

The quality of care in outpatient primary care in public and private sectors in Malaysia

May Chien Chin ^{1*}, Sheamini Sivasampu¹, Nilmini Wijemunige²,
Ravindra P Rannan-Eliya² and Rifat Atun³

¹Institute of Clinical Research, Ministry of Health Malaysia, Block B4, National Institutes of Health (NIH), No.1, Jalan Setia Murni U13/52, Seksyen U13, Shah Alam, 40170 Selangor Darul Ehsan, Malaysia, ²Institute for Health Policy, 72 Park Street, Colombo 2, Sri Lanka and ³Harvard T.H. Chan School of Public Health, 677 Huntington Avenue, Boston, MA 02115, USA

*Corresponding author. Institute of Clinical Research, Ministry of Health Malaysia, Block B4, National Institutes of Health (NIH), No.1, Jalan Setia Murni U13/52, Seksyen U13, Shah Alam, 40170 Selangor Darul Ehsan, Malaysia. E-mail: chinmaychien@gmail.com

Accepted on 5 September 2019

Abstract

In Malaysia, first-contact, primary care is provided by parallel public and private sectors, which are completely separate in organization, financing and governance. As the country considers new approaches to financing, including using public schemes to pay for private care, it is crucial to examine the quality of clinical care in the two sectors to make informed decisions on public policy. This study intends to measure and compare the quality of clinical care between public and private primary care services in Malaysia and, to the extent possible, assess quality with the developed economies that Malaysia aspires to join. We carried out a retrospective analysis of the National Medical Care Survey 2014, a nationally representative survey of doctor–patient encounters in Malaysia. We assessed clinical quality for 27 587 patient encounters using data on 66 internationally validated quality indicators. Aggregate scores were constructed, and comparisons made between the public and private sectors. Overall, patients received the recommended care just over half the time (56.5%). The public sector performed better than the private sector, especially in the treatment of acute conditions, chronic conditions and in prescribing practices. Both sectors performed poorly in the indicators that are most resource intensive, suggesting that resource constraints limit overall quality. A comparison with 2003 data from the USA, suggests that performance in Malaysia was similar to that a decade earlier in the USA for common indicators. The public sector showed better performance in clinical care than the private sector, contrary to common perceptions in Malaysia and despite providing worse consumer quality. The overall quality of outpatient clinical care in Malaysia appears comparable to other developed countries, yet there are gaps in quality, such as in the management of hypertension, which should be tackled to improve overall health outcomes.

Keywords: Quality of care, outpatient care, public delivery, private sector, quality of clinical care, quality measurement, Malaysia

Key Messages

- The public sector provides better quality than the private sector in most indicators examined, including acute and chronic conditions and prescribing, despite spending less.
- Both public and private sectors perform worse when resource availability is limited.
- Malaysian patients receive the recommended care just over half the time, a level comparable to those in the USA and Australia.

Introduction

The quality of clinical care provided by providers to patients is a critical link between the quantity of care provided to a population and its ultimate health impact. However, current global efforts to systematically assess and compare levels of coverage have been hampered by the lack of empirical data on quality, and a scarcity of proven methods that can be applied at scale (Akachi *et al.*, 2016). Additionally, although improving healthcare quality has been the ostensible motivation for many healthcare policy reforms in Malaysia, the quality of clinical care is rarely assessed. A recent systematic review of Malaysia's healthcare system also found that a shortfall in the country's performance on health outcomes may be driven by failures to adequately diagnose and treat a range of conditions (Ministry of Health Malaysia and Harvard T.H. Chan School of Public Health, 2016).

In a mixed system of healthcare, such as in Malaysia, the public and the private sectors differ in organization, financing, governance and regulations, and in provider and patient characteristics. Such differences raise important policy questions including the implications both for strategic choices and as well as policy intervention if the two sectors provide different levels of quality to their patients. Although Malaysia achieves relative equality in use of outpatient care when considering both public and private sector use (Rannan-Eliya, 2013), whether its hybrid system is associated with disparities in quality of care provided to poor and non-poor Malaysians—a critical question for equity—is unknown (Rannan-Eliya *et al.*, 2016). Furthermore, for Malaysian policymakers, who seek to globally benchmark Malaysia's health system performance and who explicitly aspire to raise the country into the ranks of the developed nations (Ahmad, 2019), there is a lack of evidence on overall quality of clinical processes in Malaysia and how this compares with other countries, and in both acute and chronic care.

In April 2019, Malaysia introduced a new public programme to pay for private primary care for poorer citizens (Ministry of Finance Malaysia, 2018; Bernama, 2019): whether and how this might be expanded is a critical policy question. The impact of this and other interventions to engage with the private sector might have on clinical quality, however, is not known, and information on clinical quality differences between sectors is needed. Studies that measure such quality variations within the health system are critical to allow health policymakers, managers and providers to make informed choices about whether and how to invest to improve coverage, and the implications for public policy of extending strategic purchasing to the private sector.

This study examines variations of clinical quality in the public and private outpatient primary care settings in Malaysia. A feature of the research on quality of care differences between public and private providers in developing countries is that most studies look only at structural characteristics (whether providers have the equipment), provider competency and knowledge (whether providers know what to do) and patient satisfaction (whether patients rate providers well). A systematic review covering the period 1980–2009 by Berendes *et al.* (2011) found that out of 80 studies with adequate study design that compared public and private quality, only 22 looked at the actual quality of clinical practice. Out of these, the majority only looked at prescribing patterns. Incidentally, only two of these studies were from the East Asia and Pacific, both of which were from Thailand. We would argue that ultimately what matters in terms of outcomes is the quality of clinical practice (what providers actually do), since having the necessary inputs or knowledge does not necessarily translate into better quality.

Using a range of quality indicators, we analysed the dataset of a national survey on primary care carried out in 2014, which recorded 27 587 patient encounters in public and private clinics. Specifically, we utilized validated quality indicators to compare the performance of public and private outpatient primary care according to the domains of the types of conditions (acute vs chronic) and the clinical processes which the indicators measure. As the availability of resources is one of the known major determinants of quality of care, we categorized each indicator based on the intensity of resources needed to achieve it, comparing performances by the public and private sectors.

The setting

Malaysia is a South-East Asian country located on both sides of the South China Sea—the Malay Peninsular and part of the island of Borneo. The Malaysian population, which is ethnically diverse, numbered 32 million in 2016. Malaysia is experiencing a demographic shift as its population ages, an epidemiologic transition as its disease burden shifts to non-communicable diseases such as hypertension, diabetes and hyperlipidaemia (Institute for Public Health (Malaysia), 2015a), and an economic transition that has already propelled its economy from low-middle-income to upper-middle-income status.

In Malaysia, first-contact care is provided by both public and private outpatient clinics staffed by qualified doctors, who either alone or with other healthcare workers provide basic medical care, minor surgery, immunization, detection and management of chronic diseases and sexually transmitted diseases (Khoo, 2000; Safurah *et al.*, 2013). Where advanced care and treatment are needed, referral mechanisms to the next level of care exist in both sectors. As a result, Malaysians have access to volumes of healthcare delivery that are comparable to those in many high-income nations. An average Malaysian makes four ambulatory visits to a doctor per year: levels comparable to those in the Sweden and USA. These are provided through a hybrid healthcare system that combines comprehensive, government-subsidized public sector services that are available free to all Malaysians, alongside parallel private sector delivery, financed mostly by individual patients paying out-of-pocket (Rannan-Eliya *et al.* 2016). Consequently, Malaysia achieves relative equality in the use of outpatient care because a pro-poor gradient in use of public clinics largely compensates for the pro-rich gradient in use of private services (Rannan-Eliya, 2013).

The provision of outpatient care, most of which primary care, in Malaysia is split between public and private sectors, with the public sector accounting for 60% of all patient contacts in 2015 (Institute for Public Health (Malaysia), 2015b). Public sector outpatient primary care services are organized into two tiers of primary care clinics and community clinics, with each clinic serving a defined geographical area. These are financed directly by the Ministry of Health (MOH). These clinics are supervised by district-level managers and are subject to standard operating procedures (SOPs). Additionally, MOH monitors the quality of all its clinics, using a national set of key performance indicators (Safurah *et al.*, 2013).

In contrast, in the private sector, primary outpatient care services are delivered by numerous, competing, privately owned, for-profit clinics. These are largely accountable to their owner-investors, with minimal accountability to regulatory agencies and professional bodies. Private providers are not integrated or coordinated, and are subject to minimal regulation by the Private Healthcare Services and Facilities Act, which is mostly concerned with qualifications and structural aspects of operation, and which is weakly enforced

(Safurah *et al.*, 2013). Unlike in the public sector, there are few processes to monitor and improve the quality of care provided by private-sector physicians. The Quality Improvement Program (QIP) (Malaysia Medical Association, 2011) a quality assurance programme, which aims to instil good practices and maintain service quality among private general practitioners, is mandatory only for practitioners who enter and qualify in the diploma programme or advanced training programme in family medicine. However, as a family medicine qualification is not a requirement to practice as a general practitioner in Malaysia, many private general practitioners are not covered by the QIP.

The two sectors differ in their coverage. All Malaysians are entitled to make use of the public sector clinics but can choose to pay and make use of the private sector alternative. In practice, higher income Malaysians are more likely to opt to use private clinics whilst poorer Malaysians are more likely to use public clinics, with private clinics accounting for a larger share of provision in urban areas (Institute for Public Health (Malaysia), 2011). This is driven by patient demand for what they perceive as higher consumer quality in the private sector, and the greater ability of higher income patients to self-pay (Quek, 2009; Rannan-Eliya *et al.*, 2016). In addition, in contrast to the private sector where acute conditions predominate (which includes upper respiratory tract infection, gastroenteritis and musculoskeletal disorders), half the patient load at public clinics consists of chronic conditions, such as hypertension, diabetes and hyperlipidaemia (Sivasampu *et al.*, 2016), probably because the relevant medications are provided free in the public sector. Despite this, the average government expenditure on a public sector outpatient visit (RM 95 in 2011) is two-thirds that of a private-sector visit (RM 157 in 2011; Rannan-Eliya, 2013).

Methods

Data source

We used data from the 2014 round of the National Medical Care Survey (NMCS) to perform a retrospective analysis of quality. The NMCS is a repeated, nationally representative survey of doctor–patient encounters that collects information on utilization, morbidity patterns and the process of care at outpatient stand-alone primary care clinics. The study questionnaire and methodology were adapted from the Bettering the Evaluation and Care of Health programme (Britt *et al.*, 2016) with some modifications. Details of the study methodology have previously been published (Sivasampu *et al.*, 2016) and are briefly described here.

NMCS is a national survey and covers all 14 states in the country. The NMCS 2014 utilized a stratified, four-stage sampling design. First, all clinics were stratified by states and by sectors: public and private. The initial list of clinics combines the listing of all MOH clinics with the list of private-sector clinics that are registered with the Private Medical Practice Division of MOH (registration is generally complete in Malaysia). In the first stage of sampling, the NMCS randomly selected clinics (primary sampling unit) in each stratum; the second stage involved the random selection of survey dates; the third stage involved sampling all healthcare providers providing care on each date; and the fourth stage involved sampling of at least 30 encounters from each clinic.

Being a national study, the NMCS 2014 was representative of patients visiting both public and private outpatient primary care clinics. The final sample of public clinics consisted of 139 randomly selected clinics from all eligible clinics in the public sector. In selecting the private-sector clinic sample, private clinics that had participated in the NMCS 2012 round were excluded from the sampling

frame to improve response, and a total of 1002 private clinics were finally selected. The characteristics of the study sample and the patient profile in each sector are shown in Table 1 (additional details in Supplementary Table A1).

The providers at each clinic were required to record on paper forms information for a sample of their patient encounters. In the public sector, providers included physicians, nurses and medical assistants; in the private sector, providers were solely physicians. Information was collected on patient demographics, mode of payment, reasons for seeking care, problems managed and for each problem managed, the pharmacotherapy, counselling and procedures, investigations, follow-up treatment and whether a medical certificate was issued. The International Classification of Primary Care Second Edition (Classification Committee of the World Organization of Family Doctors, 2014) was used to classify the reasons for encounter, diagnoses, investigations, procedures and advice/counselling. Medications were coded and classified using the World Health Organization Anatomical Therapeutic Chemical classification (WHO Collaborating Centre for Drug Statistics Methodology, 2011).

A public notice was placed at each participating clinics to inform patients of the ongoing study and that data would be collected for research purposes only. As all involved agencies are government institutions, study participants had the assurance that data confidentiality is enforceable by law.

Selection of quality indicators

To assess quality, we adopted the methodology of the RAND Quality Assessment Tools System. This was first used in a series of studies in the USA (McGlynn *et al.*, 2003; Asch *et al.*, 2004) but has since been replicated by researchers in other developed countries including UK and Australia. The RAND approach looks at actual practice quality by assessing whether a provider carries out appropriate or inappropriate actions based on a set of validated quality indicators.

To select quality indicators for our study, we looked for sets of indicators with robust selection criteria, which have been validated by use in other studies and which cover the clinical aspect of care given for common condition presenting to primary care in Malaysia. We compiled a list of potential quality indicators from several sources, including those developed for the RAND studies. The RAND indicators are derived using the RAND-UCLA modified Delphi method, which is a method proven to have content, construct and predictive validity when used in other applications (Fitch *et al.*, 2001). We also obtained indicators from the Caretrack Australia study, which developed indicators using similar methods to RAND (Runciman *et al.*, 2012). Further drug prescribing indicators were identified, such as the Beer's criteria for potentially inappropriate use of medicines in older adults (Fick *et al.*, 2003); from a study of poly-pharmacy in the elderly (Gnjidic *et al.*, 2012); and the International Network for Rational Use of Drugs guidelines (Shankar, 2009). Collectively, the indicators from the selected sources allow a comprehensive measurement of clinical quality using valid and widely used quality indicators.

We determined the measurability of each indicator against the NMCS dataset. A quality indicator was included if the recommended care was measurable with the dataset. Out of the 668 indicators identified, the NMCS 2014 data contained sufficient information to assess 66 indicators. These indicators covered a total of 24 conditions ranging from headache to osteoarthritis (Supplementary Table A2). We further categorized the 66 indicators

Table 1 Description of clinic and patient samples by sector

Characteristics	Weighted, unstandardized		Weighted, standardized		P-value for difference
	Public (n = 15 470)	Private (n = 12 117)	Public (n = 15 470)	Private (n = 12 117)	
Mean age (years)	40.9	34.6	40.9	40.7	0.9
Age group (years) (%)					0.6
0–4	8	8.1	8	7.9	
5–14	6.7	7.4	6.7	6.7	
15–29	19.5	26.4	19.5	19.4	
30–44	18	28.4	18	17.9	
45–59	24.9	18.2	24.9	24.8	
60–75	18.9	7.5	18.9	18.7	
>75	3.9	2.1	3.9	3.8	
Missing	0.2	0.5	0.2	0.8	
Male (%)	40.4	50.5	40.4	7.9	0.9
Ethnicity (%)					
Malay	62.9	54.6	62.9	52.8	<0.001
Chinese	13.8	23.5	13.8	27.9	
Indian	11.5	9.0	11.5	8.8	
Other	7.8	3.2	7.8	3.4	
Missing	4.1	9.7	4.1	7.1	

Table 2 Examples of quality of care indicators used in study

Indicator	Condition	Type of condition	Clinical process	Resource intensity
Advice on compliance to medications	Diabetes	Chronic	Advice	High
Patients prescribed an antihypertensive drug have the following combination of medications avoided—angiotensin-converting enzyme inhibitor (or angiotensin II receptor antagonist) plus potassium-sparing diuretic	Hypertension	Chronic	Prescribing	Medium
Patients presenting with pharyngitis were NOT prescribed antibiotics	ENT-related	Acute	Prescribing	Low
Patients presenting with clinical signs suggestive of pneumonia had an urgent chest X-ray performed	CAP	Acute	Investigation	High
Patients given a macrolide not prescribed a statin	Prescribing macrolide	Others	Prescribing	Low

ENT, ear, nose and throat; CAP, community acquired pneumonia.

by types of conditions and processes of care, following the classification approach of McGlynn *et al.* (2003). When categorized by types of conditions, 38 indicators were related to acute conditions, 25 indicators to chronic conditions and 3 indicators were prescribing indicators that could not be categorized to either acute or chronic conditions. When categorized by processes of care, 15 indicators were related to investigation, 39 to prescribing, 9 to advice and 5 to procedural. In the 39 prescribing indicators, 20 indicators measured prescribing an indicated drug correctly, 18 measured not prescribing inappropriate or contraindicated drugs, whilst one fell into neither category.

The availability of resources is known to be a major determinant of quality of care attainment. As such, we classified our indicators *a priori* according to resource intensity in the Malaysian context, following studies done in Sri Lanka (Rannan-Eliya *et al.*, 2015a,b). Resource intensity is defined as the measure of resources needed for an appropriate process to take place. Resources are defined as the cost or availability of services, devices or trained staff. A low resource intensity indicator requires very little or no resources to fulfil appropriately, whereas a high resource intensity indicator requires a high amount of resources. A panel of family medicine specialists made the assessment of resource intensity for each indicator. Twenty-six indicators were categorized as low resource intensity, 15 as medium and 25 as high. Examples of indicators and the

categorizations are shown in Table 2. A complete list of indicators used and respective classifications are available in Supplementary Table A2.

Statistical analysis

Quality scores were calculated using the overall percentage method (Reeves *et al.*, 2007). For each indicator, it was determined if patients that were eligible for that indicator received recommended care. We defined a quality instance as each opportunity that a provider could undertake a recommended action (or not undertake an inappropriate action) in relation to a specific condition or context. This definition allows each patient encounter to trigger more than one quality instance. Scores, expressed as percentages (0–100%), were calculated by dividing all instances in which participants received recommended care by the total number of instances in which the care should be given. This method, which aggregates scores of individual indicators from a range of diseases, allows us to generate composite scores of quality in desired categories to give us meaningful information. This method is the one adopted in similar studies, including those in the USA, Australia and Sri Lanka (McGlynn *et al.*, 2003; Runciman *et al.*, 2012; Rannan-Eliya *et al.*, 2015a,b).

We applied sampling weights to represent the population from which the samples were drawn, accounting for the sampling design,

Table 3 Comparison of quality of care between public and private sector by condition type, clinical process and resource intensity

Category	Indicators, <i>n</i>	Public sector			Private sector			Difference (95% CI) percentage points
		Patients, <i>n</i>	Eligible events, <i>n</i>	Mean score, %	Patients, <i>n</i>	Eligible events, <i>n</i>	Mean score, %	
Overall	66	7571	37 435	59.3	7626	30 025	53.1	6.3 (3.4 to 9.1)***
Types of conditions								
Acute	38	2979	3702	65.3	2979	4092	51.4	13.9 (8.4 to 19.3)***
Chronic	25	4501	30 230	55.5	4501	22 197	47.2	8.3 (4.2 to 12.3)***
Others	3	1860	3503	86.2	2032	3736	89.7	-3.5 (-7.7 to 0.8)
Clinical process								
Investigation	15	232	325	45.9	399	432	46.2	-0.3 (-16.6 to 16.0)
Prescribing	39	6247	22 706	93.0	6632	19 085	79.2	13.9 (11.2 to 16.6)***
Advice	9	5096	14 379	6.4	4012	10 444	5.6	0.8 (-1.5 to 3.2)
Procedural	5	29	29	49.6	118	119	40.7	8.9 (-20.9 to 38.6)
Resource intensity								
Low	26	6193	17 133	93.1	6406	15 195	84.1	9.0 (6.1 to 11.9)***
Medium	15	3773	5755	92.0	3014	3664	69.6	22.4 (18.0 to 26.8)***
High	25	5169	14 547	6.5	4471	11 163	5.4	1.2 (-1.1 to 3.5)

Notes: Weighted for age, gender and types of conditions. Significance of difference indicated by * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. 95% confidence interval calculated using bootstrapped standard error.

clinic non-response and the activity weight of each clinic. The activity weight of a clinic was calculated as the average patient encounters of the clinic per day divided by the number of patient encounters surveyed in the clinic. When comparing the public sector to the private sector, we standardized the patients in the private sector to the public sector by age category, gender and types of conditions (acute/chronic). *T*-tests were used to test for the significance of differences in scores between the public sector and the standardized private sector for overall quality and subsets of quality indicators related to types of conditions (acute and chronic); subsets of indicators related to the processes of care (investigation, prescribing, procedural and advice); subsets of indicators by resource intensity (low, medium and high); and subsets of drug prescribing indicators (prescribing correctly and not prescribing incorrectly).

Standard errors were estimated using the bootstrap method, and the level of significance was set at $\alpha = 0.05$. All analyses were performed using Stata version 13.0 (StataCorp, 2013).

Results

Characteristics of study sample

Generally, the patient population in the public sector was slightly older than that of the private sector (Table 1). There were slightly more females than males presenting to the public sector, whereas almost equal numbers presented to the private sector. After standardization, there were no significant differences in age or gender. However, the differences in ethnic composition remained, with a larger proportion of Chinese patients in the private sector than the public sector.

A total of 541 clinics out of 546 participating clinics in the survey yielded data that generated quality instances, with 16 967 of 27 587 patient encounters (61.5% of total patient encounters) triggering a total of 67 460 quality instances based on 66 indicators. The patient encounters which did not trigger any quality instances were mostly encounters that either lacked a relevant quality indicator or for which the dataset lacked information to apply a relevant indicator.

Comparison of quality of care between the public and private sector

Overall, patients received the recommended care 56.5% of the time (95% confidence interval = 55.0–58.1%) with higher performance in the public sector compared to the private sector (59.3% vs 53.1%, $P < 0.001$) (Table 3). Patients with acute illnesses in the public sector were more likely to receive recommended care than those in the private sector (65.3% vs 51.4%, $P < 0.001$). Similarly, patients with chronic illnesses in the public sector were more likely to receive recommended care than those in the private sector (55.5% vs 47.2%, $P < 0.001$). Performance was similar in the clinical processes of investigation, advice and procedures; however, the public sector performed better in prescribing than the private sector (93.0% vs 79.2%, $P < 0.001$). There was a reduction in performance as the resource intensity of indicators increased in both sectors. The public sector performed better than the private sector for low and medium resource intensity indicators (93.1% vs 84.1% and 92.0% vs 69.6%, $P < 0.001$). The public and private sectors performed equally poorly in high resource intensity indicators (6.5% vs 5.4%, $P > 0.05$).

Prescribing indicators can be divided into either indicators for prescribing required drugs or indicators for not prescribing inappropriate or contraindicated drugs. We found that the public sector performed better than the private sector in both categories (91.1% vs 76.2% for prescribing required drugs; 94.9% vs 82.5% for not prescribing inappropriate drugs, $P < 0.001$) (Supplementary Table A3). Both sectors performed better in not prescribing wrongly compared to prescribing correctly.

The public sector performed significantly better than the private sector in four conditions representing 41.3% of primary care patient visits. They were hypertension (60.4% vs 53.0%, $P < 0.001$), community acquired pneumonia (29.7% vs 2.8%, $P < 0.001$), upper respiratory tract infection (84.7% vs 43.1%, $P < 0.001$) and diarrhoea (82.8% vs 58.5%, $P < 0.001$) (Table 4). The private sector performed marginally better than the public sector only in osteoarthritis (0% vs 1.7%, $P < 0.05$), which represented only 1% of patients.

As benchmarking quality is important to Malaysian policy-makers, we compared quality scores between the USA and Malaysia

Table 4 Comparison of quality of care between public and private sector clinics by condition

Condition	Indicators, <i>n</i>	Public sector			Private sector			Difference (95% CI) percentage points
		Patients, <i>n</i>	Eligible events, <i>n</i>	Mean score, %	Patients, <i>n</i>	Eligible events, <i>n</i>	Mean score, %	
Asthma	1	46	46	0.6	168	168	2.3	-1.7 (-6.2 to 2.8)
Community acquired pneumonia	3	31	92	29.7	5	16	2.8	27.0 (15.5 to 38.4)**
Diabetes	1	2510	2510	3.3	1320	1320	1.3	2.0 (-0.4 to 4.4)
Dyspepsia	1	32	32	3.5	34	34	15.7	-12.2 (-27.8 to 3.4)
ENT	4	233	233	34.5	381	385	22.0	12.5 (-0.7 to 25.6)
Headache	3	157	180	99.7	266	313	100	-0.3 (0.9 to 0.3)
Hypertension	9	3805	27 442	60.4	3043	19 393	53.0	7.3 (4.4 to 10.3)**
Lower back pain	3	11	32	99.7	48	145	97.9	1.9 (-0.8 to 4.5)
Osteoarthritis	4	48	108	0	621	1093	1.7	-1.7 (-0.03 to -0.4)*
Prenatal care	1	662	662	15	78	78	15.1	-0.1 (-0.1 to 10.5)
Sexually transmitted diseases/vaginitis	12	33	82	6.2	28	65	3.6	2.7 (-0.05 to 10.4)
Upper respiratory tract infection	1	1543	1543	84.7	1722	1722	43.1	41.6 (35.7 to 47.5)**
Urinary tract infection	6	86	95	70.4	74	81	84.1	-13.7 (-28.0 to 0.5)
Prescribing macrolide	1	251	251	97.4	358	358	97.3	0.1 (-5.8 to 6.0)
Prescribing in patients over 65 years old	2	1626	3252	85.4	1689	3378	88.9	-3.5 (-8.6 to 1.6)
Diarrhoea	3	249	748	82.8	418	1254	58.5	24.3 (18.9 to 29.7)**

Notes: Weighted for age, gender and types of conditions. Significance of difference indicated by * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. 95% confidence interval calculated using bootstrapped standard error.

for the 12 common indicators that were used also by McGlynn *et al.* (2003) was made, as shown in Supplementary Table A4. This found that Malaysia performed comparably with the USA in prescribing quality indicators, but poorer in the advice, procedure and investigation quality indicators that were considered.

Discussion

Overall, patients in primary care received recommended care just over half of the time (56%) in Malaysia. This is comparable with overall quality scores reported in studies using similar methods in the USA (55%), Australia (57%) and Sri Lanka (64–65%) (McGlynn *et al.*, 2003; Runciman *et al.*, 2012; Rannan-Eliya *et al.*, 2015b). However, these aggregate scores reflect different combinations of indicators in each country, as well as differences in case mix.

In this study, we found that primary care in general performed well in the management of headache and lower back pain, and in prescribing practices for patients above 65 years old (Table 4). However, there were conditions where management was poor. Of particular concern is performance in the management of hypertension, an important condition whose prevalence is on the rise (Institute for Public Health (Malaysia), 2015a). Studies have shown that adherence to process quality indicators is related to better control of blood pressure in hypertension (Asch *et al.*, 2001, 2005). In our study, we find that hypertensive patients in general received recommended care just over half the time, which suggests that improvement in clinical management practices could help reduce the burden of hypertension-related illnesses.

Both sectors performed relatively well in drug prescribing indicators. Good prescribing practices include prescribing the correct medication at the right doses, as well as avoiding incorrect prescribing practices, including the prescription of inappropriate or contraindicated drugs. We found that quality scores for prescribing in both domains were over 75% in both sectors. The benefits of prescribing the appropriate medication are obvious; however, avoiding inappropriate prescribing is just as important, and

highlights the contribution of primary care to minimizing risks such as antibiotic resistance, and drug interactions, whilst also minimizing costs spent on unnecessary medications. We found that the private sector did not perform as well as the public sector in indicators related to prescribing unnecessary or contraindicated drugs, in effect being more likely to 'over-prescribe' than the public sector. Das and Hammer (2004) reported similar findings in India, where private providers, who often dispensed drugs, had incentives to over-prescribe. However, we found that public sector providers in Malaysia generally prescribed correct drugs and generally did not 'under-dispense' in contrast to the findings in India, suggesting that public sector providers in Malaysia have an incentive to exert effort and prescribe correct treatment. Furthermore, the findings of better overall prescribing practices in the public sector compared to the private sector is consistent with a systematic review by the World Health Organization, which reported that the public sector had higher percentages of patients treated according to clinical guidelines, lower average number of medicines per patient and higher percentages of medicines prescribed from the essential medicine lists compared to the private sector (Shankar, 2009).

Our finding that the public sector in Malaysia consistently performed better than the private sector overall, as measured in the domains measured by the 66 indicators, contrasts with the recent literature. The systematic review by Berendes *et al.* (2011) comparing clinical quality of primary care in 22 low- and middle-income countries found that the private sector performed marginally better than the public sector (47% vs 45%), but none of the reviewed studies used methods as comprehensive as ours or involved such large samples of providers or of patient encounters. However, a recent study of outpatient quality of care in Sri Lanka using similar methods to our study, found that the public and private sectors performed similarly (Rannan-Eliya *et al.*, 2015b). Our results indicate that there are likely to be substantial systematic differences across countries in the relative performance of public providers vs private ones, and that it would be incorrect to generalize that private providers perform better.

Furthermore, whilst the public sector performed better regardless of the resource intensity of indicators, we found that the public sector particularly outperformed the private sector for indicators that were not exclusively constrained by the availability of resources. Some examples of low to medium resource intensity indicators used include: not prescribing antibiotics for a simple upper respiratory tract infection; prescribing lipid-modifying medications for patients with hyperlipidaemia with concomitant coronary heart disease; and assessing lung function using a peak flow metre in asthma exacerbations. These indicators are reflective mainly of providers' knowledge and practice habits, and to a lesser extent the availability of basic resources.

There are several possible reasons for the better performance of the public sector. At the system level, providers' practices can be influenced by standardizing the delivery of care and adoption of SOPs and in-service training; areas that vary significantly between the public and private sectors. Indeed in Malaysia, to ensure that standardized quality care is provided, the public sector adopts centrally developed SOPs along with standard monitoring of quality, whilst the use of SOPs and external quality monitoring is much less prevalent in the private sector. This is similar to the finding in the USA, where patients who received healthcare from the Veterans Health Administration (VHA), an integrated public delivery system which provides coordinated care with a performance measurement system in place, received better care in conditions or areas targeted by the VHA performance indicators compared to the national data dominated by private hospitals (Asch *et al.*, 2004). Our findings suggest the importance of institutionalizing quality assurance programmes and other management interventions to improve quality.

Second, as part of in-service training of providers, continual medical education (CME) is mandatory in the public sector at both clinic and district levels. In contrast, CME is currently only practiced on a voluntary basis in the private sector. However, there is an initiative to regulate CME attendances of the private providers through the revised Medical Act in making it a requirement for the renewal of the annual practicing certificates. Unlike in Sri Lanka, where it is hypothesized that clinicians transfer good practices learned in the public sector over to the poorly regulated private sector (Rannan-Eliya *et al.*, 2015b), our findings suggest a pattern more similar to findings in India (Das and Hammer, 2004), where it was suggested that clinicians in the private sector feel pressured to cater to the expectations of their patients, which may not always be equivalent to good practice. One reason for this difference may lie in the fact that in Sri Lanka most private doctors in primary care are government doctors engaged in private practice in their off-duty hours, whilst in Malaysia and many Indian states most private provision is by full-time private physicians with much less spill-over. This indicates the importance of extending CME activities to the private sector, when their physicians do not benefit from CME in the public sector, so that doctors are empowered to make correct decisions, and are also supported by their clinics.

Third, the finding that the private sector did not perform as well as the public sector for medium resource intensity indicators could reflect, to a certain extent, the limited availability of seemingly basic resources in the private sector. The National Survey of Primary Healthcare Establishment and Workforce in 2011 showed that 75% of private practices were stand-alone clinics and private clinics in general had limited facilities compared to the public clinics (Hwong *et al.*, 2014). Peak flow metres were available only in 65% of private clinics (97% in public clinics); an electrocardiogram was available in 89% of private clinics (97% in public clinics); pap smear services were available in 73% of private clinics (100% in public clinics);

and there were no private facilities with available laboratory spaces, whilst over half the private clinics out-sourced their laboratory services. It is a possibility that if the required facilities are not readily available, practitioners are less likely to initiate needed tests or procedures, even if they are able to refer elsewhere.

We observed a substantially worse performance in the high resource intensity indicators in both sectors. These indicators included measures of performance in counselling, which requires manpower and time, as well as medications, investigations and procedures that are either expensive or require resources to be readily available in our primary care settings. Examples of such indicators include: patients presenting with symptoms of dyspepsia were prescribed a proton pump inhibitor; patients diagnosed with hypertension were advised to exercise for 30 min a day; and sexually active male patients presenting with penile discharge should be tested for gonorrhoea at the time of presentation. These processes are important for providing quality care and indicate areas where better resource allocation or increased resources can help improve quality.

As an opportunistic analysis using a national survey that was not primarily intended to measure quality, the strength of this study is that the Hawthorne effect (Holden, 2001) is unlikely to have been substantial, since providers would not have anticipated that their actions would be later evaluated for compliance with international quality standards. Nevertheless, the fact that the analysis was opportunistic results in several limitations. First, the information captured was recorded by the participating healthcare providers or their assistants. This could have led to recording bias if busy healthcare providers failed to record all their actions, e.g. in the counselling domain, or if recordings were done by assistants who might not have appreciated and recorded some processes of care which took place. Second, the abstraction of information from a provider-completed survey can be likened to the chart abstraction method in which investigators review medical records to score indicators. The use of standardized patients, a gold standard method for measuring process quality, has been found to generate quality scores systematically higher than with chart abstraction, although both approaches captured variations in quality between providers similarly (Peabody *et al.*, 2000). On the other hand, because our study depended on providers self-recording, it is also likely that more information on actions was collected than in typical chart extraction exercises. We also note that our method still retains an important advantage over the standardized patient approach, which is that it can cover a far wider range of quality indicators and which are more representative of the overall patient population than is possible using standardized patients.

A potential study limitation is inconsistencies in the information collected and pre-validated indicators to measure quality in our dataset. For example, three indicators could not be measured to their full extent, such as the indicator 'patients diagnosed with hypertension were advised to participate in at least 30 min per day exercise', where the time component was not captured in the survey. The indicator was considered fulfilled if any advice to exercise was given and not fulfilled if this advice was not given. However, when we analysed the data without these three indicators, we found that the overall scores were actually higher, but only by 6 percentage points (not shown).

Another limitation concerns the sampling design of the NMCS. To improve the response rate in the private sector, the NMCS 2014 survey excluded private clinics that participated in the 2012 survey that could introduce bias to the sampling frame. However, our experience does not suggest a significant bias. We also find that the NMCS reflects closely the burden of diseases that presents to primary care. Hence, the results from this study can likely be generalized to the Malaysian context. Additionally, the total number of

eligible patients (16 967) far exceeded the number of patients sampled in other published quality studies, such as the USA ($N=6712$), Australia ($N=1154$) and Sri Lanka ($N=1971$), which gives us confidence in the robustness of our estimates. Nevertheless, our comparison with the US study results is inherently limited because it was only possible to find 11 indicators in common. Further research utilizing a larger range of indicators common to other countries is warranted but will be difficult because most datasets in these other developed countries tend not to be public domain.

Conclusions

Our study finds that public sector primary care services in Malaysia performed better on measured indicators of clinical quality than the private sector, despite the lower spending per public sector visit (Rannan-Eliya, 2013). This suggests that the greater use of private outpatient services by the non-poor and the reliance of the poor on public services in Malaysia does not contribute to income inequalities in access to effective outpatient care when accounting for quality, further reinforcing previous findings that Malaysia does well in terms of healthcare coverage (Rannan-Eliya *et al.*, 2016). This also confirms that Malaysia is an example of a hybrid healthcare system that combines inferior consumer quality (Yunus *et al.*, 2004; Quek, 2009; Ministry of Health Malaysia and Harvard T.H. Chan School of Public Health, 2016) in its public sector with clinical quality equal to or higher than the private sector.

Where quality practice required higher levels of resources in terms of time, money and personnel, it was found that both sectors performed poorly. Our findings suggest that increasing funding and improving clinical governance, training, supervision and monitoring of medical personnel have important roles to play in improving quality of care in Malaysia's public sector. At the same time, understanding why the private sector delivers worse clinical quality should be a priority, as well as identification of interventions to reduce the quality gaps. This would be particularly important if policy reforms aim to shift provision to the private sector. Through our study, we have also identified the urgent need to tackle the issue of poor clinical quality in the management of hypertension, a major risk factor in Malaysia. The evidence on the comparison of quality with other countries suggests that quality of care in Malaysia is comparable to other developed countries, but further research with more comparable data is required.

Supplementary data

Supplementary data are available at *Health Policy and Planning* online

Acknowledgements

The authors thank the Director General of Health Malaysia for his permission to publish this article. This study was supported by the Ministry of Health, Malaysia [grant number: 15-607-25769 (IIR)]. This study was a collaborative project entitled Malaysian Health Systems Reform (MHSR) between the Ministry of Health, Malaysia and Harvard TC Chan School of Public Health.

Role of sponsors

The principal investigator and researchers involved in the design of the study, data collection and analysis are employees of Ministry Health Malaysia and the Institute for Health Policy. Harvard School of Public Health was involved in the conception, analysis and interpretation only. The opinions, results and conclusions reported in this article are those of the authors and are independent from the funding source.

Conflict of interest statement. None declared.

Ethical approval. The NMCS was approved by the Medical Research and Ethics Committee of the Ministry of Health Malaysia (NMRR-09-842-4718).

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