ORIGINAL RESEARCH

Comparison between melanoma diagnostic pathways and access to services for rural versus metropolitan patients during Victoria's COVID-19 lockdown

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INTRODUCTION

Rural Australians face significant barriers accessing specialist health care,[1] with 92% of dermatologists located in cities.[2] Poorer access has been associated with poorer cancer outcomes generally[3] and poorer melanoma prognosis specifically.[4] Rural melanoma patients experienced a 20% higher age-adjusted case-fatality rate compared with metropolitan counterparts,[5] and patients from inner regional communities have the highest melanoma mortality rates (6.3 deaths per 100 000 persons versus 4.6 for major cities).[6]

We have previously identified missed opportunities in the pathway for early diagnosis of nodular melanoma.[7] Similarly, we hypothesised missed opportunities may be found in rural patients' diagnostic pathways (associated with poorer access to services and related barriers) that could explain their poorer prognosis. We therefore compared rural and metropolitan diagnostic pathways for patients seen at the Victorian Melanoma Service (VMS), a multidisciplinary referral clinic, which sees approximately 20% of melanomas in the state, one third from rural areas.

METHODS

Between February and August 2020, consecutive VMS patients with new invasive melanomas were invited for an over-the-phone survey about the following: (1) patient access to services – speciality of doctors seen, difficulty accessing doctors, telehealth appointments and COVID-19 impacts on pathway; and (2) patient timeline to diagnosis – lesion onset/first noticed, to initial consult and to diagnostic biopsy (Appendix 1). Patients were classified as rural or metropolitan according to the Modified Monash Model classification.[8] Data were analysed using descriptive statistics. Patients not contactable after two attempts were excluded from the study.

RESULTS

117 of 203 eligible patients were recruited: 84 metropolitan and 33 rural; 48 women and 69 men. There were no significant differences in age, distribution of sex, or Breslow thickness between the metropolitan and rural groups (Table 1). Thirty discrete diagnostic pathways were captured (Figures S1, S2 and S3) and grouped into four main pathways for analysis (Fig. 1). Each pathway had similar proportions of rural and metropolitan patients (Fig. 2).

Rural patients reported greater difficulties accessing services (OR, 4.75; 95% CI, 1.50–15.25; $P < 0.01$). Barriers included travel time (21%), difficulty accessing skin doctors (18%), appointment costs (9%) and difficulty taking leave (3%). Notwithstanding, rural patients were as likely as metropolitan patients to have received regular doctor-led skin checks prior to diagnosis (OR, 1.03; 95% CI, 0.42–2.51; $P = 0.94$) and to have had a dermatologist assess their melanoma initially (OR, 1.26; 95% CI, 0.42–3.56; $P = 0.63$). Although not statistically significant, rural patients seemed more likely to be offered telehealth appointments (OR, 1.6; 95% CI, 0.66–3.90; $P = 0.25$).

While 21% of rural patients (*vs* 15% metropolitan) were initially falsely reassured their lesion was benign (OR, 1.47; 95% CI, 0.44–4.49; $P = 0.46$), they had similar likelihoods of having diagnostic biopsy within one month of initial consult (OR, 0.95; 95% CI, 0.35–2.68; $P = 0.91$). Missed opportunities for rural patients could not be robustly identified from these data (Table S1).

6.8% of pathways were negatively affected by COVID-19 and its restrictions relating to cancelled appointments and negative COVID-testing requirements. Our data provide

Table 1 Participant characteristics

| Characteristics (n)	Rurality		
	Metropolitan (n = 84)	Rural (n = 33)	P-value
Sex			
Male (*69*)	53 (63.1%)	16 (48.5%)	0.15
Female (*48*)	31 (36.9%)	17 (51.5%)	
Age, years	63.5 (55–73.5) Median (IQR)	67 (54–78) Median (IQR)	0.59
Breslow thickness, mm	1.5 (0.88–2.75) Median (IQR)	1.6 (0.9–2.5) Median (IQR)	0.75

Data are displayed as number of patients (percentage) unless otherwise stated.

Pearson's chi-squared test was used for analysis of categorical data.

The Mann–Whitney *U*-test was used for continuous data.
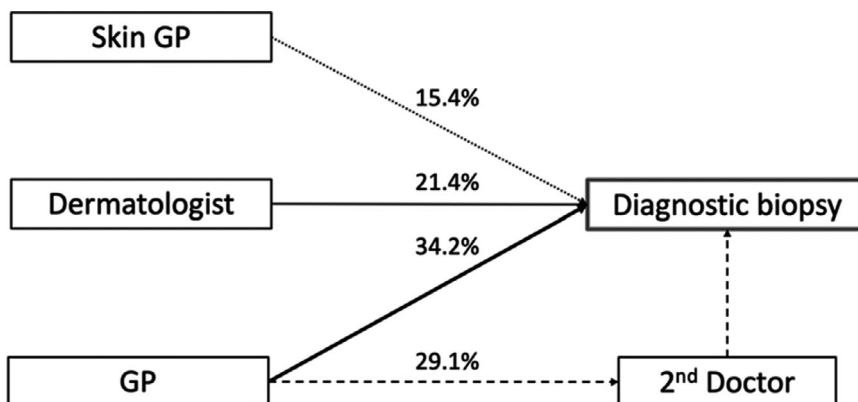
Figure 1 Melanoma diagnostic pathways. The 30 distinct pathways were grouped into four main pathways for analysis, based on the type of doctor to (1) assess lesion at initial consult and (2) conduct diagnostic biopsy of the melanoma. The most common experience (34.2%) involved a GP assessing the lesion first and a GP conducting diagnostic biopsy (represented by the black solid line).
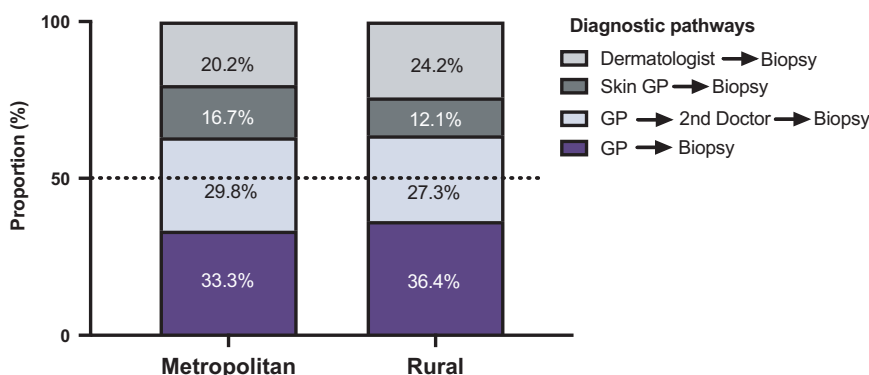
Figure 2 Proportion of metropolitan and rural patients by diagnostic pathway. Once patients presented for initial assessment of their lesions, there were approximately similar proportions of patients from the rural and metropolitan groups who experienced each diagnostic pathway.

some indication that rural pathways were more likely affected (OR, 2.76; 95% CI, 0.48–15.69; $P = 0.16$). Three patients experienced diagnostic biopsy delays related to COVID-19: two rural (BT 3 mm, 4.1 mm) and one metropolitan (BT 0.4 mm).

DISCUSSION

This study did not provide convincing evidence that difficulties accessing health care led to delayed diagnoses, or missed opportunities for timely diagnosis, to explain the poorer melanoma survival experienced by rural patients.[4–6] Rural patients in this study did not have thicker tumours nor faced poorer prognoses (according to stage) compared with metropolitan counterparts. However, all participants were referred to a multidisciplinary service, and a significant limitation is a lack of data on people who developed melanoma but were not referred. The development of the Melanoma Clinical Outcomes Registry will enable population-based capture of such data in future.

Rural patients comprised 28% of participants, consistent with VMS referrals generally. Since recruitment occurred during Victoria's COVID-19 lockdown, selection bias was a limitation. It is likely that many rural (and some metropolitan) patients were treated locally over this period. This study's findings emphasise perceived inequities experienced by rural patients. Teledermatology may improve access to dermatologic assessment and timely management. Future studies into referral patterns of regional patients are required to improve the understanding about barriers to diagnosis and reasons for nonreferral to multidisciplinary services.

Data from the Victorian Cancer Registry estimate 511 melanomas went undiagnosed over the COVID-19 period,[9] consistent with the significant drop in VMS referrals over this time, particularly for thin tumours.[10] Further analysis of COVID-19's impact on diagnostic pathways and whether this has led to a true post-COVID stage shift, particularly for rural patients, is warranted.

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CONFLICT OF INTEREST

None.

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ETHICS APPROVAL

Alfred Human Research Ethics Committee (HREC no. 160/20) and Monash University Human Research Ethics Committee (HREC no.23933).

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Supporting Information

Additional Supporting Information may be found online in Supporting Information:

Figure S1. Map of patient-detected-melanoma pathways.
Figure S2. Map of doctor-detected-melanoma pathways.
Figure S3. Map of 'Other person'-detected pathways.
Table S1. Diagnostic timelines.
Supplementary Material Questionnaire.