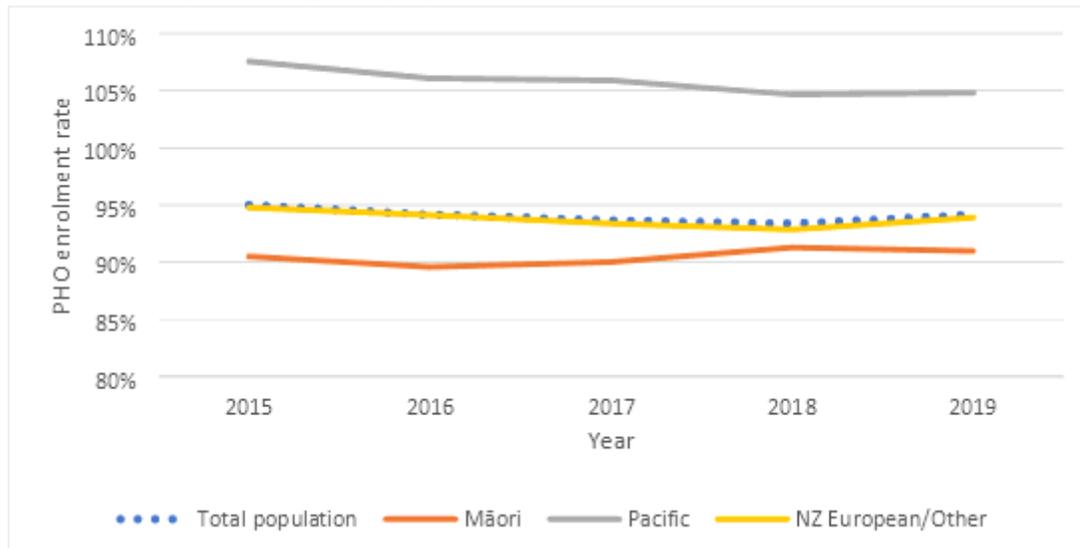
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# Figures



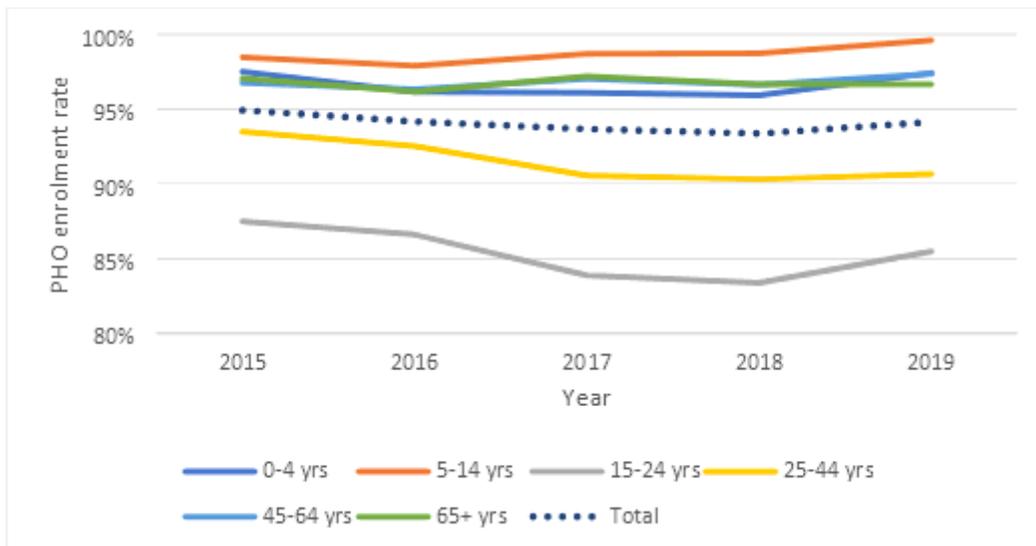
**Figure 1**

Evolution of percentage of population enrolled in a PHO, 2015-2019



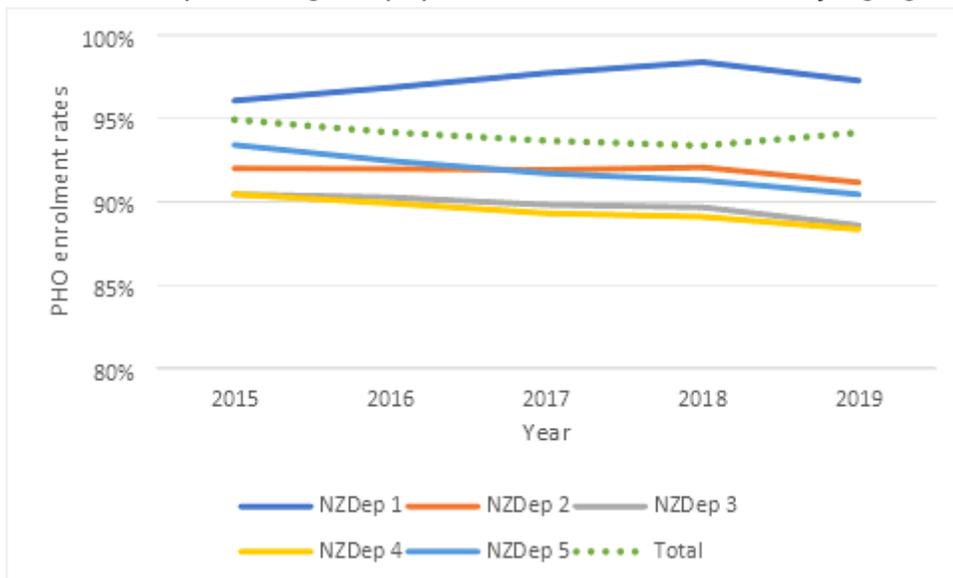
**Figure 2**

Evolution of percentage of population enrolled in a PHO, per ethnicity groups, 2015-2019



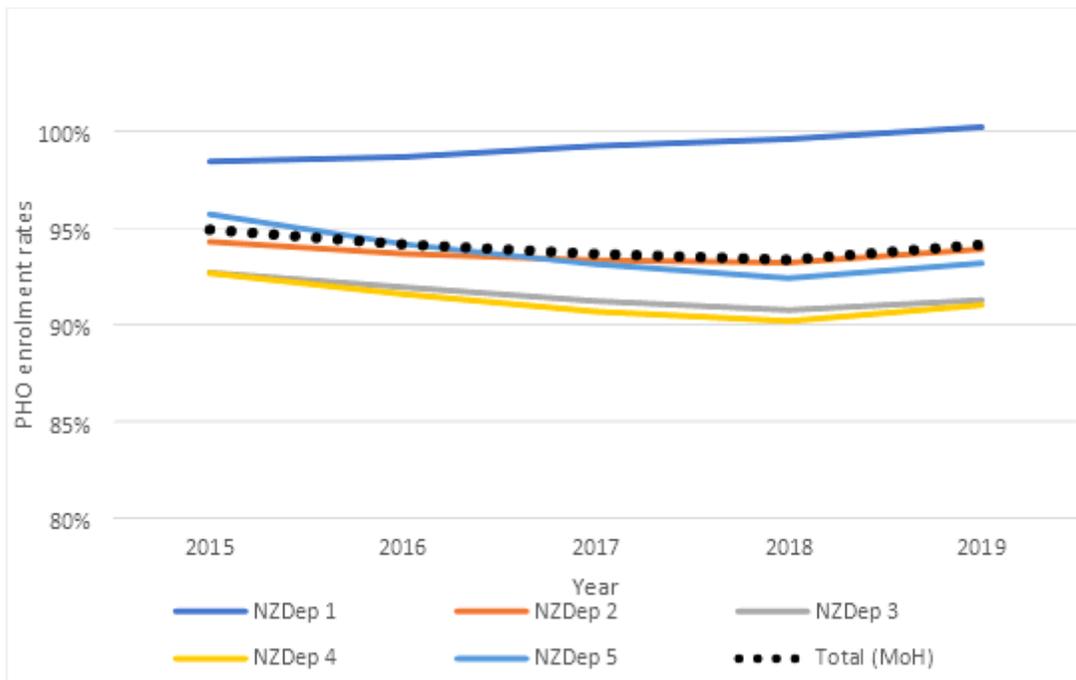
**Figure 3**

Evolution of percentage of population enrolled in a PHO, by age group, 2015-2019



**Figure 4**

Evolution of percentage of population enrolled in a PHO, per deprivation quintiles, 2015-2019



**Figure 5**

Evolution of percentage of population enrolled in a PHO, per adjusted\* deprivation quintiles, 2015-2019.