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**A casemix study of patients seen within an urban Aboriginal Health Service  
dermatology clinic over a five year period**

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Ethics approval was obtained from the Royal Melbourne Hospital Human Research Ethics Committee (HREC) and the project was supported by the VAHS Research Sub-Committee.

Key Words: Aboriginal and Torres Strait Islander, Indigenous, Dermatology, urban, dermatoeidemiology, Aboriginal Community Controlled Health Organisations.

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Article type : Original Research

## **A casemix study of patients seen within an urban Aboriginal Health Service dermatology clinic over a five-year period**

### **Abstract**

This is the largest study of Aboriginal and Torres Strait Islander dermatologic presentations to an urban specialist clinic within a community-controlled health organisation. It adds to our understanding of Aboriginal and Torres Strait Islander dermatoepidemiology. Patient files were reviewed over the five-year audit period, with age, gender, Indigenous status, diagnosis, disease category, 'new' or 'review consultation' and 'did not attend' (DNA) data recorded. Our study shows that eczema and benign, pre-malignant or malignant neoplasms are the most common presentations for urban Aboriginal and Torres Strait Islander patients. Lupus erythematosus and cutaneous infections were less prominent in comparison to data from rural and remote populations. Overall, a broad casemix of dermatologic presentations was observed. Similar to other studies, adult male patients were under-represented. Most skin malignancies were diagnosed in this cohort; this, therefore, identifies a possible target for public health intervention. A high ratio of new to review patients is consistent with the clinic offering a consultation model of care facilitated by primary health care providers' support within Aboriginal Community-Controlled Health Service. DNA rates in this study were lower than hospital outpatient rates in a comparative study<sup>1</sup> and may be attributed to specialist dermatology care being offered in a more culturally sensitive environment.

The dermatology clinic at the Victorian Aboriginal Health Services (VAHS) provides a good breadth of specialist dermatology care. The community health care model could be replicated in centres elsewhere, including interstate, to help overcome barriers to specialist dermatology care experienced by Aboriginal and Torres Strait Islander populations. Additionally, this model improves trainee exposure and understanding of Aboriginal and Torres Strait Islander health.

### **Introduction**

37 The VAHS is a metropolitan Aboriginal Community-Controlled Health Organisation (ACCHO)  
38 located on Wurundjeri Country in the Melbourne inner-city suburb of Fitzroy. Established in  
39 1973, it is the largest single provider of primary health care to Aboriginal and Torres Strait  
40 Islander people in Melbourne, with 33,395 yearly episodes<sup>2</sup> that service one-quarter of the  
41 25,119 Aboriginal and Torres Strait Islander people in Melbourne<sup>3</sup>. VAHS also provides care  
42 to non-Indigenous patients, who represent approximately 10% of patients. The VAHS  
43 dermatology clinic was re-established in late 2013. In 2015, a federally funded specialist  
44 training program scheme provided an accredited dermatology trainee to attend the clinic  
45 monthly over twelve months. From February 2016, the clinic was included under the  
46 Victorian dermatology training program.

47

48 To our knowledge, this original research paper represents the largest collection of urban  
49 data on Aboriginal and Torres Strait Islander dermatologic health. This study intends to  
50 better inform our understanding of dermatologic conditions that impact the health of  
51 metropolitan-based Aboriginal and Torres Strait Islander populations. It also aims to assess  
52 the accessibility and acceptability of this speciality service by capturing DNA rates and  
53 comparing them against published hospital attendance data.

54

## 55 **Materials and Methods**

56 Ethics approval was obtained from the Royal Melbourne Hospital Human Research Ethics  
57 Committee. The VAHS Research Sub-Committee also supported the project. Patients were  
58 identified using Medicare billing lists and cross-referenced against patient lists generated  
59 from VAHS booking software. Patients in receipt of multiple diagnoses only had their primary  
60 presenting complaint recorded as the diagnosis. Review appointments were included in the  
61 demographic data and listed as separate episodes of care, but these are not included in the  
62 results analysis. Appointments that were booked but not attended were recorded as a DNA  
63 episode. Patients who returned for a review appointment within twelve months were marked  
64 as a review. Those who were re-referred after twelve months or re-presented with a different  
65 skin concern were classed as a new presentation.

66

67 Electronic patient medical records were reviewed retrospectively to collect data on age,  
68 gender, indigeneity, new or review consultation, DNA, diagnosis and disease categories. As  
69 described by Tilakaratne et al., disease categories were allocated according to the  
70 Australasian College of Dermatologists (ACD) curriculum<sup>4</sup> for ease of comparison. The  
71 current ACD curriculum outlines 38 disease categories in its Specialised Content Topic  
72 Areas. In line with the study above, a normal full skin examination was recorded as a 39th  
73 category.

74 **Results**

75 In total, 255 episodes of care were recorded in the five-and-a-half-year period from  
76 December 2013 to August 2019. The majority (229 episodes of care) involved Aboriginal or  
77 Torres Strait Islander patients (89.8%), while 26 out of 255 episodes of care involved  
78 patients identifying as non-Indigenous (10.2%). There were 196 episodes of care for new  
79 patients (77%) and 59 review episodes of care (23%) over the five-and-a-half-year period.  
80 Fifty-six DNAs were recorded between 2013–2018, amounting to 56 of the 214 recorded  
81 appointments (26%). DNAs were not collected for 2019, as a change in the clinic's software  
82 prevented this data from being retrospectively collected with accuracy. Of these 56 DNAs,  
83 45 were Aboriginal or Torres Strait Islander (80%) and eleven were not Aboriginal or Torres  
84 Strait Islander (20%). Men were under-represented, comprising just over one-third of all  
85 patients seen. The median age was 41. There were 52 episodes of care for patients aged 18  
86 years or under (20.4%). To avoid conditions frequently seen being over-represented, only  
87 new cases are included in the Results and Discussion sections.

Eczema or dermatitis	<ul style="list-style-type: none"> <li>• Eczema (22)</li> <li>• Venous eczema (2)</li> <li>• Nodular prurigo (1)</li> <li>• Pompholyx (1)</li> <li>• Hand dermatitis (1)</li> <li>• Lichen simplex chronicus (1)</li> </ul>
Psoriasis	<ul style="list-style-type: none"> <li>• Chronic plaque psoriasis (5)</li> <li>• Pityriasis amiantacea (1)</li> <li>• Palmoplantar pustulosis (1)</li> </ul>
Papulosquamous	<ul style="list-style-type: none"> <li>• Seborrheic dermatitis (5)</li> <li>• Periorificial dermatitis (1)</li> <li>• Lichen striatus (1)</li> <li>• Keratosis pilaris (1)</li> <li>• Lichen planus (1)</li> </ul>
Urticaria, erythema, purpura and vasculitis	<ul style="list-style-type: none"> <li>• Urticaria (2)</li> </ul>
Benign skin neoplasms	<ul style="list-style-type: none"> <li>• Viral warts (7)</li> <li>• Seborrheic keratoses (3)</li> <li>• Epidermoid cysts (3)</li> <li>• Dermatofibromas (2)</li> <li>• Chondrodermatitis nodularis (1)</li> <li>• Benign vulval melanotic macule (1)</li> <li>• Intradermal naevus (1)</li> <li>• Blue naevus (1)</li> <li>• Glomangioma (1)</li> </ul>
Pre-malignant and malignant neoplasms	<ul style="list-style-type: none"> <li>• Invasive melanoma (1)</li> <li>• Melanoma in situ (1)</li> <li>• Dysplastic naevi (2)</li> <li>• Atypical intradermal naevi (1)</li> <li>• Basal cell carcinomas (3)</li> <li>• Squamous cell carcinoma in situ (5)</li> <li>• Actinic keratoses (13)</li> <li>• Actinic cheilitis (1)</li> </ul>
Infections	<ul style="list-style-type: none"> <li>• Tinea corporis (4)</li> <li>• Herpes simplex (3)</li> <li>• Onychomycosis (4)</li> <li>• Folliculitis (2)</li> <li>• Infected eczema (1)</li> </ul>
Adnexal diseases	<ul style="list-style-type: none"> <li>• Acne (7)</li> <li>• Hidradenitis suppurativa (3)</li> </ul>

Pigmentary disorders	<ul style="list-style-type: none"> <li>• Pityriasis versicolor (1)</li> <li>• Melasma (1)</li> <li>• Vitiligo (1)</li> </ul>
Infestations, bites and stings	<ul style="list-style-type: none"> <li>• Scabies (4)</li> <li>• Pediculosis capitis (1)</li> </ul>
Autoimmune connective tissue or rheumatological disorders	<ul style="list-style-type: none"> <li>• Systemic lupus erythematosus (1)</li> <li>• Discoid lupus erythematosus (1)</li> <li>• Erythema elevatum diutinum (1)</li> <li>• Relapsing polychondritis (1)</li> </ul>
Vesiculobullous disease	<ul style="list-style-type: none"> <li>• Dermatitis herpetiformis (1)</li> </ul>
Disorders of Hair	<ul style="list-style-type: none"> <li>• Alopecia areata (1)</li> <li>• Folliculitis decalvans (1)</li> </ul>
Disorders of Nails	<ul style="list-style-type: none"> <li>• Benign longitudinal melanonychia (1)</li> </ul>
Disorders of sweat glands	<ul style="list-style-type: none"> <li>• Hyperhidrosis (4)</li> </ul>
Anogenital diseases	<ul style="list-style-type: none"> <li>• Genital lichen sclerosis (1)</li> <li>• Genital eczema (1)</li> <li>• Genital psoriasis (1)</li> </ul>
Disorders due to physical agents (inc. PMLE)	<ul style="list-style-type: none"> <li>• Polymorphic light eruption (1)</li> <li>• Radiation dermatitis (1)</li> </ul>
Disorders of Macrophages (Non-Infective Granulomas)	<ul style="list-style-type: none"> <li>• Granuloma annulare (6)</li> </ul>
Disorders of dermal connective tissue	<ul style="list-style-type: none"> <li>• Keloids (3)</li> <li>• Atypical fibromatosis (1)</li> <li>• Lipodermatosclerosis (1)</li> </ul>
Vascular system disorders	<ul style="list-style-type: none"> <li>• Progressive telangiectasia – suspected capillary malformation arteriovenous malformation (CM-AVM) (1)</li> </ul>
Skin signs in systemic disorders	<ul style="list-style-type: none"> <li>• Juvenile dermatomyositis (1)</li> </ul>
Metabolic and systemic disorders	<ul style="list-style-type: none"> <li>• Acanthosis nigricans (3)</li> </ul>
Psychocutaneous disorders	<ul style="list-style-type: none"> <li>• Delusions of parasitosis (1)</li> <li>• Acne excorie (2)</li> </ul>
Dermatoses of specific populations	<ul style="list-style-type: none"> <li>• Notalgia paresthetica (1)</li> <li>• Brachioradial pruritus (1)</li> </ul>
Full skin exam normal	<ul style="list-style-type: none"> <li>• Full skin exam normal (33)</li> </ul>

88 Table 1: Casemix results with a number of new diagnoses in each category. The left column indicates categories  
89 based on the ACD curriculum. The right column shows the number of times a new diagnosis was made, with the  
90 frequency of each new diagnosis given in brackets.  
91

## 92 Discussion

93 Optimising urban Aboriginal and Torres Strait Islander services is vital to national health  
94 outcomes since recent census data shows that most Aboriginal and Torres Strait Islander

95 people reside in regional areas (351, 200) and major cities (298, 400). The minority live in  
96 remote and very remote areas (148, 700)<sup>3</sup>. Further, the population growth of Aboriginal and  
97 Torres Strait Islander people is greatest within major cities and is expected to continue to  
98 rise<sup>3</sup>.

99

100 Our research addresses the gap identified in a previous casemix study<sup>4</sup>, where Aboriginal  
101 and Torres Strait Islander patients represented 2% of outpatient dermatology presentations  
102 to Royal Adelaide and Royal Darwin Hospitals and only 17% of Northern Territory outreach  
103 clinics<sup>4</sup>. These rates are respectively<sup>3</sup> equal to and lower than population parity. They show  
104 that in Australian studies examining urban, regional and remote centres, most specialist  
105 dermatology outpatient health care is accessed by non-Indigenous Australians<sup>1,4</sup>. Improving  
106 access to outpatient services is an important marker of dermatology care access, which is  
107 predominantly an outpatient specialty.

108

109 Conditions in which serious sequelae were diagnosed and referred onwards for prompt care  
110 include a diagnosis of juvenile dermatomyositis, referred to the Royal Children's Hospital for  
111 admission and acute management, and psoriatic arthritis mutilans referred urgently to  
112 rheumatology. These time-critical cases demonstrate the importance of access to specialist  
113 dermatology services optimising outcomes for these patients.

114

115 Similar to previous data<sup>1</sup>, cases of eczema were common. The frequency of eczema  
116 presentations decreased in the final two years of the clinic's operation, despite increased  
117 numbers. This may be due to a higher proportion of patients receiving initial treatment by  
118 primary care providers after the clinic was established.

119

120 Malignant and pre-malignant skin neoplasms were seen frequently, with 26 in total. One  
121 0.44 mm Breslow thickness invasive melanoma and one melanoma in situ were detected,  
122 both in male patients. In a previous study, risk factors for cutaneous malignancy within an  
123 urban Aboriginal and Torres Strait Islander cohort in Sydney were identified as male sex,  
124 skin phototype III and immunosuppression<sup>5</sup>. In that study, basal cell carcinoma was most  
125 common (50%), followed by squamous cell carcinoma (31.8%), melanoma (9.1%) and  
126 cutaneous sarcomas (9.1%). All malignant skin neoplasms except for the melanoma in situ  
127 occurred in Aboriginal and Torres Strait Islander patients, highlighting skin phenotype  
128 variability within urban Indigenous populations. In a survey of Aboriginal and Torres Strait  
129 Islander health care workers, 64% ranked education regarding skin cancers, sunspots and  
130 moles as very relevant, lending support for education in this area<sup>6</sup>.

131

132 Keloid scars were common and often seen concurrently with acne indicating the importance  
133 of early speciality dermatology care in this cohort. There were three new cases of  
134 hidradenitis suppurativa. A true incidence of hidradenitis suppurativa within Aboriginal and  
135 Torres Strait populations has not been identified, but the national incidence is estimated  
136 between 0.2% and 4%<sup>7</sup>. The authors agree with published comments that hidradenitis  
137 suppurativa within Aboriginal and Torres Strait populations may be underestimated due to  
138 barriers to accessing care, stigmatisation or delays to diagnosis or dermatology referral<sup>8</sup>.

139  
140 Notably, presentations for bacterial and fungal infection were fewer than reported in previous  
141 studies<sup>1,9-11</sup>. This may demonstrate high treatment rates within primary care or a reduction in  
142 the prevalence in urban areas. Similarly, cases of scabies were fewer than figures seen in  
143 studies investigating scabies endemic in communities in central and northern Australia<sup>11</sup>.

144  
145 Previous research has suggested that autoimmune connective tissue disorders, especially  
146 systemic lupus erythematosus (SLE), are seen more commonly in Aboriginal and Torres  
147 Strait Islander people<sup>11</sup>. Our data did not corroborate this; however, anecdotally, most SLE  
148 patients seen at VAHS attend rheumatology clinics. Therefore, this would not have been  
149 documented as a primary diagnosis. An audit of rheumatology and renal clinics at public  
150 hospitals might yield insightful data to complement this study. Previous authors have noted  
151 discoid lupus erythematosus is more prevalent in Aboriginal and Torres Strait Islander  
152 patients<sup>11</sup>, but similarly, this was not found. A possible explanation for this may include  
153 differences in urban and remote population groups, comparatively lower UV status of  
154 Victoria influencing dermatoepidemiology or the small numbers in our study design.

155  
156 Psoriasis was not frequently seen. One explanation is that reduced pathogen exposure prior  
157 to European colonisation may have resulted in less evolutionary pressure for innate  
158 immunity, a driving factor in psoriasis. Supporting this is that the Major Histocompatibility  
159 Complex HLA-A and HLA-B, genes critical in the immune response, show near  
160 monomorphism in Indigenous Australians from the Oceania region<sup>11</sup>. Additionally, HLA-Cw6,  
161 which has the most significant relative risk amongst the many genes involved in psoriasis,  
162 has been observed to be lower in Indigenous Australians<sup>11</sup>. Another explanation may be lack  
163 of awareness of newer treatment options available that may prompt patients with psoriasis to  
164 present for dermatology care.

165  
166 New cases of acanthosis nigricans were seen three times. This contrasts with common  
167 understandings that recognise it may be more common in Aboriginal and Torres Strait  
168 Islander patients, likely associated with increased rates of polycystic ovarian syndrome,

169 diabetes and obesity. The low numbers may be underestimated and reflect that it was not  
170 the primary reason for attending the dermatology clinic.

171

172 Capillary malformation arteriovenous malformation (CM-AVM) was suspected in a child and  
173 a sibling. Still, as genetic testing has not yet confirmed the diagnosis, this condition was  
174 placed in the vascular system disorder category. In total, 23 disease categories were seen,  
175 allowing for a broad trainee experience.

176

177 Analysis of the DNA rate contrasts against the previous data<sup>1</sup> that identified a 50% DNA rate  
178 for Aboriginal and Torres Strait Islander hospital outpatient appointments. This study  
179 demonstrated a rate of 26%. The lower DNA rate may be due to additional supports  
180 provided by VAHS to overcome barriers to care not offered within the public outpatient clinic  
181 setting. These supports include transport to the clinic, co-location of other primary care  
182 services, and delivering services within a familiar and culturally appropriate setting.

183

184 Our data also shows a high ratio of new to review patients concordant with the clinic  
185 primarily offering a consultation model. This success can be attributed to good primary care  
186 support with follow-up often undertaken by VAHS general practitioners. In our experience,  
187 this model has been effective and demonstrates a sustainable use of specialist services.

188

189 This study offers many valuable insights into the casemix of patients seen within an urban  
190 Aboriginal and Torres Strait Islander healthcare setting and recognises three main  
191 limitations. Firstly, only the primary diagnosis was recorded for each visit and not multiple  
192 diagnoses when present. This method ensured that each episode of care represented a  
193 single consultation with a dermatologist. This may have resulted in an underestimation of  
194 some coexistent conditions. Secondly, although this is the largest urban study of Aboriginal  
195 and Torres Strait Islander dermatologic presentations reported with 255 episodes of care,  
196 the numbers remain small. As a result, external validity is limited, and the numbers recorded  
197 may not truly reflect prevalence in the broader population. Finally, the study was  
198 retrospectively designed, and so the information collected was limited to basic demographic  
199 data. There is further research potential in expanding the dataset to include secondary  
200 diagnoses and Fitzpatrick skin type, urban or rural status and latitude, and medical  
201 comorbidities.

202

## 203 **Conclusion**

204 In conclusion, this five-year audit of the Victorian Aboriginal Health Service dermatology  
205 clinic is the largest study of urban Aboriginal and Torres Strait Islander health ever collected

206 and the first to look at data collected within an ACCHO. Our improved knowledge of the  
207 scope of dermatologic presentations will assist in the education and upskilling of primary  
208 health care providers and direct health initiatives in skin diseases. It also highlights the  
209 demand for specialist dermatology care in Aboriginal and Torres Strait Islander patients and  
210 supports the ongoing allocation of funding and resources in this setting. We hope this data  
211 encourages interstate dermatology training programs to work collaboratively with ACCHOs  
212 to set up accredited training posts.

213  
214 This research is endorsed by the VAHS Aboriginal and Torres Strait Islander Research sub-  
215 committee and would not have been possible without the support and feedback they  
216 provided or without the support of VAHS clerical and services staff. The authors  
217 acknowledge that Aboriginal and Torres Strait Islander people should be collaboratively  
218 involved in research and retain ownership of intellectual property generated. Data from this  
219 paper will be part of ongoing quality improvement to optimise health outcomes for Aboriginal  
220 and Torres Strait Islander people who access this service. The authors recognise that  
221 Aboriginal and Torres Strait Islander people should benefit from research as part of an  
222 ethical standard that ensures when research is undertaken it contributes to the community's  
223 health under study.

224

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226

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