ORIGINAL ARTICLE

Rural–urban differences in wait-time to general surgical outpatient care

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Abstract

Introduction: The Ministry of Health aims to reduce health inequalities with particular reference to geographic and ethnic discrepancy in terms of access to health care. Our study's objectives were to identify if rurality in the region of Taranaki, New Zealand, impacts surgical care provision and to support interventions in order to minimise such inequity.

Methods: Demographic and referral data were collected for each patient referred to general surgery in a 24-month period (n = 2878) allowing allocation of rurality descriptors using both the Statistical Standard for Geographic Areas 2018 (SSGA18) and the Geographic Classification for Health (GCH). Wait-time was defined as the time from referral to the first specialist appointment. Impact of rurality and ethnicity on this wait-time was analysed using a 2-tailed Student's t-test.

Results: As per the GCH, those in urban categories (n = 1927) had a mean wait-time of 81.5 days versus those in rural categories (n = 830) which had a mean wait of 90 days. The rural classification R1 descriptor (n = 491) had a mean wait-time of 95.3 days compared with their urban counterparts of 81.5 days (P = 0.0017). Rural Māori and settler patients faced the longest wait-times with a mean of 101.2 days, especially when compared with urban European Pakeha (or white New Zealander) (P = 0.035). These results were also reflected in the statistical analysis of the median values. Similar results were seen when using the SSGA18 which categorised 1371 patients into large urban areas and these patients had an average wait-time of 79.5 days compared to their small urban (n = 836) (P = 0.052) and rural counterparts (n = 538) (P = 0.0015) who had mean wait-times of 86.2 and 92.5 days, respectively.

Conclusion: Rural patients are experiencing significantly longer wait-times to surgical care than their urban counterparts. This discrepancy is more pronounced in patients from the R1 rural category and in those who are Māori and early settlers. Interventions to improve rural surgical access are needed, for example, specialist clinics in rural areas, better hospital transport services and virtual triaging services.

Keywords: Rural general surgery, rural medicine, rural surgical care provision, rural surgical care provision inequities, wait-times

Résumé

Introduction: Le ministère de la santé vise à réduire les inégalités en matière de santé, en particulier les disparités géographiques et ethniques en termes d'accès aux soins de santé. Les objectifs de notre étude étaient d'identifier si la ruralité dans la

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région de Taranaki, en Nouvelle-Zélande, a un impact sur la prestation de soins chirurgicaux et dans le soutien des interventions visant à minimiser cette inégalité.
Méthode: Des données démographiques et de référence ont été recueillies pour chaque patient référé vers la chirurgie générale au cours d'une période de 24 mois (n = 2878), ce qui a permis d'attribuer des descripteurs de ruralité en utilisant à la fois la norme statistique pour les zones géographiques (SSGA18, statistical standard for Geographical areas) et la classification géographique pour la santé (GC, Geographic Classification for Health). Le temps d'attente a été défini comme le temps écoulé entre le moment où le patient est référé et le premier rendez-vous avec un spécialiste. L'impact de la ruralité et de l'ethnicité sur ce temps d'attente a été analysé à l'aide d'un test t-bilatéral.
Résultats: Selon la GCH, les patients des catégories urbaines (n = 1927) avaient un temps d'attente moyen de 81.5 jours, contre 90 jours pour les patients des catégories rurales (n = 830). Le descripteur R1 de la classification rurale (n = 491) avait un temps d'attente moyen de 95.3 jours par rapport à 81.5 jours pour les catégories urbaines (P = 0,0017). Les patients Māori/Colons vivant en milieu rural ont connu les temps d'attente les plus longs, avec une moyenne de 101,2 jours, surtout par rapport aux Pakeha (ou Néo-Zélandais blancs) vivant en milieu urbain (P = 0,035). Ces résultats se reflètent également dans l'analyse statistique des valeurs médianes. Des résultats similaires ont été obtenus en utilisant la SSGA18 qui a classé 1371 patients dans les grandes zones urbaines et ces patients avaient un temps d'attente moyen de 79.5 jours par rapport à leurs homologues des petites zones urbaines (n = 836) (P valeur = 0,052) et des zones rurales (n = 538) (P valeur = 0,0015) qui avaient des temps d'attente moyens de 86.2 et de 92.5 jours, respectivement.
Conclusion: Les patients ruraux ont des temps d'attente pour les soins chirurgicaux significativement plus longs que leurs homologues urbains. Cet écart est plus prononcé chez les patients de la catégorie rurale R1 et chez les Māori et colons. Des mesures sont nécessaires pour améliorer l'accès à la chirurgie en milieu rural, telles que des cliniques spécialisées dans les zones rurales, de meilleurs services de transport hospitalier et des services de triage virtuels.

Mots-clés: Médecine rurale, prestation de soins chirurgicaux en milieu rural, inégalités dans la prestation de soins chirurgicaux en milieu rural, chirurgie générale en milieu rural, temps d'attente

INTRODUCTION

Inequity of healthcare provision in rural areas of Aotearoa, also known as New Zealand, has been widely discussed, and the struggle to identify a true definition of 'rural' in a healthcare context has led to the challenge of accurately assessing the extent to which this inequity exists.[1-3] Therefore, the appropriate interventions to minimise this have been lacking. International literature has demonstrated this inequity in health systems similar to our own.[3-5] The Ministry of Health has stated that providing 'comprehensive, quality services for people living in rural areas is a priority for the government'.[6] This retrospective study looked to investigate the impact that rurality has on elective surgical wait-times in Taranaki Base Hospital and raises interventions which could be implemented to combat this. Despite a complement of strong rural healthcare workers, particularly in south Taranaki, an area with known need, our rural populations are not receiving equitable care from speciality services. This needs to be a focus moving forward, particularly with the opportunity that the national health reform provides.[7]

The primary objective of our study was to determine the difference between the mean and median wait-times (in days) to first specialist clinic appointment for all elective patients referred to surgical services of rural versus urban populations. The secondary endpoints were to identify factors, which impact on these wait-times, such as ethnicity and social deprivation.

METHODS

Study setting

The region of Taranaki has a complex geographical nature,[8] reaching as far north as Mokau and South to Waitootara a 127 km drive from the Base Hospital in the city of New Plymouth. Taranaki has a land mass of 7258 square km with a population of just over 125,000.

This is a large agricultural region with many small rural towns. In general, social deprivation scores are higher in these rural areas and minority

ethnicities, notably Māori and settlers are well represented in these areas.[8,9] Note that this study for rural population was a reference to early settlers including but not limited to the Maori population alone. Settlers include Pacific islanders and early immigrants from Asia. All secondary care services including all general and subspeciality surgery in Taranaki are offered only at the city hospital. General surgical services offered include general surgery, skin lesions, breast and endocrine surgery and colorectal surgery.

Using the coding system from our Health Informatics services, all patients who had been referred from primary care to the general surgical services over a consecutive 24-month period (between 7th November 2019 and 30th November 2021) were identified. Patient demographics, ethnicity, post code, date of referral, date of first specialist appointment (FSA) and type and reason of referral were collated. Rurality allocation was performed using 2 New Zealand geographical classifications; the Statistical Standard for Geographic Areas 2018 (SSGA18) and the Geographical Classification of Health (GCH).[10,11]

Two-tailed Student's *t*-test was used to assess for statistical significance between the mean wait-times for the FSA based on rurality and ethnicity.

Based on patients' post codes, SSGA18 was used to allocate each patient a rurality descriptor of large urban area (30,000–99,999 residents), small urban areas (1000–9999) or rural area (<1000 residents). The SSGA18 also includes other descriptors for larger resident bases. However, these other descriptors are not relevant to any Taranaki areas and this study. A rural area is classified as an area outside urban areas and can be further broken down into rural settlements: <200 residents and 200–1000 residents. For this study, these subgroups of rural settlements are not separated from the 'rural area'. This urban–rural classification is a flat classification in which each area is a single geographical entity with a name and numeric code.[10]

Again, using the domicile codes of each patient, the Geographic Classification for Health (GCH), a novel classification tool produced by University of Otago through a health context lens, was used to allocate rurality descriptors.[11] This classification allocates two urban classifications (U1 and U2): U1 is the largest urban category and encompasses areas of >100,000 within 25-min drive from the nearest secondary care hospital. The classification also included 3 rural classifications (R1, R2 and R3); R3 is the most rural classification with drive times of >90 min with R1, 25–60 min, and R2, 60–90 min.[12,13]

The New Zealand Deprivation Index (NZDEP) scoring system was used to categorise the levels of social deprivation.[14] The type of elective referrals are prioritised as 'immediate' (within 2 weeks), 'urgent' (within 28 days), 'semi-urgent' (within 6 weeks) and 'routine' (within 4 months). Using these data points, the length of wait-time in days to first clinical appointment was calculated.

Ethical approval was obtained using the hospital's local ethics protocols and procedures. Given the unidentifiable pooled nature of data collected for this study, individual patient consent was not required.

RESULTS

A total of 2878 patients were identified as having been electively referred to surgical services. A total of 2758 patients were included in the analysis with 120 patients excluded. Reasons for exclusion were patients whose home address was outside the Taranaki region (n = 66) and those whose first specialist assessment had not occurred at the time of analysis (n = 54).

Of those included in the analysis, 1075 (38.98%) were male and 1683 (61.02%) were female with a mean age of 57.2 years. 411 (14.9%) patients were Māori/settler and 2346 (85.06%) were non-Māori/settler. 538 patients (19.51%), 1223 patients (44.34%) and 997 patients (36.15%) were classed to have low, medium and high NZDEP scores, respectively. The breakdown of referral type was as follows: immediate 373 (13.52%), urgent 689 (24.98%), semi-urgent 805 (29.19%) and routine 890 (23.27%) [Table 1].

The mean wait-time for all patients across all types of referrals in this study was 84.4 days (median = 50, range: 0–533 days). The mean wait-time for Māori/settler patients was 90 days (median = 56, range: 0–533) compared to their non-Māori/settler counterparts which was 83.3 days (median = 49, range: 0–458, P = 0.084). The mean wait-time per referral type is demonstrated in Table 2. Those with low deprivation scores

waited the shortest period with an average of 81.3 days (median = 50, range: 0–417) [Table 3]. Those in medium and high deprivation categories had average wait-times of 84.8 (median = 49, range: 0–533) and 85.4 (median = 50, range: 0–413), respectively [Table 4].

Most patients fell into the large urban classification when using the SSGA18 (n = 1371, 49.95%) or the U2 classification when using GCH (n = 1927, 69.87%). There were 836 patients, who were classed in the small urban category and 538 who fell into the rural settlement category as per the SSGA18. The GCH categorised 491 patients in the R1 category and 339 patients in the R2 category.

Table 1: Patient characteristics

Characteristic	*n* (%)
Sex	
Male	1075 (38.985)
Female	1683 (61.02)
Age (years)	
Mean	57.2
Median	60
Range	1–99
Referral type	
Immediate	373 (13.52)
Urgent	689 (24.98)
Semi-urgent	805 (29.19)
Routine	890 (32.27)
Ethnicity	
Māori/settlers	411 (14.90)
Non-Māori/settlers	2346 (85.06)
Social deprivation	
Low (NZDEP 1–3)	538 (19.51)
Medium (NZDEP4-7)	1223 (44.34)
High (NZDEP 8–9)	997 (36.15)
Rurality (GCH)	
U2	1927 (69.87)
R1	491 (17.80)
R2	339 (12.29)
Rurality (SGA18)	
Large urban	1371 (49.95)
Small urban	836 (30.46)
Rural settlement	538 (19.60)

GCH: Geographic Classification for Health, NZDEP: New Zealand Deprivation Index, SGA: Standard for geographical areas

Table 2: Wait-time data for total population per referral type

Category of referral	Sample (*n*)	Mean (days)	Median	Range
Overall (all)	2758	84.4	50	0–533
Immediate (I)	373	12.8	11	0–121
Urgent (A)	689	26.5	23	0–211
Semi-urgent (B)	805	104.2	99	0–394
Routine (C)	890	141.2	154	0–533

First comparisons were made using the SSGA18 as a marker of rurality. This demonstrated that those from large urban areas and who were non-Māori/settlers had smaller mean and median values than rural settlements with regard to wait-times to surgical appointments (P = 0.0015). There was also a trend of shorter mean and median wait-times for large urban areas versus their small urban counterparts, but the difference was not statistically significant (P = 0.052). Māori/settler patients consistently had a significantly longer wait-time than non-Māori/settler patients in each rural category: Rural areas against large urban areas (P = 0.007) and small urban areas (P = 0.049) [Table 5].

A further comparison was made using the GCH as a marker of rurality. This demonstrated again that patients from rural categories, both R1 and R2, experienced longer mean and median wait-times than their urban counterparts: U2 patients versus those in R1 (P = 0.0017).

This discrepancy was more pronounced for Māori/settler patients across the urban–rural descriptors. There was also a statistically significant longer wait-times when comparing rural Māori/settler (mean = 97.8, median = 59) to urban European Pakeha (mean = 80.7, median = 20) (P = 0.035) [Table 5].

Further to the rurality outcomes, this study appeared to have shown longer wait-times for Māori/settler patients at all levels of social deprivation than European Pakeha patients. However, the difference is not shown to be significant at this sample size [Table 6].

DISCUSSION

Achieving equity in healthcare delivery in Aotearoa, New Zealand, is a priority of the Ministry of Health and the healthcare workforce.[2,7] Those who reside in rural areas have poorer access to healthcare services in New Zealand – this is driven by a complex interplay of environmental and social factors. Although we have an improving rural healthcare workforce, both in terms of human resource and access to resources, improvement in access to specialist services such as surgery is still required.

Table 3: Wait-time data per rurality (Statistical Standard for Geographic Areas 18) and ethnicity				
Group and ethnicity	*n*	Median	Mean	Range
Large urban area total	1371	44	79.54	0–394
Small urban area total	836	50.5	86.23	0–413
Rural settlement total	538	57	92.95	0–533
Large urban area non-Māori/settlers	1205	51.5	78.95	0–394
Small urban area non-Māori/settlers	675	49	85.89	0–378
Rural settlement non-Māori/settlers	457	57	90.61	0–533
Large urban area Māori/settlers	166	51.5	83.79	1–367
Small urban area Māori/settlers	161	56	87.94	2–413
Rural settlement Māori/settlers	81	116	106.15	2–285

Table 4: Wait-time data per rurality (Geographic Classification for Health) and ethnicity				
Group (as per GCH) and ethnicity	*n*	Median	Mean	Range
U2	1927	47	81.53	0–417
R1	491	56	95.28	0–533
R2	339	50	84.74	0–458
U2 non-Māori/settlers	1663	20	80.67	0–417
R1 non-Māori/settlers	411	7	94.13	1–533
R2 non-Māori/settlers	272	28.5	82.83	2–378
U2 Māori/settlers	264	10	86.95	0–367
R1 Māori/settlers	79	32	102.35	2–413
R2 Māori/settlers	67	17	92.48	7–458

GCH: Geographic Classification for Health

Table 5: Wait-time data per New Zealand Deprivation Index score category and ethnicity				
Deprivation and ethnicity	*n*	Median	Mean	Range
Low Māori/settlers	45	76	93	0–287
Middle Māori/settlers	151	58.5	94.57	0–458
High Māori/settlers	214	55	87.32	0–413
Low non-Māori/settlers	493	49	80.3	0–417
Middle non-Māori/settlers	1071	48	83.48	0–533
High non-Māori/settlers	782	49	84.87	0–378

Our study illustrates wait-times for all elective patients referred to the general surgical service in Taranaki.

We have identified a statistically significant difference in the wait-times to FSA experienced by rural patients compared to their urban counterparts. This difference has been shown using 2 different rurality allocation tools. Importantly, this difference is more pronounced for rural Māori/settler patients. This echoes previous studies demonstrating inequity for Māori/settler patients at all levels of healthcare delivery.[15,16]

A further discrepancy exists for patients who are in high social deprivation categories based on the NZDEP who also experience longer wait-times. This result is not unique to New Zealand; Butler *et al*. reported a very similar issue in the United States.[17] There are no comparative studies in developed countries for general surgical services. For GP appointments in rural Australia, rural populations can have an excessive wait-time of 12 weeks to get an appointment compared with their urban counterparts.[18] The subsequent secondary care referrals can only be presumed for much further delays. A longer colorectal cancer pathway is also noted in Victoria, Australia, where rural patients experience 6–85 days longer wait-times for diagnosis and treatment.[19]

Interventions to combat this discrepancy of access could include increasing specialist clinics in the region. Currently, 1 specialist clinic per month is serving a small number of patients well; however, this delivery is disproportionate to the need. The global pandemic has demonstrated the strength and efficacy of telehealth processes, which may be explored in selected cases within rural populations. Surgery is a procedural speciality and thus its full service cannot be delivered at a distance, especially since good clinical examination plays such an important role in our consultations. Since the COVID-19 pandemic, we have vastly increased telephone consultations for follow-ups, freeing more first specialist assessment appointments.

An effective, reliable and efficient hospital transport system may remedy some of the inequitable access to services that has been shown in this study. These interventions provide discussion points for the local surgical department and overall health economics in terms of delayed diagnosis and treatment. Furthermore, there are the unquantifiable emotional, physical and social burdens associated with poorer access to health care.

Table 6: Subgroup analysis and comparisons	
Comparison	*P*
Rurality comparisons utilising the SSGA18	
Large urban area versus small urban area	0.052
Large urban area versus rural settlement	0.0015
Small urban area versus rural settlement	0.15
Rurality comparisons per ethnicity utilising the SSGA18	
Large urban area non-Māori/settlers versus large urban area Māori/settlers	0.46
Large urban area non-Māori/settlers versus rural settlement Māāori/settlers	0.007
Large urban area non-Māori/settlers versus small urban area Māori/settlers	0.181
Small urban area non-Māori/settlers versus rural settlement Māori/settlers	0.049
Small urban area non-Māori/settlers versus small urban area Māori/settlers	0.772
Rural settlement non-Māori/settlers versus rural settlement Māori/settlers	0.138
Rurality comparisons utilising the GCH	
U2 versus R1	0.0017
U2 versus R2	0.49
R1 versus R2	0.073
Rurality comparisons per ethnicity utilising the GCH	
Urban Māori/settlers versus urban European Pakeha	0.234
Rural Māori/settlers versus urban Māori/settlers	0.22
Rural Māori/settlers versus Urban European Pakeha	0.035
Deprivation score comparisons	
Low versus medium	0.388
Medium versus high	0.92
Low versus high	0.49
Deprivation score comparisons per ethnicity	
Low Māori/settlers versus low non-Māori/settlers	0.29
Med Māori/settlers versus med non-Māori/settlers	0.139
High Māori/settlers versus med non-Māori/settlers	0.699
Deprivation score comparisons per rurality	
Low rural versus low non-rural	0.77
Medium rural versus medium non-rural	0.003
High rural versus high non-rural	0.27

SSGA18: Statistical Standard for Geographic Areas 18, GCH: Geographic Classification for Health

Limitations of our study include collection of retrospective data and type II error for the differential sample sizes between categories, especially in the subgroup analysis. Moreover, this study captures only 1 part of a patient's clinical journey from presentation to primary care to FSA. There are other steps in the care pathway, which can contribute further inequities for rural, early settlers and Māori populations. Further research into other aspects of patient experience is warranted in order to appreciate the wider scale of healthcare inequity to rural populations. Finally, this study for rural population was a reference to early settlers rather than the Maori population alone. Therefore, this study is not large enough to truly declare statistically significant differences between those populations.

Our study also reflects the surgical care provision for the region of Taranaki and cannot be extrapolated to represent the care of patients throughout Aotearoa New Zealand. Given the variability in geography and resource provision in other regions, a national collaborative study may provide a better reflection of the wait-times experienced by rural patients across New Zealand for nonacute surgical care.

CONCLUSION

Rural patients are experiencing longer wait-times to surgical care than urban patients in the Taranaki region. This discrepancy is more pronounced in the most rural settlements and in those who are Māori/settlers. These results are in keeping with the known unequal distribution or inadequate

focus of health resource to those living in rural areas. The cause of discrepancies is multifactorial, and the solutions are complex. Interventions to improve access and further funded national research into other areas of inequity should be a priority for the ongoing national health reform.

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