

Urban–rural geographic distribution of Otorhinolaryngologist, Head and Neck surgeons in Aotearoa New Zealand

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ABSTRACT

AIM: We identified geographic distribution of Otorhinolaryngologist, Head and Neck surgeons in Aotearoa New Zealand. To identify the future workforce pipeline, we explored trainee intentions for specialist practice.

METHOD: A survey was distributed to all New Zealand Society of Otolaryngology, Head and Neck Surgery (NZSOHNS) members and all current New Zealand Otolaryngology, Head and Neck surgery trainees. Data were gathered on work location and patterns of work, including on-call commitments and full-time equivalent hours worked. Trainees were asked about future career plans.

RESULTS: An 88% response rate was achieved encompassing senior medical officers (SMOs) and trainees. A total of 64.8% (68) of respondents reported primarily working in a metropolitan hospital and 26.7% (28) reported working in a regional centre. Rates of internationally trained surgeons were significantly higher in regional centres compared to metropolitan hospitals (64.3% vs 32.4%, $p < 0.05$). Regional respondents had higher after hours on-call burden, a higher full-time equivalent (FTE) worked and higher average hours worked per week. Retirement intentions within the next 10 years were high in both groups (64% regional and 52.9% metropolitan, $p < 0.05$).

CONCLUSIONS: The regional workforce in ORLHNS work longer hours, are older and are reliant on internationally trained surgeons. Current training of ORLHNS surgeons is unlikely to keep pace with expected retirements.

In Aotearoa New Zealand, approximately 25% of the population resides in non-urban areas, yet the specifics of Otorhinolaryngology, Head and Neck Surgery (ORLHNS) care provision in these regions remain unclear. The challenge begins with the absence of a universally accepted definition for urban and rural areas. Health workforce New Zealand, Statistics New Zealand (Stats NZ) and the Royal Australasian College of Surgeons (RACS) each offer different criteria, complicating efforts to assess and address the disparities in healthcare delivery effectively.^{1,2} RACS has acknowledged significant disparities in healthcare delivery for rural patients, underscoring a pressing need for focussed research in this area.³⁻⁵

ORLHNS training in Aotearoa New Zealand has historically been urban-centric, with only two (Whangārei and Palmerston North) true regional training units. Historically, the application requirements for surgical education and training (SET) have favoured aspiring surgeons employed in large units that offer support for research and a broad range of sub-specialty surgical experiences. This environment facilitates the accumulation

of points with fewer barriers compared to those working in smaller regional centres. This trend, coupled with a reliance on specialist international medical graduates (SIMGs) in non-urban hospitals, risks exacerbating service provision gaps in regional areas. Recognising these challenges, RACS has initiated the rural action plan, aiming to retain regional trainees through strong social or cultural connections. Our own Aotearoa New Zealand selection board has introduced increased weighting to rural hospital placements and rural-focussed research, with an aim to positively discriminate for trainees likely to return to regional centres. However, without clear data on service coverage, optimising these efforts remains a challenge.^{3,6}

We address a critical gap in our understanding of ORLHNS workforce distribution across Aotearoa New Zealand. By examining the current landscape and exploring the future career intentions of ORLHNS Surgical Education and Training (SET) trainees, we aim to shed light on the dynamics of healthcare provision and its implications for rural or regional communities.

Methodology

This study employed an online survey to gather comprehensive insights from members of the New Zealand Society of Otolaryngology, Head and Neck Surgery (NZSOHNS) and NZ ORLHNS SET trainees. The decision to use an online survey was driven by the need to efficiently reach a wide and geographically dispersed audience, ensuring a high level of participation and diversity in responses.

The survey was designed to include questions on demographics, sub-specialty practice, work volume, on-call frequency, service to non-urban areas and attitudes towards rural service provision. Prior to distribution, the survey underwent a pilot testing phase among a select group of ORLHNS professionals to refine questions for clarity and relevance.

All members of NZSOHNS and ORLHNS SET trainees were invited to participate, aiming for a comprehensive capture of perspectives across

Aotearoa New Zealand. The survey was distributed via email by the NZSOHNS administrative team, with follow-up reminders sent 3 weeks and 1 month later to maximise response rates.

Respondents were categorised into specialist medical officers (SMOs) and trainees, allowing for nuanced analysis of workforce distribution and attitudes by career stage.

Metropolitan hospitals were defined as those located in Auckland, Hamilton, Wellington, Christchurch or Dunedin, with all other hospitals considered regional. This distinction enabled a focussed analysis on urban versus regional service provision.

Southland receives ORLHNS services from Otago for both acute and elective patients. For analytical purposes, and due to the historical consolidation of the Otago and Southland health boards into the Southern Health Board, the populations of Otago and Southland have been considered together as a single entity under Dunedin's catchment.

Table 1: Specialist medical officer demographics.

		Overall (n=105)	Metropolitan (n=68)	Regional (n=28)	
Age	20–29				
	30–39	6.70%	7.4%	3.6%	P=0.275
	40–49	31.40%	33.8%	21.4%	P=0.12
	50–59	25.70%	20.6%	35.7%	P=0.068
	60–69	29.50%	32.4%	28.6%	P=0.366
	70+	6.70%	5.9%	10.7%	P=0.219
Gender	M	81.00%	77.9%	89.3%	P=0.104
	F	18.00%	20.6%	10.7%	P=0.133
	Prefer not to say	1%	1.5%	0.0%	P=0.354
Ethnicity	European/Pākehā	66.40%	75.0%	57.1%	p<0.05
	Māori and Pacific peoples	2%	0.0%	3.6%	P=0.1458
	Asian	17.30%	13.2%	21.4%	P=0.168
	Middle Eastern/Latin American/African	2.90%	0.0%	3.6%	P=0.1458
	Other	14.40%	11.8%	17.9%	P=0.222

Table 1 (continued): Specialist medical officer demographics.

Country of primary medical training	New Zealand	59%	67.6%	35.7%	p<0.05
	International	41%	32.4%	64.3%	p<0.05
Fellow of the Royal Australasian College of Surgeons (FRACS)	Yes	75.50%	83.8%	57.1%	p<0.05
	No	24.50%	16.2%	42.9%	p<0.05

Table 2: Specialist medical officer respondents by region.

Region	Number of surgeons	Full-time equivalent (public only)	Mean hours of work (public and private)
Northland	5	0.78	45.23
Auckland	31	0.6	39.62
Waikato	6	0.65	46.33
Bay of Plenty	10	0.94	45.23
Gisborne	1	0.6	24
Taranaki	0	0	0
Manawatū-Whanganui	5	0.65	41.25
Hawke's Bay	2	0.63	48.5
Wellington	10	0.86	39.5
Nelson	4	0.73	40
Canterbury	13	0.93	50.5
Otago	9	0.68	46.5

Table 3: On-call commitment.

	Overall	Metropolitan	Regional	
1 in 3	12.4%	4.4%	35.7%	p<0.05
1 in 4	5.7%	0.0%	21.4%	p<0.05
1 in 5	5.7%	2.9%	14.3%	p<0.05
1 in 6	4.8%	4.4%	7.1%	0.301
1 in 7	12.4%	19.1%	0.0%	p<0.05
1 in 8 or more	47.6%	63.2%	14.3%	p<0.05
NR	11.4%	5.9%	7.1%	

Table 4: Trainee demographics.

Age	30–39	100%
Gender	M	68.2%
	F	31.8%
Ethnicity (multiple can apply)	European/Pākehā	72.7%
	Māori	31.8%
	Pacific peoples	0.0%
	Asian	13.6%
	MELAA	0.0%
	Other	9.1%
Country of primary medical training	New Zealand	90.9%
	International	9.1%
Completed Rural Medical Immersion Programme (RMIP)	Yes	13.6%
	No	86.4%

Table 5: Support for rural fellowship.

Strongly agree	28.6%
Agree	41.0%
Neutral	15.2%
Disagree	6.7%
Strongly disagree	2.9%
NR	5.7%

Data from the survey were analysed using OpenEPI employing descriptive statistics to examine differences between groups and identify trends. P-values were calculated using mid-P exact. The analysis was structured to ensure a clear understanding of the workforce distribution and the challenges faced in non-urban healthcare delivery. For purposes of maintaining anonymity in the SMO group, Māori and Pacific peoples ethnicity groups were collated together due to small numbers. Ethnicity was reported in line with Stats NZ's methodology. Data for regional populations were taken from Stats NZ reporting on population at June 2023.⁷ Partially completed surveys were included for analysis of the questions that were answered. Nine individuals did not

provide details of primary work location but provided responses to other questions and were included in the overall analysis. Full-time equivalent (FTE) was specified as public work only. Hours of work were assessed as per individual respondent.

Results

Our survey yielded a response rate of 88%, with 127 out of a possible 145 participants responding, of which 105 were SMOs and 22 were SET trainees.

Geographical distribution and workforce analysis

Among the SMO respondents, 96 provided details about their primary work location, revealing

a significant distribution across Aotearoa New Zealand. Approximately 64.8% (68 SMOs) reported working predominantly in metropolitan hospitals, with 31 (29%) based in the greater Auckland region. Population analysis revealed metropolitan hospitals have a ratio of 1.84 surgeons per 100,000 patients, compared to 2.1 surgeons per 100,000 patients in regional hospitals. This suggests a slightly denser surgical coverage in non-metropolitan areas but did not reach statistical significance (Table 1 and Table 2).

Hours worked and on-call commitments

The analysis of work hours and FTE ratios revealed that surgeons in regional centres generally reported higher work hours (average of 43.4 vs 42.7 hours per surgeon) and a greater FTE per surgeon (0.77 vs 0.69) compared to those in metropolitan centres. The difference did not reach statistical significance ($p=0.301$). On-call commitments were notably more demanding in regional centres, with 71.4% of surgeons undertaking on-call at a ratio of 1:5 or less. Comparatively, a significantly lower frequency of on-call duty was reported in metropolitan centres (1:7 or greater, $p<0.05$). This highlights a disproportionately higher on-call burden on surgeons outside major urban centres.

Training background and sub-specialty practice

A notable disparity in training backgrounds was observed between surgeons in metropolitan and regional areas. Specifically, 83.8% of metropolitan surgeons hold a fellowship from the Royal Australasian College of Surgeons (FRACS), compared with just 53.7% of their regional counterparts ($p<0.05$). This difference highlights concerns about the training and accreditation of future surgeons, particularly in regional centres, given that the RACS mandates a FRACS qualification for accreditation in ORLHNS training. Furthermore, regional surgeons are more likely to have obtained their primary medical degree from overseas (64.3% vs 32.4% for metropolitan surgeons, $p<0.05$), suggesting a greater dependence on internationally trained professionals in these areas.

Sub-specialty practice trends also varied by location, with regional surgeons more likely to identify as generalists (75% vs 41.2% for metropolitan surgeons, $p<0.05$), despite all respondents reporting at least one area of sub-specialty practice. This suggests a broader scope of practice required in regional areas, potentially due to the

varied demands of these communities.

Trainee results

Twenty-two SET trainees responded to the survey out of 24 on the training scheme at the time of the survey.

As expected, trainees were younger than SMO counterparts, with all trainees aged between 30–39. The proportion of female surgical trainees and Māori were higher than in the SMO respondents (31.8% vs 18% and 31.8% vs 2% respectively). The proportion of trainees who undertook their primary medical training in Aotearoa New Zealand is higher than the SMO respondents too (91% vs 59%); this is likely reflective of the positive selection for cultural competency that is taught heavily in Aotearoa New Zealand's medical schools. ORLHNS trainees recognise the importance of regional training exposure, with 18 of 22 trainees supporting a regional placement either during or prior to training. Social isolation (68%), professional factors such as case mix and on-call burden (55%), remoteness (45%) and professional isolation (50%) were the most commonly cited barriers to regional practice for ORLHNS trainees.

Service provision, training exposure and workforce sustainability

The survey revealed a strong commitment to regional service provision, with 63% of respondents indicating their departments offered outreach services to rural areas. Regional training exposure was reported by 40.4% of all respondents, highlighting the significance of rural experiences in surgical training pathways. Future workforce considerations appear positive, with 31.8% of trainees expressing an intention to practice in regional hospitals, supporting the potential for sustainable service provision in these areas.

SMO respondents were surveyed on a rural fellowship as a pathway to regional practice, with 69.6% strongly agreeing or agreeing with the concept. If implemented, this could act as a pathway to provide new surgeons with broad generalist exposure and experience of supported regional practice.

Retirement intentions

The ageing workforce is more pronounced in regional areas, with 75% of surgeons over the age of 50 compared to 58.8% in metropolitan areas ($p<0.05$). The intention to retire within the next 10 years was high across both groups but more so in regional areas (64% vs 52.9%, $p<0.05$). This underscores the urgent need for strategic planning

to address the impending retirement wave and ensure continuity of care.

Discussion

By providing detailed insights into the demographics, practices and attitudes of the ORLHNS workforce, this survey contributes valuable data towards addressing the disparities in rural healthcare provision in Aotearoa New Zealand.

The findings from our study highlight the vulnerabilities in the provision of ORLHNS services across Aotearoa New Zealand. The impending retirements of a significant portion of the workforce, both in urban and regional areas, signal a looming crisis that could exacerbate the existing disparities in ORLHNS healthcare access. A total of 52.9% of metropolitan ORLHNS surgeons and 64.3% of regional ORLHNS surgeons are intending to retire within the next 10 years. This equates to 55 surgeons. Over the same period, 48 new surgeons would pass through the NZSOHNS training scheme. The reliance on overseas-trained surgeons to fill these gaps, while necessary, underscores the urgent need for a more sustainable solution to workforce development and retention in regional settings.

Urban vs rural definitions and implications

A key challenge identified in our analysis is the lack of a standardised definition for “urban” and “rural”, complicating efforts to accurately assess service needs and allocate resources. Adopting an operational definition that reflects the unique geographic and demographic realities of Aotearoa New Zealand would facilitate more targeted and effective research. Specialist healthcare delivery does not map well to the currently used definitions. We feel our use of metropolitan and regional hospitals works well in the context of our Aotearoa New Zealand ORLHNS workforce and could be used for longitudinal research into workforce trends.

There was no statistical difference in the number of hours worked by regional or metropolitan surgeons; however, surgeons working in regional centres have a significantly more frequent on-call commitment.

International comparisons and learning opportunities

Our data reveal that Aotearoa New Zealand's ratio of surgeons to patients in regional centres, while higher than in urban areas, still falls short

of international benchmarks. The United States of America (USA) describes ratios of between 2.5 and 3.6 per 100,000 patients, while international estimates put global averages at 2.19 per 100,000 patients.⁸⁻¹⁰ The ratio of regional surgeons in our study may be influenced by the concentration of surgeons in some regional centres. Whangārei (2.45/100,000), Tauranga (2.82/100,000) and Nelson (2.39/100,000) have higher ratios of surgeons per 100,000 patients, which may represent influential data points skewing the overall figures. Conversely, some regions rely on single surgeon coverage or have no resident service, in the case of Taranaki.

Trainee selection

Our study highlights the importance of the existing positive rural selection practices for the Aotearoa New Zealand ORLHNS trainees to directly address the impending shortage of ORLHNS professionals in regional areas. Trainees selected through this process are likely to bring a diverse set of skills and a strong commitment to rural healthcare, contributing to the resilience and sustainability of ORLHNS services outside urban centers.^{11,12}

Trainee pipeline

The rural workforce appears to have an established pipeline, with 31.8% of trainees intending to have rural practice as an SMO and 13.8% of trainees having completed the Rural Medical Immersion Programme (RMIP). Work from Shelker and colleagues shows a high rate of progression to rural practice for doctors who completed the RMIP in medical school.¹³ Regional training centres are vulnerable to the loss of FRACS surgeons, which could have significant implications on the national pipeline of new ORLHNS surgeons. Introduction of a rural fellowship is generally supported by respondents and could bolster the regional pipeline.

Limitations

Non-responder bias

Our study did not capture data from 12% of NZSOHNS members and did not include responses from some practicing surgeons who are not affiliated with NZSOHNS. This could introduce bias in our findings, as the perspectives and characteristics of non-responders may differ from those who participated.

Variability in definitions

The lack of a standardised definition for

“urban” versus “rural” poses a limitation. Our classification into metropolitan and regional hospitals, while practical, may not fully reflect the nuances of geographic and demographic variations across Aotearoa New Zealand, potentially impacting the accuracy of our findings regarding healthcare provision.

Self-reported data

The survey relied on self-reported data from respondents, which may be subject to inaccuracies or biases. Respondents might have under-reported or over-reported certain aspects of their work, such as hours worked or on-call commitments.

Generalisability of findings

The study’s findings are specific to the ORLHNS workforce in Aotearoa New Zealand and may not be generalisable to other countries or healthcare systems. Differences in healthcare delivery models and workforce structures could influence the applicability of our results in other contexts.

Incomplete data

Some respondents did not provide complete information regarding their primary work location or other key variables. Although partially completed surveys were included in the analysis where relevant, missing data could affect the robustness of our conclusions.

Survey response rate

Although we achieved a high response rate of 88%, the survey’s responses may not fully capture the diversity of experiences and perspectives within the ORLHNS community.

Policy and practice recommendations

1. Enhancing the visibility and attractiveness of rural practice through targeted incentives, support systems and career development opportunities could mitigate the reliance on overseas-trained surgeons
2. Expanding and promoting programmes like the RMIP, which have shown success in

encouraging rural practice, could strengthen the rural ORLHNS workforce pipeline.

3. Addressing the upcoming wave of retirements requires not only boosting the number of trainees but also ensuring that training programmes are responsive to the evolving needs of rural communities.
4. Encouraging the role of generalism in regional ORLHNS in keeping with the RACS Rural Health Equity plan, which identifies the adaptable nature of a rural surgeon and the need for a broad skill base.^{3,14,15}
5. Exploring the introduction of a rural fellowship to further generalist training in a supported environment.

Summary

Our findings highlight the complex dynamics of Aotearoa New Zealand’s ORLHNS workforce, with clear distinctions in geographical distribution, work hours, training backgrounds and service provision patterns. We confirmed that regional areas relying on internationally trained surgeons have a greater on-call burden and a higher proportion of generalists. These factors contribute to the unique challenges in maintaining a diverse and skilled workforce outside urban centres. The data reveal a concerning trend of impending retirements within the metropolitan and regional ORLHNS surgeon populations, signalling a potential workforce crisis in the near future. However, the interest shown by trainees in regional practice—coupled with the positive influence of programmes like the RMIP and positive rural/regional trainee selection represent a beacon of hope for the revitalisation of regional ORLHNS services. By enhancing training pathways and ensuring a concerted focus on the unique demands of non-metropolitan healthcare delivery, we can anticipate a future where disparities in regional ORLHNS services are substantially reduced, if not eliminated. Our findings underscore the urgent need for strategic planning and resource allocation to ensure equitable healthcare access for all New Zealanders, regardless of their geographic location.

COMPETING INTERESTS

Nil.

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