

Research paper

Ethnicity, discrimination and health outcomes: a secondary analysis of hospital data from Victoria, Australia

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ABSTRACT

Discrimination is difficult to measure objectively in clinical settings, although it has been identified as a significant cause of ethnic health disparities. Proxy quantitative indicators relating to differential outcomes based on quality of care can begin to shed some light on the possible discrimination, but current data are largely from countries where there is differential access to healthcare as a result of health insurance schemes, and this is a major confounder in the findings. Using data from Victoria, Australia, where there is currently universal healthcare coverage, we explored a number of quality of care-related clinical outcomes across ethnic groups. The aim was to explore the relationship between ethnicity and clinical outcomes for postpartum haemorrhage, sepsis and cardiac rehabilitation in Victoria, Australia, as the first step to developing methods for research into discrimination in quality of care. We drew on the Victorian Admitted Episodes Dataset and undertook a secondary data analysis based on re-categorisation of country of birth data. A multi-variate logistic regression was used to examine the

relationship between ethnicity and specified clinical outcomes. Results showed that the risk for postpartum haemorrhage was higher in ethnic minority groups, and access to intensive care for sepsis lower; however, there was no association with access to cardiac care. Our analyses did not support any strong or consistent barriers to access or poor outcomes of care for particular ethnic groups. This may be an indication of the protection provided by universal health coverage. However, research in this area in Australia is in its infancy and there is a lack of systematically collected administrative data on ethnicity. Growing ethnic minority populations, not just in Australia but also in many other high-income countries, highlight a critical need for the development of data collection systems that are conceptually sound and useful for the monitoring of ethnic minority health in general, and potential discrimination in particular.

Keywords: discrimination, ethnicity, health outcomes, multi-methods

Introduction

In population-based health studies, ethnicity is often treated as an extraneous variable to be statistically controlled at the time of analysis. When ethnicity is studied in its own right, there remain conceptual and analytic tensions. In broad terms, however, the definition and use of ethnicity in the investigation of disparities in health and health outcomes falls into three broad categories: (1) those health effects attributable to genetic predispositions (Anand, 1999); (2) those health effects attributable to socio-economic context and culturally patterned behaviours and beliefs of the group being studied (Adamson *et al*, 2003); and (3) those health effects attributable to the behaviour of others towards the group being studied (Smedley *et al*, 2003).

In a clinical setting, the last of these health effects, resulting from differential treatment by virtue of ethnicity, remains one of the most disturbing possibilities because it is indicative of discrimination; treatment deliberately or unknowingly determined or influenced by a clinician's view about a patient's personal characteristics such as age, race, gender, ethnicity and religion, above and beyond their objective clinical relevance, which results in a worse health outcome than if the patient had been treated on the basis of their clinical presentation alone. The difficulty is that when the clinical encounter is scrutinised, allowances need to be made for variation in and the fallibility of clinical judgements (Smedley *et al*, 2003), the possible misperception of the patients and an explicit recognition of socially constructed group categorisation and perceived stereotypes related to the group by other social groups (Karlsen and Nazroo, 2006). Nonetheless, there is no shortage of small-scale, targeted studies documenting the perception of racism and racial discrimination in healthcare settings by patients from minority ethnic groups (Barnes and Weiner, 1999; Doescher *et al*, 2000; Krieger, 2001).

Under these circumstances, particularly when the interest is not in individual clinicians but in institutionalised or systemic bias associated with patients' ethnicity, one of the best strategies for drawing attention to discrimination in clinical care is in the identification of statistical irregularities in targeted clinical outcomes. Differential rates in the access to information, diagnosis and treatment for a range of conditions have all been identified as indicative of discrimination within healthcare, making each a potentially useful proxy indicator (Anonymous, 1999a,b; Bach *et al*, 1999; Canto *et al*, 2000; Britton *et al*, 2004). Most of the epidemiological research of this kind reported in the literature has come out of the US, driven by an awareness of and recognised need to deal with racial and ethnic discrimination in healthcare (LaVeist,

2002; National Research Council, 2004). However, in the US, the exploration of disparate clinical outcomes patterned by race and ethnicity-related discrimination is conflated by the nature of health funding. (The exception to the funding-related bias is perhaps in the elderly with Medicare Managed Care and patients in the Veterans hospitals.) Private health insurance and wealth are both strongly associated with good clinical outcomes, and because both are strongly patterned by race and ethnicity, these alter the association between ethnicity and clinical outcomes.

Research using a similar approach in the analysis of the relationship between access to healthcare and ethnicity as proxies for discrimination has been conducted in the UK. However, the application of the findings is also restricted by the complexities of the multidimensionality of ethnicity as a construct and socio-economic factors (Bhopal, 2004). These limitations highlight a major challenge in epidemiological research on discrimination and health. Beyond highlighting the potential disparities, current approaches do not explore the underlying service-related and other factors that could flag potential discrimination. The Institutes of Medicine in the US suggest factors that include institutional practices, stereotyping and provider bias. However, the systematic investigation of these factors remains poor (Krieger, 2001; Smedley *et al*, 2003) and the methods underdeveloped.

The aim of the current research was primarily to explore quality of care-related clinical outcomes across ethnic groups within the context of a universal healthcare coverage system, thus minimising the bias faced by researchers in countries like the US that have differential access to health insurance. The analysis was expected to provide preliminary data for the development of methods for further research into discrimination and quality of care. The underlying assumption was that systematic discrimination would lead to poorer outcomes for ethnic minority patients where the outcomes rely on the quality of care. For discrimination to occur there need to be markers of exclusion (Reidpath *et al*, 2005) such as skin colour (Comstock *et al*, 2004) or overt cultural or religious practice; institutional and/or healthcare staff attitudes that would be exclusionary or which would reflect concerns about social distance; and patients who would report a perception of discrimination.

Australia provides a useful setting to explore the relationship between clinical health outcomes and ethnicity, because of the federally funded universal health insurance scheme. The Medicare Scheme in Australia guarantees free or subsidised primary care and most specialist referrals, free treatment in public hospitals and subsidised pharmaceuticals to Australian and New Zealand citizens, or holders of, or applicants for, permanent migration visas. While many of the US studies control statistically for the confounding

introduced by the commercial nature of clinical care, Australia provides a setting where technically, access is not an issue.

Notwithstanding the availability of universal health-care in Australia, largely qualitative research into the experiences of migrant groups has reported significant negative experiences with health services (Manderson and Allotey, 2003a). Racism is cited by ethnic minorities as a reason for frustration with health services, and ultimately explains their withdrawal from the services in spite of an ongoing need for care (Allotey *et al*, 2002). To date however, with the exception of some research on the health outcomes of indigenous Australians, there is almost no population-based epidemiological research into clinical health outcomes associated with patients' ethnicity. This paper reports an analysis investigating the relationship between patient ethnicity and care-related clinical outcomes, and discusses the implications for future research into discrimination and health.

Methods

The study was based on the secondary analysis of an existing data set described below. All analyses were conducted using SAS 8.2 (SAS Institute Inc, 1999). Approval for these analyses was obtained from the Victorian Department of Human Services and its institutional ethics committee.

Data source

The analysis was undertaken using hospital discharge abstracts for the state of Victoria on the Eastern seaboard of Australia. Victoria is the second largest state in Australia (population ~5 million (Australian Bureau of Statistics, 2001)) with high ethnic diversity. One-quarter of the population is overseas born, with 72% from non-English-speaking regions including Asia, Africa, Middle East, the Pacific, Eastern Europe and South America. The Victorian Admitted Episodes Dataset (VAED) is maintained by the Victorian State Department of Human Services, and is based on statutorily required data compiled by individual private and public hospitals (Acute Health Division, 2000). The data include demographic and clinical information on each episode of patient care, with clinical information coded in the format of the International Classification of Disease-10 (ICD-10) (Australian Modification) from July 1 1998 and the ICD-9 (Clinical Modification) prior to that.

Ethnicity classification

Unlike in the UK, there is no administrative requirement to collect data on ethnicity in Australia. The approach adopted by the Australian Institute for Health and Welfare in the reporting of immigrant health is geographical with four categories that include: (1) UK and Ireland; (2) other Europe; (3) Asia; and (4) an 'other' category which includes Africa, the Americas, Middle East, New Zealand and the Pacific Islands (Australian Institute of Health and Welfare, 2004). These categories supply large enough groups to provide sufficient statistical power in analyses; however their merit ends there, because the extent of heterogeneity of the countries in the groups precludes any meaningful, theoretical, cultural or ethnic discussions.

Given the conditions required for discrimination to occur (Reidpath *et al*, 2005), country of birth data were used to recategorise patients according to perceptible ethnic markers of exclusion. The principal markers were English language proficiency and 'visibility' or visible physical difference based on likely phenotypic physical variation from the Anglo-Celtic Caucasian. The approach is consistent with the race discrimination literature and serves as a more useful conceptualisation than simple physical geography (country of birth) (Physicians for Human Rights, 2003; Smedley *et al*, 2003; National Research Council, 2004). There were, therefore, three major categories (see Box 1):

- 1 Australian-born *or* overseas-born patients from English-speaking, predominantly white countries (e.g. Australia, New Zealand, UK, and Ireland)
- 2 non-visible minorities: overseas-born patients from non-English-speaking, predominantly white countries (e.g. Italy, Greece, and the former Yugoslavia)
- 3 visible minorities: overseas-born patients from countries with largely non-white populations and/or predominantly Islamic countries (e.g. Afghanistan, Vietnam, and Sudan).

It is important to note here that there is an *ad hoc* collection of data on Australian aboriginality, but patients falling into this category were excluded for two reasons. First, identification of Aboriginal patients is often incomplete and inaccurate. Second, the antecedents of social disadvantage of Australia's indigenous population preclude them being categorised with the majority of (white) Australian-born patients.

Clinical outcomes data

The quality of care given within an institutional setting has important implications for the clinical

Box 1 Classification of ethnic groups by country of birth

English-speaking

- Australia and Australian External Territories
- New Zealand
- UK + Ireland
- North America (not Mexico)

Non-visible

- Southern Europe
- Western Europe
- Northern Europe
- Eastern Europe
- Former USSR + Baltic States
- South America (including Mexico)
- Central America

Visible minorities

- Pacific Islander: Melanesia, Micronesia, Polynesia
- Middle East, including Turkey
- North Africa, including Algeria, Egypt, Libya, Morocco, Sudan
- Asia: Southeast Asia, Northeast Asia
- Indian subcontinent: India, Pakistan, Bangladesh
- Sub-Saharan Africa: Central/West Africa, Southern/East Africa, including Somalia and Ethiopia

outcomes of any admissions episode. Given our definition of discrimination, the conditions for the preliminary analysis had to relate to quality of care. The three conditions examined were attendance at cardiovascular rehabilitation after a cardiac event or procedure, postpartum haemorrhage and general sepsis.

The first indicator, attendance at cardiac rehabilitation, was chosen primarily because cardiovascular-related treatments demonstrate the strongest and most consistent evidence of ethnic disparities in the US (Smedley *et al*, 2003). Among other things, cardiac rehabilitation indicates the capacity of physicians, surgeons, nurses and hospital physiotherapists to communicate the importance of risk factor modification to patients who have recently undergone a major cardiac event in a way that motivates patients to attend outpatient preventive services. Data were aggregated from 66 outpatient cardiac rehabilitation programmes in Victoria from January to December 1998, and linked to all cases of acute myocardial infarction, coronary artery bypass grafting and percutaneous transluminal coronary angioplasty from the 1998 VAED. The attendance rate was based on the number of cardiac cases from the VAED sample linked to the rehabilitation dataset.

We selected post-partum haemorrhage for a number of reasons. Qualitative findings of discrimination

have related largely to women's engagement with reproductive health services (Manderson and Allotey, 2003a); the choice of a childbirth-related condition provided the opportunity to explore quantitative methods of triangulation of the qualitative data. Risk of post-partum haemorrhage also provides insight into the quality of care for younger women, a specific demographic group well represented in the newer migrant groups. Post-partum hemorrhage is defined in the Australian ICD-10-AM coding guidelines as blood loss within 24 hours of delivery, either a 500 ml blood loss after a vaginal delivery, or 1000 ml blood loss after a caesarean section (National Centre for Classification in Health, 1998, 2000). All deliveries from 1 July 2000 to 30 June 2003 were considered for analysis.

Sepsis exemplifies a common severe illness, which demands high-level hospital care, often with the requirement for intensive care services. The complexity of its pathogenesis and treatment is often difficult to communicate. It therefore provides a good proxy for quality of care in hospital settings. For this analysis we examined both differences in access to intensive care following sepsis, and hospital mortality. Sepsis was defined using the ICD-10-AM codes for Gram-positive, Gram-negative, fungal, tuberculous, anaerobic and microbiologically undefined sepsis section (National Centre for Classification in Health, 1998, 2000). The analysis period extended four years, from 1 July 1999 to 30 June 2003.

Data analysis

Multivariable logistic regression was used to examine the relationship between ethnicity (visibility) and healthcare/outcome. The covariates in the adjusted models included socio-economic status, proximity to services, co-morbidities, and type of hospital: public hospitals funded through Medicare versus private hospitals covered by private health insurance. Private insurance carriers can elect to be hospitalised at a public hospital.

The socio-economic status of individual patients was estimated using the Australian Bureau of Statistics Socio-Economic Indicator for Advantage, SEIFA (Australian Bureau of Statistics, 2003). Based on previous work, a dichotomous variable was generated reflecting those in the lowest quartile on index of economic resources in comparison to the top three quartiles (Australian Bureau of Statistics, 2003). Proximity to services was estimated using the Accessibility/Remoteness Index of Australia (ARIA) (Commonwealth Department of Health and Aged Care, 2001), which marks the proximity of a patient's residence to a wide range of goods and services, including medical services (Commonwealth Department of Health and

Aged Care, 2001). A dichotomous classification was generated distinguishing patients residing in areas classified as *highly accessible*, with no physical restriction on access to most goods and services, from the rest. Co-morbidities were measured using an ICD-10-AM version of the Charlson co-morbidity index in the cardiac analysis (Sundararajan *et al*, 2004). The type of hospital in which the patient was treated was classified as *public*, *private*, or *other*. Less than 10% received their care as private patients at public hospitals; *other* indicated patients such as veterans who were funded under a different Commonwealth government health insurance scheme from Medicare, but nonetheless received care in public hospitals.

Results

Access to cardiac rehabilitation

In 1998, 13 076 patients were hospitalised for a myocardial infarction, coronary artery bypass graft or an angioplasty. Their mean age was 66 years with a standard deviation of 12. Thirty percent were women, and 73% were English speaking (see Table 1). Overall, 23.7% of cardiac patients attended rehabilitation, whereas 23.0% of English-speaking cardiac patients attended rehabilitation.

In a crude logistic regression model, with the English-speaking group as the reference, the odds of attending rehabilitation were higher for patients from the Indian subcontinent in the visible ethnic minority category (odds ratio and 95% confidence interval, 1.39 (1.07, 1.81)) and from non-visible countries (1.12 (1.02, 1.24)) (see Table 2). In the fully adjusted model, covariates with higher odds of attending rehabilitation included male gender, younger age, cardiac bypass as the cardiac event, lower co-morbidity, intensive care during admission, admission as an emergency patient, private patient type, living in an area classified as being in the highest quartile of economic resources, and having high accessibility to goods and services. Ethnicity did not relate to attendance at cardiac rehabilitation, with the two groups showing higher odds of attendance in the crude analysis no longer significantly different from the English-speaking group.

Post-partum haemorrhage

Overall 8.5% of deliveries from both minority categories were complicated by post-partum haemorrhage, in comparison to a rate of 7.9% of women born in English-speaking countries (see Table 3). In the crude model, women from visible and non-visible minority groups all had an elevated chance of post-partum haemorrhage (Table 2). The adjusted model

for the odds of post-partum haemorrhage after delivery included other risk factors which may have the potential to alter the relationship between ethnicity and the risk of post-partum haemorrhage. In addition to age, patient type, that is *public*, *private*, *other*, area of residence in the lowest quartile of economic resources, area of residence with high accessibility to goods and services, these included processes which increase uterine atony such as uterine distension, induction of labour, preterm labour, rapid labour, and prolonged labour; placental factors; chorioamnionitis; genital tract trauma; coagulopathies; type of delivery such as spontaneous vertex, caesarean section, forceps, vacuum, breech; and other factors such as diabetes in pregnancy, gestational and otherwise, and pre-eclampsia. The risk was higher in visible minorities, although in a fully adjusted model, only women from Asia and the Pacific Islands appeared to have a higher risk. Women who delivered at private hospitals had a lower risk compared to those delivering at public hospitals (data not shown).

Transfer to an intensive care bed in sepsis

Overall, 23.3% of sepsis patients transferred to intensive care during hospitalisation, very similar to the figure of 23.7% of English-speaking patients who were transferred (see Table 4). In the crude model, sepsis patients from non-visible countries of birth were less likely to go to intensive care (0.89 (0.83, 0.95)) as were patients from sub-Saharan Africa (0.62 (0.42, 0.93; see Table 2)). In the fully adjusted model, male gender, younger age, lack of co-morbidity, surgery during the admission, end-organ dysfunction during the admission, microbiological nature of sepsis, residence in an area with high accessibility to goods and services were all associated with higher odds of intensive care use. Notably, the SEIFA economic index did not relate to intensive care use. Patients in the visible ethnic category, particularly from Asia and sub-Saharan Africa, had lower odds of receiving intensive care.

Hospital mortality in sepsis

Eighteen percent of patients with sepsis died in hospital (see Table 4). In the crude model, patients from non-visible and visible countries of birth had higher odds of hospital mortality. After adjustment, patients from non-visible countries of birth had lower odds of death in hospital, with patients from other ethnic groups having a similar risk of death as those from English-speaking countries. Other factors associated with an increased risk of mortality included female gender, age, requirement for intensive care, co-morbidity, end-organ dysfunction, patients in public

Table 1 Cardiac events

	English speaking	Non-visible	Visible	Visible, subclassifications						
				Asia	Indian subcontinent	Middle East	North Africa	Pacific Islander	Sub-Saharan Africa	
Total <i>n</i> = 13 076, year 1998										
Ethnicity (%)	73.0	20.1	6.9	1.6	2.1	1.3	0.8	0.4	0.6	
Age (mean (SD)), years	67 (12)	66 (11)	61(12)	62 (12)	62 (11)	58(11)	63 (11)	56 (13)	64 (13)	
Gender (% female)	32	26	24	27	22	23	23	22	29	
Cardiac rehabilitation attendance (%)	23	25	25	21	30	26	28	19	21	
Indication for cardiac rehabilitation										
acute myocardial infarction (%)	43	41	44	35	40	40	33	28	47	
coronary artery bypass graft (%)	26	28	33	37	28	29	40	40	27	
angioplasty (%)	25	25	23	21	25	23	20	19	23	
Co-morbidity										
severe co-morbidity (%)	29	33	31	31	29	37	37	22	25	
congestive heart failure (%)	14	17	14	17	13	13	16	10	8	
Hospital factors										
intensive care (%)	86	87	89	91	87	91	87	84	88	
admitted as an emergency patient (%)	44	49	44	37	49	48	43	33	47	
public patient (%)	55	73	65	55	65	79	73	40	63	
Socio-economic factors										
lowest quartile economic resources (%)	17	17	11	14	7	14	11	18	12	
high accessibility to goods and services (%)	86	97	99	99	99	99	100	93	98	

Table 2 Models of access and outcome

Country of birth		English speaking	Non-visible	Visible	Visible, subclassifications					
					Asia	Indian subcontinent	Middle East	North Africa	Pacific Islander	Sub-Saharan Africa
Access	CR	1.00	1.12 (1.02–1.24)	1.11 (0.95–1.31)	0.86 (0.62–1.2)	1.39 (1.07–1.81)	1.16 (0.82–1.63)	1.31 (0.86–2.01)	0.78 (0.4–1.5)	0.86 (0.49–1.52)
	ADJ	1.00	0.98 (0.87–1.1)	0.94 (0.79–1.13)	0.85 (0.58–1.26)	1.14 (0.84–1.53)	0.83 (0.57–1.22)	1.07 (0.67–1.71)	0.82 (0.39–1.72)	0.68 (0.35–1.32)
cardiac rehabilitation	CR	1.00	0.89 (0.83–0.95)	0.92 (0.83–1.02)	0.91 (0.78–1.06)	0.8 (0.62–1.03)	1.06 (0.82–1.38)	1.13 (0.81–1.57)	1.24 (0.87–1.77)	0.62 (0.42–0.93)
	ADJ	1.00	1.05 (0.96–1.15)	0.83 (0.73–0.95)	0.82 (0.68–0.98)	0.75 (0.55–1.01)	1.09 (0.79–1.49)	1.06 (0.72–1.57)	0.85 (0.52–1.39)	0.51 (0.31–0.83)
intensive care in sepsis	CR	1.00	1.16 (1.06–1.26)	1.5 (1.44–1.57)	1.69 (1.6–1.78)	1.27 (1.13–1.42)	1.13 (1.01–1.26)	1.2 (0.89–1.62)	2.06 (1.79–2.37)	1.2 (1.04–1.38)
	ADJ	1.00	1.09 (0.99–1.19)	1.34 (1.28–1.4)	1.48 (1.39–1.57)	1.12 (1–1.26)	1.03 (0.92–1.15)	1.12 (0.82–1.54)	1.86 (1.6–2.16)	1.16 (0.99–1.36)
Outcome	CR	1.00	1.16 (1.08–1.25)	0.87 (0.77–0.97)	0.84 (0.7–1)	0.83 (0.62–1.1)	0.83 (0.61–1.14)	1.31 (0.92–1.85)	0.95 (0.62–1.46)	0.68 (0.44–1.05)
	ADJ	1.00	0.77 (0.7–0.84)	0.82 (0.71–0.94)	0.83 (0.68–1.02)	0.77 (0.56–1.06)	0.81 (0.58–1.15)	0.77 (0.52–1.14)	1.13 (0.64–1.99)	0.77 (0.47–1.24)

CR, crude; ADJ, adjusted.

Table 3 Deliveries

Total <i>n</i> = 175 602, year 2001–2003	English speaking	Non-visible	Visible	Visible subclassifications					
				Asia	Indian subcontinent	Middle East	North Africa	Pacific Islander	Sub-Saharan Africa
Ethnicity (%)	81.9	3.9	14.3	7.5	2.0	2.3	0.3	0.9	1.3
Age (mean (SD)), years	30 (5)	31 (5)	30 (5)	31 (5)	31 (5)	29 (6)	30 (6)	30 (6)	30 (5)
Level of post-partum haemorrhage									
none (%)	92.1	90.9	88.5	87.3	90.1	91.1	90.6	84.9	90.7
low/moderate (%)	6.9	8.3	9.9	11.0	8.2	7.9	8.8	13.7	8.2
severe (requiring transfusion/hysterectomy) (%)	1.0	0.8	1.5	1.8	1.7	1.0	0.6	1.4	1.2
Caesarean section (%)	26	26	25	24	30	20	27	25	29
Forceps or vacuum extraction (%)	13	12	12	14	14	9	9	7	12
Obstetric tears (%)	1	1	1	2	1	1	1	2	1
Uterine distension (%)	10	10	10	10	11	7	8	6	9
Induced labour (%)	13	11	11	10	11	12	10	11	12
Preterm labour (%)	6	6	6	6	6	6	6	6	5
Placental factors (%)	4	4	4	4	4	4	4	5	3
Diabetes (%)	4	5	11	12	14	8	9	10	6
Pre-eclampsia (%)	3	2	2	2	2	2	1	3	2
Hospital factors									
public patient (%)	64	71	82	81	76	92	81	81	76
Socio-economic factors									
lowest quartile economic resources (%)	14	10	13	14	9	11	11	14	16
high accessibility to goods and services (%)	91	98	98	99	99	98	100	93	98

Table 4 Sepsis

Total <i>n</i> = 32 450, years 1999–2003	English speaking	Non-visible	Visible	Visible, subclassifications					
				Asia	Indian subcontinent	Middle East	North Africa	Pacific Islander	Sub-Saharan Africa
Ethnicity (%)	76.7	16.6	6.7	3.0	1.2	0.9	0.6	0.5	0.6
Age (mean (SD)), years	57 (28)	70 (12)	58 (20)	57 (21)	61 (21)	58 (17)	68 (15)	45 (19)	59 (20)
Gender (% female)	45	40	49	51	47	46	39	56	46
Access and outcome									
intensive care (%)	24	22	22	22	20	25	26	28	16
hospital mortality (%)	18	20	16	15	15	15	22	17	13
Organism									
fungal (%)	2	3	2	2	3	3	2	1	2
Gram-negative (%)	19	23	26	28	28	20	18	27	25
Gram-positive (%)	30	23	25	25	25	22	27	38	21
other (%)	49	52	47	45	45	56	54	34	51
Co-morbidity and severity									
severe co-morbidity (%)	39	52	45	42	42	53	58	51	40
end-organ dysfunction (%)	34	40	38	37	37	39	50	40	36
Hospital factors									
surgery (%)	11	13	15	15	17	14	16	20	11
admitted as an emergency patient (%)	70	72	74	78	73	72	67	76	67
public patient (%)	67	80	80	82	76	88	77	64	77
Socio-economic factors									
lowest quartile economic resources (%)	16	17	13	14	6	19	14	15	8
high accessibility to goods and services (%)	91	97	99	99	100	100	99	97	97

hospitals, patients with Gram-positive and fungal sepsis (in comparison to Gram-negative sepsis).

In summary, patients from Asia and sub-Saharan Africa had lower odds of receiving intensive care in comparison to those born in an English-speaking country; however, this decreased access did not translate to worse outcomes in these two groups.

Conclusions

The purpose of the above analysis has been to explore a classification based on the use of a routinely available variable in hospital discharge abstracts, *country of birth*, to describe variation in access and outcomes in healthcare delivered to ethnic groups in a universal healthcare system. The classification was based on a theoretically informed approach that distinguished ethnically *visible* and *invisible* groups from the background population of Australia.

The findings on access to cardiac care show no associations. These results are in sharp contrast to US studies that show clear disparities, with the greatest burden falling on the more visible African American and Hispanic populations (Weitzman *et al*, 1997; Petersen *et al*, 2002; Gonzalez *et al*, 2003). However, the existence in Australia of a universal, public, health insurance scheme in the form of Medicare may indeed demonstrate that, regardless of attitudes held by staff, universal healthcare coverage may be the critical factor in ensuring optimal outcomes, regardless of ethnicity. In other words in the application of treatment and care regimens in Australian hospital settings, the system is *colour blind* with respect to clinically, although not necessarily personally and emotionally, important outcomes. This is not to say that discrimination based on race and ethnicity does not occur, nor does it diminish the importance of perceived discrimination. It does, however open up an important line of inquiry and the potential for cross-country comparisons in the examination of experiences of discrimination and the mitigation of this experience by universal access.

Some association is shown with post-partum haemorrhage, which could suggest poorer management and late identification of excessive bleeding (Bouvier-Colle *et al*, 2001). The identified associations merely provide a small but critical piece to a complex puzzle, the rest of which could be provided by the other methods of research.

In sepsis, patients from Asia and sub-Saharan Africa had lower odds of receiving intensive care in comparison to those born in an English-speaking country; however, this decreased access did not translate to worse outcomes in these two groups.

There are some clear limitations in the analysis, which point to areas requiring further work. Due to

the lack of a predefined variable on ethnicity, a surrogate measure based on country of birth was developed. The potential for misclassification is highest for two groups: (1) individuals born in Australia to parents born in countries within the visible and non-visible groups; and (2) individuals within the visible ethnic category who are from countries where English is either the lingua franca or the medium of instruction.

There is a clear need for the development of methods that identify and monitor discrimination in the quality of care received by ethnic minorities (Smedley *et al*, 2003; National Research Council, 2004). This will become increasingly important for two main reasons. Current migration trends are from poor countries with black majority populations towards high-income countries that have traditionally operated as mono-cultural. Secondly, economic policies are generally moving away from the protections given by the welfare state. The full implications of these two trends will need to be demonstrated with a systematic research agenda.

A complete theoretical and hypothesis-driven approach to the investigation of ethnicity, discrimination and health outcomes is needed to understand how health systems and the culture of medical practice can improve care for all ethnic groups. The assumption is that health outcomes and quality of care rely on the ability of health systems to be sensitive to the needs of particular patients, while maintaining equitable access regardless of culture and ethnicity. These assumptions focus the specific research questions and approach, which necessarily would require the use of a multi-method protocol. A five-step protocol would potentially consist of:

- 1 *the identification of disparities in clinical outcomes*: the analysis of clinical outcome/quality of care data by ethnicity, categorised according to markers of exclusion. The covariates in the analysis will need to take into account the various clinical and contextual associations with poorer health outcomes for the given condition
- 2 *a policy analysis of institutional and clinical procedures*: while policies may not necessarily be overtly discriminatory in intent, they may have the effect of discriminating against particular groups who as a result of particular characteristics are unable to comply with set guidelines. Protocols for policy analysis have been proposed for compliance with human rights frameworks in health (Hunt, 2004)
- 3 *investigation of discriminatory practice*: discrimination in practice may be the result of an omission, intentional or unconscious, that results in the disadvantage to individuals or groups based on particular characteristics. Tools for the analysis of discrimination in practice have been implemented,

for instance in the investigation of HIV-related discrimination (UNAIDS, 2000)

- 4 *staff attitudes*: despite policy and practice guidelines, negative attitudes of individual staff towards ethnic minorities may be reflected in their practice. While overt racism is not often documented, the evolution to subtler but no less prejudicial attitudes has been documented in service provision settings. There is considerable political opposition to confronting racial attitudes (Krieger, 2001; Smedley *et al*, 2003; National Research Council, 2004). Nonetheless, there is an urgent need for a measure and ongoing monitoring of markers of social distance (Bogardus, 1925) in general and racial attitudes in particular
- 5 *patient perceptions and experiences of discrimination*: discrimination has been reported in a number of studies. Without a more systematic comparative case studies design into the experiences, it is difficult to determine if experiences reflect a general substandard quality of care, or if the perception of discrimination is indeed a result of ethnic markers (Manderson and Allotey, 2003a, 2003b).

The Agency for Healthcare Research and Quality in the US suggests that the indicators for quality of care likely to identify discrimination include effectiveness, patient safety, timelines and patient centredness (Agency for Healthcare Research and Quality, 2005). These, however, require that the relevant data are systematically collected. Existing data on ethnicity vary widely in quality, mode of collection and definition. Data sets in the UK, for instance, rely on self-definition or health staff definition (Anonymous, 1996; McAuley *et al*, 1996; McKenzie and Crowcroft, 1996; Karlsen and Nazroo, 2006), with ongoing debates about the relevance of the categories. Australia relies on country of birth and the US on broad categories based on origins. While there is some merit to redesigning data collection systems to address the definitional problems, some use can be made of existing data by linking the operationalisation of ethnicity to the central hypothesis of the research question. Furthermore, multi-method studies that explore both objective and subjective experiences and outcomes of discrimination are critical to exploring and addressing the effect on health and healthcare. Our proposed multi-method protocol provides a range of data to enable triangulation for the assessment of discrimination.

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REFERENCES

- Acute Health Division (2000) *The Victorian Admitted Episodes Dataset: an Overview April 2000*. Melbourne: Acute Health Division, Victorian Government Department of Human Services.
- Adamson J, Ben-Shlomo Y, Chaturvedi N and Donovan J (2003) Ethnicity, socio-economic position and gender – do they affect reported health-care seeking behaviour? *Social Science and Medicine* 57:895–904.
- Agency for Healthcare Research and Quality (2005) *2004 National Healthcare Disparities Report*. AHRQ Publication No 05–0014. Rockville, MD: US Department of Health and Human Services.
- Allotey P, Manderson L and Reidpath D (2002) Addressing cultural diversity in Australian health services. *Health Promotion Journal of Australia* 13:31–5.
- Anand S (1999) Using ethnicity as a classification variable in health research: perpetuating the myth of biological determinism, servicing socio-political agendas, or making valuable contributions to medical sciences. *Ethnicity and Health* 4:241–4.
- Anonymous (1999a) Editor's choice: error and institutionalised racism. *BMJ* 318:612.
- Anonymous (1999b) Institutionalised racism in health care [editorial]. *The Lancet* 353:765.
- Anonymous (1996) Style matters: ethnicity, race, and culture: guidelines for research, audit, and publication. *BMJ* 312:1094.
- Australian Bureau of Statistics (2001) *2001 Census of Population and Housing*. Canberra: Australian Bureau of Statistics.
- Australian Bureau of Statistics (2003) *Census of Population and Housing: socio-economic indices for areas, Australia 2001*. Canberra: Australian Bureau of Statistics.
- Australian Institute of Health and Welfare (2004) *Australia's Health 2004. The ninth biennial report of the Australian Institute of Health and Welfare*. Canberra: Australian Institute of Health and Welfare.
- Bach PB, Cramer LD, Warren JL and Begg CB (1999) Racial differences in the treatment of early-stage lung cancer. *New England Journal of Medicine* 341:1198–205.
- Barnes M and Weiner W (1999) Evidence of race based discrimination triggers new legal and ethical scrutiny. *8 BNA Health Law Reporter* 8: 1984.
- Bhopal R (2004) Glossary of terms relating to ethnicity and race: for reflection and debate. *Journal of Epidemiology and Community Health* 58:441–5.
- Bogardus E (1925) Measuring social distances. *Journal of Applied Sociology* 1:216–26.
- Bouvier-Colle M, Ould EJD, Varnoux N *et al* (2001) Evaluation of the quality of care for severe obstetrical haemorrhage in three French regions. *British Journal of Obstetrics and Gynaecology* 108:898–903.
- Britton A, Shipley M, Marmot M and Hemingway H (2004) Does access to cardiac investigation and treatment contribute to social and ethnic differences in coronary heart

- disease? Whitehall II prospective cohort study. *BMJ* 329:318.
- Canto JG, Allison JJ, Kiefe CI *et al* (2000) Relation of race and sex to the use of reperfusion therapy in Medicare beneficiaries with acute myocardial infarction. *New England Journal of Medicine* 342:1094–100.
- Commonwealth Department of Health and Aged Care (2001) *Measuring Remoteness: Accessibility/Remoteness Index of Australia (ARIA), revised edition*. Canberra: ACT, Commonwealth of Australia.
- Comstock R, Castillo E and Lindsay S (2004) Four year review of the use of race and ethnicity in epidemiologic and public health research. *American Journal of Epidemiology* 159:611–19.
- Doescher M, Saver B, Franks P and Fiscella K (2000) Racial and ethnic disparities in perceptions of physician style and trust. *Archives of Family Medicine* 9:1156–63.
- Gonzalez PC, Gauvreau K, Demone JA, Piercey GE and Jenkins KJ (2003) Regional racial and ethnic differences in mortality for congenital heart surgery in children may reflect unequal access to care. *Pediatric Cardiology* 24: 103–8.
- Hunt P (2004) *The Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health. Report of the Special Rapporteur E/CN.4/2004/49*. Geneva: United National General Assembly.
- Karlsen S and Nazroo JY (2006) Defining and measuring ethnicity and race: theoretical and conceptual issues for health and social care research. In: Nazroo JY (ed) *Health and Social Research in Multiethnic Societies*. London: Routledge, pp. 20–38.
- Krieger N (2001) The ostrich, the albatross, and public health: an ecosocial perspective—or why an explicit focus on health consequences of discrimination and deprivation is vital for good science and public health practice. *Public Health Reports* 116:419–23.
- LaVeist TA (ed) (2002) *Race, Ethnicity and Health: a public health reader*. San Francisco: John Wiley and Sons.
- Manderson L and Allotey P (2003a) Cultural politics and clinical competence in Australian health services. *Anthropology in Medicine* 10:71–85.
- Manderson L and Allotey P (2003b) Story telling, marginality and community in Australia: how immigrants position their difference in health care settings. *Medical Anthropology* 22:1–22.
- McAuley J, de Souza L, Sharma V *et al* (1996) Describing race, ethnicity, and culture in medical research. Self defined ethnicity is unhelpful. *BMJ* 313:425–6.
- McKenzie K and Crowcroft NS (1996) Describing race, ethnicity, and culture in medical research. *BMJ* 312:1054.
- National Centre for Classification in Health (1998) *The International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification, ICD-10-AM Australian Coding Standards First Edition 1 July 1998*. National Centre for Classification in Health. Sydney: Faculty of Health Sciences, University of Sydney.
- National Centre for Classification in Health (2000) *The International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM), Volume 5 ICD-10-AM Australian Coding Standards Second Edition 1 July 2000*. National Centre for Classification in Health. Sydney: Faculty of Health Sciences, University of Sydney.
- National Research Council (2004) *Measuring Racial Discrimination*. Washington DC: National Academies Press.
- Petersen LA, Wright SM, Peterson ED and Daley J (2002) Impact of race on cardiac care and outcomes in veterans with acute myocardial infarction. *Medical Care* 40:186–96.
- Physicians for Human Rights (2003) Identifying disparities and discrimination and developing plans to address them. In: Physicians for Human Rights (ed) *The Right to Equal Treatment*. Washington DC: Physicians for Human Rights, pp. 25–30.
- Reidpath D, Chen K, Giffird S and Allotey P (2005) ‘He hath the French pox’: stigma, social value, and social exclusion. *Sociology of Health and Illness* 27:468–89.
- SAS Institute Inc (1999) SAS. 8.2 ed. Cary, North Carolina: SAS Institute Inc.
- Smedley BD, Stith AY and Nelson AR (eds) (2003) *Unequal Treatment: confronting racial and ethnic disparities in health care*. Washington DC: National Academies Press.
- Sundararajan V, Henderson T, Perry C *et al* (2004) New ICD-10 version of the Charlson comorbidity index predicted in-hospital mortality. *Journal of Clinical Epidemiology* 57:1288–94.
- UNAIDS (2000) *Protocol for the Identification of Discrimination against People Living with HIV – UNAIDS Best Practice Collection*. Geneva: UNAIDS.
- Weitzman S, Cooper L and Chambless L (1997) Gender, racial and geographical distances in the performance of cardiac diagnostic and therapeutic processes for hospitalized acute myocardial infarction in four states. *American Journal of Cardiology* 79:722–6.

CONFLICTS OF INTEREST

None.

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