

# Understanding Hospital Waiting Times

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## Introduction

Hospital waiting times are a perennial worry in Singapore. With an ageing population with increasingly complex illnesses that require expensive and sophisticated care, being able to get to that care is the first worry for many people. In the annual Patient Satisfaction Survey 2015 conducted by the Ministry of Health, long waiting time for public healthcare services is an enduring issue [1]. Patients naturally assume that shorter waiting times mean better care, fewer complications, better outcomes, and higher quality of life.

In the Committee of Supply debate in 2016, the Minister for Health asserted that waiting times in accessing care are a top priority for his ministry. Waiting times (95<sup>th</sup> percentile) for Specialist Outpatient Clinics had increased from 110 days in 2013 to 125 days in 2015. This is possibly due in part to the increase in subsidised attendances by 26% for the elderly [2], which was more than the 13.7% increase in the elderly proportion of the population in the same period [3].

The Ministry of Health has published over 20 reports on waiting times since 2001. The focus on these reports range from acute care services at emergency departments to primary care services at polyclinics [4–24]. Every healthcare institution has taken measures to reduce waiting times for patients and their families yet the problem and the concern persists.

This working paper considers the complexity of hospital waiting times, the challenge of local and international comparisons, the multitude of factors that influence waiting times and their perceptions, and what can be done to manage the experience of patients and their families.

## Measures

The conversation on hospital waiting times, be it for emergency services, inpatient beds, or outpatient consultations, in physical queues or for appointments, usually

revolves around three main questions: how do we measure and compare hospital waiting times, how do we know when they are indeed too long, and what can be done. Hospital waiting time is not a monolithic statistic. Just as the hospital is a complex organisation with many different facets of services, patients often wait for different services in different ways. Services of interest in the first analysis are emergency care, outpatient consultations, inpatient admissions (especially emergency cases), and surgery. In each of these, patients wait in a queue for their turn to receive their respective care. For outpatient consultations, elective inpatient admissions and surgery, patients may also be given an appointment and wait to be seen on another day.

Of the above, the greatest concerns are the time in the queue at the Emergency Department waiting to be seen and to be admitted thereafter, for appointments at Outpatient Clinics, and for elective admissions and surgery. Waiting times for inpatient admissions and emergency surgery are also important but are usually expedited for exigent reasons and are thus managed on different terms. This working paper focuses on the waiting times for emergency care (ED), for specialist outpatient clinic appointment (SOC), and for elective surgery (ES).

*Table 1 Types of Waiting Times*

	Waiting for Care in a Queue	Waiting for Care on Another Day
Emergency Department	From arrival at facility to being seen and treated	
Outpatient Clinics	From arrival at facility to being seen and treated	From date the clinic appointment was requested to the actual date
Inpatient Admissions	From decision for admission to transfer to bed (especially for emergency cases)	From date admission was requested to the actual date (especially for elective cases)
Surgery and Procedures	From being ready for the procedure to the actual procedure	From date surgery was requested to the actual date (especially for elective cases)

The analysis is based on datasets provided by the Ministry of Health for episodes of care between January 2013 and June 2016 across local healthcare institutions, for monthly aggregate emergency visits by patient acuity across eight restructured hospitals, and for raw anonymised specialist outpatient clinic attendances and elective

surgeries. Table 2 shows the definitions<sup>1</sup> of the waiting times, their respective sources and size of data set.

*Table 2 Data Definitions, Sources, and Sizes*

Waiting Time	Definition	Healthcare Institution	Size (n)
For Emergency Department consultation	Time from patient registering at Emergency Department to first contact with the doctor	AH, CGH, KKH, KTPH, NTFGH, NUH, SGH, TTSH	3,452,552
For Specialist outpatient Clinic new appointment	Time from patient booking first appointment at Specialist Outpatient Clinic to actual appointment date given	AH, CDC, CGH, IMH, KKH, KTPH, NTFGH, NCC, NDC, NHC, NNI, NSC, NUH, SGH, SNEC, TTSH	2,191,890
For Elective Surgery	Time from patient booking for surgical appointment during specialist appointment to actual appointment date for surgery	AH, CGH, KKH, KTPH, NCC, NDC, NHC, NTFGH, NUH, SGH, SNEC, TTSH	71,601

## Metrics

When comparing measures like waiting times, average waiting times can be very misleading. A few outliers (often for entirely unavoidable reasons) can pull the average up beyond their actual importance, and the average can be meaningless in a bimodal distribution (in which there are two peaks around a trough).

The better statistic for a broad comparison is the median, which is the waiting time experienced by the patient right in the middle (that is, half the patients at the facility had to wait for longer and half waited for shorter periods of time). The median is also known as the 50<sup>th</sup> percentile. A similar statistic that describes the experience among those who had to wait much longer is the 95<sup>th</sup> percentile (abbreviated 95<sup>th</sup> %ile below), which is the waiting time of the patient who waited longer than 95 percent of all the patients at that facility.

## Variations

Hospital waiting times vary significantly across a number of factors: including time, the availability of other facilities, types of patients, etc. Waiting times fluctuate over time,

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<sup>1</sup> As provided by Ministry of Health, Singapore.

across the day, week and year. Seasonal fluctuations in demand peak because of specific environmental incidents (like a dengue outbreak in May-Jul 2014 [25], and the GBS raw fish outbreak in May 2015 [26]). Attendances tend to drop during the festive seasons (Christmas and New Year). There is a similar dip during the Lunar New Year (although Hong Kong and Taiwan conversely report overcrowded emergency rooms in public hospitals during Chinese New Year [27,28]).

Waiting times are exquisitely sensitive to changes in demand. Of the eight restructured hospitals, KKH had the highest (620,000) emergency attendances in the study period. Two spikes reported during May 2015 (16,781) and the first three months of 2016 (17,969, 17,885, 16,727) may have been related to the unusually high incidence of dengue cases associated with the prolonged El Nino weather [25] and Hand, Foot and Mouth disease outbreaks in 2016. More than 200 children were hospitalized in KKH in 2016 [29].

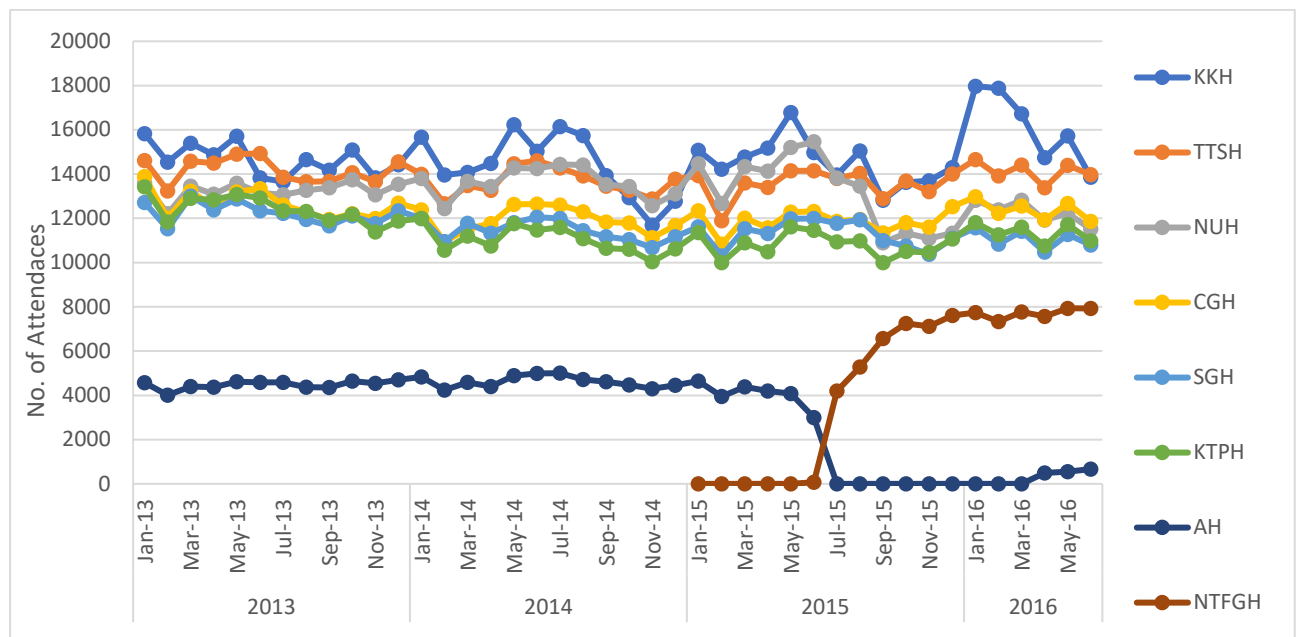


Figure 1 Emergency Attendances by Hospital and Month

Dramatic changes in attendances can also be seen at NTFGH as it opened and saw increasing numbers of emergency patients, and at AH as it conversely closed its emergency department for a period. Interestingly, the total emergency visits increased over this period of time, which is in keeping with the general observation (as in Roemer’s Law: “a built bed is a filled bed”) that demand is elastic and the greater availability of services leads to the greater utilisation of said services. The lowest emergency department visits were observed in AH (135,165) and NTFGH (84,364)

due to the closure of AH [30] and the opening of NTFGH<sup>2</sup> in June 2015. Sengkang Health took over Alexandra Hospital reopened the 24-hour Acute Clinic on 4 April 2016 [31].

It is also significant that demand in the troughs are as low as 80% of the peaks. This has implications for the resourcing of emergency departments who must be efficient when demand is low and yet be prepared and effective during the peaks.

Hospitals like Tan Tock Seng Hospital, at the crossroads of two major expressways, receive ambulance-borne patients from a wide area while Alexandra Hospital is at this time not receiving any emergency ambulance cases. The flow and volumes of patients coming to a facility will naturally affect waiting times for those already present.

When waiting times become prolonged at one hospital, cases may be diverted to other facilities, which would then cause prolonged waiting times at the other facilities. Shifting patients elsewhere is not much different from shifting resources within a facility (e.g. redeploying nurses from other wards) to meet a resource crunch. At some point, the larger system also saturates and we are back where we started, just one system level higher.

Hospitals triage and manage patients based on the urgency of their need for care. Patients with lower acuity (P3) wait longer than those with more serious conditions (P2, P1). The most severe patients are seen immediately and effectively have nearly zero waiting time.

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<sup>2</sup> Ng Teng Fong General Hospital was officially opened on 30 June 2015.

Table 3 Emergency Department Waiting Time by Hospital

Waiting Times <sup>3,4</sup> (minutes)		NTFGH	NUH	KTPH	TTSH	AH	SGH	CGH	KKH
P1	Average Median	8	12	13	4	3	15	0	2
	Average 95 <sup>th</sup> ile <sup>55</sup>	36	51	43	23	23	70	1	11
	Total	3,153	23,362	31,105	48,140	3,569	72,343	59,072	13,510
P2	Average Median	25	20	22	19	13	30	27	14
	Average 95 <sup>th</sup> ile	90	74	64	81	40	122	94	46
	Total	36,995	217,571	128,750	279,916	50,397	166,594	226,086	219,851
P3	Average Median	61	37	34	59	17	68	41	44
	Average 95 <sup>th</sup> ile	162	126	97	157	47	221	198	143
	Total	44,159	313,330	297,442	252,201	80,834	246,956	198,494	342,083

## Causes

When we are feeling unwell, any time spent waiting is undesirable, even unbearable. We recognise however that it takes resources to shorten waiting times, so how short should they be? Or conversely, how long can waiting times be and yet be acceptable? Are there absolute waiting times to achieve, or is it sufficient to compare our performance with others’?

<sup>3</sup> Average median waiting time: averaging all median waiting time with the respective patient acuity category scale between January 2013 and June 2016 for each hospital.

<sup>4</sup> Average 95<sup>th</sup> percentile waiting time: averaging all 95<sup>th</sup> percentile waiting time with the respective patient acuity category scale between January 2013 and June 2016 for each hospital.

<sup>5</sup> Statistical outliers: any points beyond First and Third Quartile plus or minus 1.5 times IQR considered as outliers. There’re 4.1% outliers for SOC wait times and 4.4% outliers for ES wait times on the long waiting time side. It suggests that the arbitrary cut-off at 95<sup>th</sup> percentile for outliers is reasonable. ED data were given in the aggregate form, we cannot show the effect of different outlier cutoffs. *Chambers, J. M., Cleveland, W. S., Kleiner, B. and Tukey, P. A. (1983) Graphical Methods for Data Analysis. Wadsworth & Brooks/Cole.*

In an ideal world, every patient entering a healthcare facility would be immediately sequentially seen at each of the service points within. The reality is that the patient is not alone. Waiting times exist because no service, healthcare or otherwise, can serve all clients simultaneously. This is aggravated in healthcare because of the nature of the clinical services provided. For example, in an outpatient clinic, not all patients turn up at the scheduled time, and some do not turn up at all. Not all patients can be managed strictly and exactly within the scheduled durations as some will take longer, eating into the following patient's slot, while others will take less time, creating a lull if the next patient has yet to arrive. Lastly, not all care professionals can adhere to the clinic hours. Surgeons are caught up in operating theatres, or are called away to attend to urgent cases.

All the above creates the inefficiency that is inherent in healthcare. Unlike the assembly line, where every unit of work can be identical and designed for efficient throughput, the hospital workflow is an unpredictable flux of workflows between multiple cells, which requires queues as buffers between work units. To provide instant service, the resources (facilities, professionals, equipment, etc.) standing by must be greater than what is needed by all patients at any one time. This is in most cases cost-prohibitive (apart for the most affluent of providers and payers).

The corollary is that adding resources can improve waiting times but will be limited by diminishing returns. Resources in dire need will be fully leveraged when first added, but subsequent increments will have less marginal impact. Having more resources than necessary creates slack that will ease queuing congestion but even that will tail off eventually.

The waiting times are ultimately balanced within any system on the relative allocation of resources and the priority accorded to the patient. This is well illustrated in Table 4 which show that patients waited shortest when they receive more resources (e.g. the paying class of patients, who have relatively more resources provided because they are indeed paying), and when patients jump queue (when bookings are forced in on congested calendars).

It does not follow however that not having a private class would necessarily improve the waiting times for the subsidised. There are 4.1 SOC and 2.4 ES patients for every one private patient, so the bulk of the resources are already deployed for the former. Also, waiting times for overall, subsidised and private SOC patients are 34.7, 39.3 days

and 15.9 days, and for ES patients 19.0, 20.9 and 14.4 days respectively. Waiting times for the subsidised patients are very close to the overall waiting times which suggests that even if the resources for the private patients were redeployed to serve the subsidised, the improvement for subsidised patients would be limited.

*Table 4 SOC New Appointment Waiting Times*

		Number	Waiting Time (Days)			
			5th %ile	Median	90th %ile	95th %ile
Subsidy Status	Private	433,000	1	8	39	55
	Subsidised	1,758,890	2	28	85	115
Forced Booked Appointment	Yes	112,541	1	8	50	79
	No	2,079,227	1	24	80	107
	Not Available	122	3	16	49	66
Overall		2,191,890	1	23	79	106

## Comparisons

It is tempting to search the world for waiting time experiences that are better than those we experience ourselves, and point to them (and often, only to them) as indications of poor performance. Defenders in turn can be as selective in their choice of comparators. The truth however is that many of the factors that determine waiting times are not within the control of the healthcare facilities who unfortunately bear the brunt of complaints.

Like any operational flow, queues form at a healthcare facility when the rate at which patients are seen does not keep up with the rate at which they arrive. Waiting times are usually not comparable across the world because of the variability in size, health needs, and accessibility of their catchment populations, the different resourcing of and constraints on the facilities, and the healthcare and financing systems within which they operate. Patients will have to wait even at an efficient and excellent facility if there is a surge of demand (for example, in a flu epidemic) while service will be almost immediate in over-resourced (and thus expensive) and under-used facilities (with possibly poorer quality for lack of practice).

In a BBC report on 9 February 2017, the National Health System of the United Kingdom recorded the worst ever waiting times for 13 years [32]. Apparently only 82% of patients at hospital Emergency Departments were “transferred, admitted or discharged within



four hours”. This is the time to be completely done with their visit, rather than the waiting time to see the doctor. Waiting time for a bed was longer, up to 12 hours for patients for admission.

The following table provides comparisons of median and 90<sup>th</sup> percentile waiting times between Singapore, the United Kingdom and Hong Kong. At first glance, it would appear that Singapore has shorter median and 90<sup>th</sup> percentile waiting times for almost every category. Whether this means Singapore is doing better than the other countries depends on what is meant by “doing better”.

*Table 5 SOC New Appointment Waiting time (weeks) for by Specialty*

Specialty	Singapore		UK <sup>6</sup>	Hong Kong <sup>7</sup>	
	Median	90th %ile	Median	Median	90th %ile
Gynaecology	2.6	4.9	5.9	21.0	70.0
Ophthalmology	3.1	9.9	9.4	51.0	66.0
Orthopaedics & Traumatology <sup>8</sup>	4.1	16.4	10.9	60.0	133.0
Paediatrics	2.3	7.1		13.0	25.0
Psychiatry	2.6	8.3		22.0	87.0
Surgery <sup>9</sup>	3.0	8.9	5.0	32.0	78.0
Total	3.3	11.3			

In terms of the reported waiting times, it is true that people in Singapore do not wait as long as people in the other two countries, with its consequent benefits. Whether Singapore healthcare is “performing better” than their counterparts would require an examination of the patient mix, economic resources available, and system constraints, in other words, a consideration of the handicaps and help for the two systems. While the absolute waiting times are shorter, we could also be less efficient (requiring more resources) or less effective (because shorter waiting times do not necessarily mean better clinical outcomes). Is that necessarily better?

To compare waiting times across groups of patients who have different needs, urgencies and expectations, arriving in different patterns and volumes, at facilities with different resourcing and capabilities, requiring different types of treatment with different

<sup>6</sup> United Kingdom (England): OECD. Explaining Waiting Times Variations for Elective Surgery Across OECD Countries (2003, OECD Health Working Papers No. 7).

<sup>7</sup> Hong Kong: Hospital Authority, 2014-15. Cross-cluster Referral as a Measure for Waiting Time Management of Specialist Outpatient Clinics in the Hospital Authority (Sep 2015).

<sup>8</sup> Orthopaedics & Traumatology: Hong Kong. Orthopaedics: Singapore and United Kingdom (England).

<sup>9</sup> Surgery includes General Surgery.

urgencies and impact on outcomes, and in different health delivery and financing systems, is a significant challenge. There are three main approaches to such comparisons:

- To use high-level broad averages for comparison and explain differences by the consideration of these factors. The numerical comparisons are not satisfying in that like is not being compared with like, while the qualitative extenuations (or rationalisations) are less helpful in improving performance. Comparisons can look good or bad simply by the choice of comparators.
- To “standardise” the comparisons by statistically adjusting for these factors, to compute what the respective waiting times would have been *if* these factors were the same. The adjusted waiting times can indicate relative efficiency and effectiveness but unfortunately are not what is experienced by patients in the real world.
- To compare strictly similar groups of patients categorised by selected factors. This requires much data which is often not available and may suffer from the problem of “small numbers”. For a population of any size, it is possible to categorise people into so many groups that there are too few people in each group for sound statistical conclusions. This is however of value for comparing treatment outcomes for specific medical conditions as is captured by the International Consortium for Health Outcomes Measurement (ICHOM) <sup>10</sup>.

Ultimately a straight comparison of raw waiting times, however adjusted or matched, obscures more than it reveals. It is useful to understand one’s own contexts and opportunities for improvement but trying to answer the question of whether we are performing better or worse than others is not only a waste of resources but a folly.

## Comparators

Having said that, it can be instructive to review waiting times around the world to better understand Singapore’s own situation in perspective.

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<sup>10</sup> Comparisons for the first type end up comparing flocks of chickens with gaggles of geese, those that attempt to “standardise” their groups compare imaginary flocks of poultry, while the last drown in a sea of feathers.

## UK-England

Table A Hospital waiting times in UK-England

Service	Description	Period	Waiting Time
ED <sup>i</sup>	Overall (consultation)	2015-16	1.2 hours (50 <sup>th</sup> %ile)
	Overall (consultation)	2015-16	3.8 hours (95 <sup>th</sup> %ile)
	Overall (admission)	2015-16	3.9 hours (50 <sup>th</sup> %ile)
	Overall (admission)	2015-16	13 hours (95 <sup>th</sup> %ile)
SOC new appointment <sup>ii</sup>	Ear, Nose and Throat	2001	9.1 weeks (50 <sup>th</sup> %ile)
	Gynaecology	2001	5.9 weeks (50 <sup>th</sup> %ile)
	Ophthalmology	2001	9.4 weeks (50 <sup>th</sup> %ile)
	Orthopaedics	2001	10.9 weeks (50 <sup>th</sup> %ile)
	General surgery	2001	5.0 weeks (50 <sup>th</sup> %ile)

Service	Description	Period	Waiting Time
ES <sup>iii</sup>	Overall	Jan 2016	6.9 weeks (50 <sup>th</sup> %ile)
	Not admitted cases	Apr 2014	18 weeks (95 <sup>th</sup> %ile)
	Admitted cases	Apr 2014	24.5 weeks (95 <sup>th</sup> %ile)

Sources:

<sup>i</sup> Baker C. Accident and emergency statistics: demand, performance and pressure. United Kingdom. House of Commons Library (21 February 2017) [33].

<sup>ii</sup> Official data source (UK-England): OECD. Explaining Waiting Times Variations for Elective Surgery Across OECD Countries (2003, OECD Health Working Papers No. 7) [34].

<sup>iii</sup> Official data source (UK; overall): Statistical Press Notice NHS referral to treatment (RTT) waiting time data January 2016. Data (as of the end of Jan 2016) [35]. UK-England (not admitted and admitted cases): House of Commons Library. Waiting times for hospital treatment (18 Mar 2015) [36].

In England, the median and 95<sup>th</sup> percentile waiting times for ED consultations are between one to four hours. Those who require admission after ED consultations can wait up to 13 hours (median: 3.9 hours; 95<sup>th</sup> percentile: 13 hours).

The National Health Service (NHS) England sets a target of discharging, admitting or transferring at least 95% of patients within four hours of their arrival at the ED (“A&E”) [33]. In 2016, 16.2% of people spent more than four hours in major ED departments, from 4.8% five years before [33]. In the quarter ending September 2016, more than 50% of all service providers (132 of 233) failed to meet the 95% target [33]. Total ED attendance rose by 5.2% between 2015 and 2016, an average of 3,216 more people visiting the ED each day [33].

Shortage of staff could be one reason for the extended waiting times. According to a report in The Telegraph, a guidance document produced by the National Institute for Health and Care Excellence (NICE) showed nine out of ten hospitals in England had dangerous shortages of nurses. While the recommended nurse to patient ratio at EDs

was 1:1, the actual ratio was 1:3 [37]. Another reason cited was a bed crunch due in part to the lack of community care. Older patients (those aged 80+ have the highest rate of ED attendance) [33] who should have been transferred to community care were stuck in hospitals and filling up beds [38].

The SOC median waiting times for consultation varied from 5.0 weeks (general surgery) to 10.9 weeks (orthopaedics). The overall median waiting time for ES is 6.9 weeks. Patients scheduled for non-admission ES can expect to wait up to 18 weeks, and those scheduled for ES requiring admission up to 24.5 weeks.

The pressures on healthcare resources and waiting time is unlikely to let up as NHS expects greater volumes of both urgent and emergency care as well as elective surgeries in the long term [38].

### Hong Kong

Table B Hospital waiting times in Hong Kong

Service	Description	Period	Waiting Time
ED consultation <sup>i</sup>	Semi-urgent cases	2015	1.8 hours (average)
	Non-urgent cases	2015	2.2 hours (average)
	Non-urgent cases (off-peak)	2015-16	3-4 hours (average)
	Non-urgent cases (peak)	2015-16	5-6 hours (average)
SOC new appointment <sup>ii</sup>	Overall	2016-14	55 weeks (50 <sup>th</sup> %ile)
	Overall	2013-14	124 weeks (90 <sup>th</sup> %ile)

Sources:  
<sup>i</sup> Semi-urgent vs. non-urgent cases: Wong S. Patients to get new waiting time guide, *The Standard* (12 December 2016) [39].  
 Non-urgent cases: Translated title: Hong Kong ED attendances continue rising (7 April 2016) [40].  
<sup>ii</sup> Hong Kong public hospitals must wait up to two and a half years to see a specialist, new data reveals. *Ecnscn*. (7 April 2015) [41].

The average waiting times of semi-urgent and non-urgent ED cases were 1.8 hours and 2.2 hours respectively in 2015. Waiting times usually spike during the holiday seasons in Hong Kong. EDs in public hospitals were overcrowded during the weekend of 2014 Chinese New Year and some diarrhoea patients waited up to 14 hours to see a doctor [27]. The Easter weekend in 2015 saw a 10.3% increase in the number of ED patients from the daily average of 5,800 patients, resulting in an additional two hours waiting time for non-emergency patients [40].

Seasonal factors also cause spikes in waiting times. Hong Kong’s Hospital Authority reported that bed occupancy rates for all public hospitals exceeded 100% during the winter season in early 2016 [42]. In March 2017’s seasonal flu peak, EDs were

overcrowded. Patients at Queen Elizabeth Hospital waited for an average of 15 hours for admission after ED consultation [43].

The reported contributing factors for Hong Kong’s long waiting time in public hospitals are an ageing population, and shortages of resources and healthcare manpower [44]. According to Hong Kong’s population projections, the proportion of elderly is expected to rise from 15% in 2014 to 28% by 2034, while the proportion of those aged under 15 will fall from 11% to 10% in the same period [45].

Misuse of emergency care in ED is also a reason for long waiting times. Out of all ED visits, 70% should have visited their family doctors instead [46]. These were semi-urgent (equivalent to Singapore’s Patient Acuity P2/P3) and non-urgent cases (equivalent to Singapore’s Patient Acuity P4)<sup>11</sup>. The introduction of an ED administration fee of HK\$100 per visit did not solve the problem of non-emergency ED visits as it was still much cheaper than private hospital/clinic fees (HK\$200-\$300) [46]. From 18 June 2017, the ED administration fee was increased to HK\$180 [47]. Other healthcare charges in the public hospitals are expected to be adjusted accordingly as well.

The median and 90<sup>th</sup> percentile of SOC new appointment waiting times are 55 weeks and 124 weeks respectively. The 90<sup>th</sup> percentile of SOC new appointment waiting times for orthopaedics and traumatology in 2015 was over three years (179 weeks) [48].

**Australia**

*Table C Hospital waiting times in Australia*

<b>Service</b>	<b>Description</b>	<b>Period</b>	<b>Waiting Time</b>
ED <sup>i</sup>	Overall (consultation)	2015-16	0.3 hours (50 <sup>th</sup> %ile)
	Overall (consultation)	2015-16	1.6 hours (90 <sup>th</sup> %ile)
	Overall (admission)	2015-16	4.1 hours (50 <sup>th</sup> %ile)
	Overall (admission)	2015-16	10.7 hours (90 <sup>th</sup> %ile)
SOC new appointment <sup>ii</sup>	Best hospitals (Victoria) <sup>^</sup>	2015	1.0-1.4weeks (50 <sup>th</sup> %ile)
	Worst hospitals (Victoria) <sup>^</sup>	2015	64.4-67.0 weeks (50 <sup>th</sup> %ile)
ES <sup>iii</sup>	Overall	2015-16	5.3 weeks (50 <sup>th</sup> %ile)
	Overall	2015-16	37.1 weeks (90 <sup>th</sup> %ile)

Sources:  
<sup>i</sup> Emergency Department Care 2015-16: Australian Hospital Statistics, Australian Institute of Health and Welfare (2016) [49].  
<sup>ii</sup> Specialist Clinics Quarterly Activity and Wait Time Report June 2016 Quarter, Victorian Health Services Performance [50].

<sup>11</sup> Hong Kong’s triage system: Triage I (critical cases: with immediate treatment); Triage II (emergency cases: < 15 minutes); Triage III (urgent cases: < 30 minutes); Triage IV (semi-urgent cases: < 120 minutes) and Triage V (non-urgent cases).

<sup>iii</sup> Elective surgery waiting times 2015-15: Australian hospital statistics, Australian Institute of Health and Welfare (2016) [51].

Notes:

<sup>^</sup> Only data for the state of Victoria was available.

The median and 90<sup>th</sup> percentile time to treatment at EDs are 0.3 hours and 1.6 hours respectively. Waiting times for admission after ED consultation are 4.1 hours (median) and 10.7 hours (90<sup>th</sup> percentile). In the state of Victoria, SOC new appointment waiting times (median) for the best performing hospitals and worst performing hospitals range from a week (1.0-1.4 weeks) to over a year (64.4-67.0 weeks). For ES, half of the patients waited 5.3 weeks or less but 10% of the patients waited for more than eight months (37.1 weeks).

In its annual report on public hospitals, the Australian Medical Association (AMA) highlighted that in 2015 73% of ED visits were completed within four hours, falling short of the target of 90% [52]. It also reported that the median ES waiting time had increased from 3.9 weeks in 2001 to 5.0 weeks in 2015. Growing demand, coupled with healthcare budget cuts were cited as reasons for the failure to improve waiting times [52]. Even though hospital bed capacity increased marginally by 256 between 2013 and 2014, it was insufficient for meeting the growth in demand [52]. The contributing factors of Australian hospitals' long waiting times are insufficient resources, greying population and inefficient healthcare infrastructures [53].

In 2016, the Australian government spent \$11 million to tackle long waiting times for ES by scheduling ESs after hours, on weekends, and at private hospitals [54]. Over 1,200 patients in Canberra on the long waitlist were fast-tracked through this initiative. Victoria State Government also tried to overcome huge waiting lists for surgery by performing more work on weekends [55].

## Canada

*Table D Hospital waiting times in Canada*

<b>Service</b>	<b>Description</b>	<b>Period</b>	<b>Waiting Time</b>
ED <sup>i</sup>	Waiting time for ED bed	2015-16	9.8 hours (50 <sup>th</sup> %ile)
	Waiting time for ED bed	2015-16	29.3 hours (90 <sup>th</sup> %ile)
SOC new appointment <sup>ii</sup>	Cardiovascular	2016	2.6 weeks (50 <sup>th</sup> %ile)
	General Surgery	2016	5.8 weeks (50 <sup>th</sup> %ile)
	Gynaecology	2016	10.1 weeks (50 <sup>th</sup> %ile)
	Internal Medicine	2016	5.1 weeks (50 <sup>th</sup> %ile)
	Medical Oncology	2016	2.0 weeks (50 <sup>th</sup> %ile)
	Neurosurgery	2016	32.5 weeks (50 <sup>th</sup> %ile)

Service	Description	Period	Waiting Time
	Ophthalmology	2016	12.0 weeks (50 <sup>th</sup> %ile)
	Orthopaedic Surgery	2016	15.6 weeks (50 <sup>th</sup> %ile)
	Otolaryngology	2016	10.1 weeks (50 <sup>th</sup> %ile)
	Plastic Surgery	2016	9.8 weeks (50 <sup>th</sup> %ile)
	Radiation Oncology	2016	1.4 weeks (50 <sup>th</sup> %ile)
	Urology	2016	10.8 weeks (50 <sup>th</sup> %ile)

Service	Description	Period	Waiting Time
ES <sup>ii</sup>	Cardiovascular	2016	5.9 weeks (50 <sup>th</sup> %ile)
	General Surgery	2016	6.4 weeks (50 <sup>th</sup> %ile)
	Gynaecology	2016	8.7 weeks (50 <sup>th</sup> %ile)
	Internal Medicine	2016	7.9 weeks (50 <sup>th</sup> %ile)
	Medical Oncology	2016	1.7 weeks (50 <sup>th</sup> %ile)
	Neurosurgery	2016	22.5 weeks (50 <sup>th</sup> %ile)
	Ophthalmology	2016	16.5 weeks (50 <sup>th</sup> %ile)
	Orthopaedic Surgery	2016	22.5 weeks (50 <sup>th</sup> %ile)
	Otolaryngology	2016	12.6 weeks (50 <sup>th</sup> %ile)
	Plastic Surgery	2016	16.0 weeks (50 <sup>th</sup> %ile)
	Radiation Oncology	2016	2.7 weeks (50 <sup>th</sup> %ile)
	Urology	2016	5.4 weeks (50 <sup>th</sup> %ile)

Sources:

<sup>i</sup> NACRS Emergency Department Visits and Length of Stay, 2015-2016 (Canadian Institute for Health Information) [56].

<sup>ii</sup> Waiting Your Turn: Wait Times for Health Care in Canada, 2016 Report (Fraser Institute) [57].

In Canada, waiting times for ED beds in the public hospitals vary from 9.8 hours (median) to more than a day (90<sup>th</sup> percentile of 29.3 hours). According to Wait Times Alliance's 2014 report, Canadians had to wait up to three times longer to access necessary medical care in public hospitals than people in other countries [58].

In its 2015 report, Wait Times Alliance attributed long ED waiting times to the code gridlock (hospitals are unable to move patients) due to a shortage of community care services. Patients who no longer required acute care continue to occupy hospital beds that should have been freed up for patients of ED, ES, and ambulance services [59]. A large proportion of the beds are occupied by elderly patients with dementia or chronic diseases who are waiting for a place in a long-term care facilities [58]. Another reason cited for the long waiting times was ED visits by those who do not have a regular family doctor [58]: in 2014, 14.9% of those above 15 years old, nearly 4.5 million Canadians, did not have a regular medical doctor [60].

The median SOC waiting times for new appointments vary from 1.4 weeks for radiation oncology to 32.5 weeks for neurosurgery. ES median waiting times vary from 1.7 weeks for medical oncology to 22.5 weeks for neurosurgery/orthopaedic surgeries.

According to a new report, 30% of tests, treatments and procedures done on patients are unnecessary [61]. Freeing up this 30% capacity for patients with legitimate needs may reduce long ED waiting times in the public hospitals [61]. Montréal's long ES waiting time have been attributed to hospital inefficiencies and failure to prioritise, as well as budget cuts leading to closure of beds and manpower reduction [62]. A survey tracking waiting times since 1993 saw the longest median waiting time for "medically necessary" treatments (20 weeks) in 2016 [63]. In the province of Quebec, patients have chosen to go to private hospitals in order to receive treatments sooner [64].

## Taiwan

Prolonged waiting times in Taiwan has been reported to have reached crisis point. Even though hospital bed capacity has increased up to four times, the issue of long waiting times continues to persist [65]. Patients still prefer to go to larger hospitals, regardless of the severity of their conditions. This results in precious hospital resources being utilized for cases that could have been managed in community care facilities. ED doctors revealed that non-acute patients who occupy hospital beds are usually the needy, the elderly and those with complex chronic diseases [65].

In 2014, 75,000 out of 7.05 million ED patients waited more than two days for ED services [28]. On average, over 200 patients a day were stuck waiting in public hospital ED. In the third quarter of 2014, one in four ED patients waited more than two days for a bed at National Taiwan University Hospital [28]. During that period, all public hospitals were full. After 2015's Lunar New Year, hospitals engaged more care coordinators to facilitate hospital discharges in a bid to cater to the festive season surge in ED visits [28].

## Rationale

After establishing that waiting times for hospital services are an international problem, we must return to the foundational consideration of *why* and *when* faster care is important. Patients think shorter waiting times mean better care, fewer complications, better outcomes, and higher quality of life, but empirically that is not always the case.

The small laceration will probably have the same long-term outcomes (complete healing, small scar) whether the poor patient waited half an hour or two. All things being equal, infection is potentially more likely with the longer wait but all things are



not in fact equal: the wound that waited longer can still be cleaned well enough to avoid the consequences of the wait, antibiotic cover given in both situations protect against infection, and the scar is in the long run equally inconspicuous, disfiguring or heroic, depending on the injury.

There are situations however where waiting times make a huge difference, for example, the time taken from a heart attack to cardiac catheterisation (the so-called “door-to-balloon” [66] time). In this case, “time is muscle” and any time spent waiting results in a greater heart muscle damage by the lack of oxygen.

The foundation of much dissatisfaction with and hence complaints of long waiting times is in the experiential perception of patients and their families. While emergency cases are obviously commonplace and workaday in the emergency department, they are rare occurrences filled with anxiety for patients and their families, especially when as layman they are uncertain of the outcomes that will ensue.

The hospital would do well to focus on softening the experience of the waiting patients and their families. Televisions and other entertainment, magazines, and other distractions make the wait less obvious.

The objective for healthcare systems with regards to waiting time then is that it must be short, and implacably shortened, for those situations where it makes a significant clinical difference, but must be managed differently for others, with a focus on the subjective experience of waiting endured by the patients and their families.

In this light, the best comparative measure of performance is perhaps not the absolute time-based durations of waiting for various types of patients but by more indirect measures of the experience of waiting, whether they felt that it was a pleasant and comfortable, even educational and productive, experience, shifting the conversation away from straight numerical comparisons.

## **Solutions**

What else can be done to improve the actual waiting times of patients at public healthcare facilities? Care professionals say that everything that is humanly possible is already being done, and there is no reason to believe to doubt that this is the unvarnished truth. Yet the congestion remains.

The waiting time a patient experiences at an acute hospital is affected by multiple factors, all of which change continuously and are fiendishly hard to align:

- The number of patients being seen at say the Emergency Department, which includes both those who are genuine emergency cases and those who choose to go to the Emergency Department for other reasons. The absolute numbers and relative mix can vary through the day, week and year.
- The ability of the Emergency Department to accommodate and manage the inflow of patients, depending on the season and the time of day. Resourcing must not only be effective at the peaks but also efficient in the troughs.
- The ability of the Emergency Department to move patients into the hospital into inpatient services or to send them home. This is in part dependent on the clinical care processes and the care professionals of the facility, but is highly dependent on the clinical conditions and progress of the patients.
- The ability of the Inpatient Services to accommodate the inflow of patients is dependent on the number of available beds, on its ability to treat and discharge patients home (without adverse impact on clinical outcomes), and on its ability to turn the beds around. Only the last is truly dependent on the hospital's capabilities. The others are critically dependent on external factors.
- The ability and capacity of the downstream care facilities to receive and accommodate the outflow from the hospital.

The focus naturally is to try to improve the operational efficiencies at the facilities. This can be done by expanding capacity (e.g. build more hospital beds), increasing resources applied (e.g. add manpower), changing processes (e.g. through reconfiguration or with automation and robots) and expanding downstream capacity (e.g. create more home care and other community services to receive patients, which in turn releases hospital capacity).

There are also demand-related factors. For instance, despite constant attempts at educating the public on the proper use of emergency services, some 51 percent of patients seen at the public healthcare emergency departments between January 2013 and June 2016 were classified as "P3" (i.e. of the third priority), many of whom did not need hospital-based emergency care. Without these patients, emergency departments

would be able to attend to the truly urgent “P1” and needier “P2” cases much more quickly and efficiently.

Each of these options entails considerable investment of funds and lead time to scale up capital resources or manpower. This can result in significant wastage when demand drops and the system is left with excess capacity. Whatever we do, the experience in healthcare and most other industries is that early improvements eventually plateau off when whatever can be done is already being done.

## Demand

Demand however will continue to rise. The key societal trends in Singapore, which do not need much explanation, will continue to demand more and more healthcare services.

- **Ageing population.** People are living longer and with more chronic disease [67,68]. This is a global phenomenon in which Singapore is unfortunately leading from the front. Our life expectancy at birth rose by 14.7% from 72.1 years in 1980 to 82.7 years in 2015 [3]. With longer lifespans and modern healthcare, more people continue to live with chronic diseases. One in two Singaporeans aged 40 and over have at least one chronic disease and one in seven have at least three<sup>12</sup>.
- **Capacity scarcity in acute facilities.** Besides being harder and more expensive to manage, older patients also take longer to recover and leave the facilities. From 2006 to 2013, patients aged 65 and above admitted to public hospitals in Singapore increased by nearly 5% from 28.6% to 33.4% [69]. The average length of stay has increased from 7.8 days in 2010 to 8.2 days in 2013 [69]. In January 2014, Changi General Hospital set up an air-conditioned tent for patients waiting for beds, a news story that has become an iconic exemplar for the “bed crunch” [70].
- **Relative need for downstream healthcare facilities and home care.** Patients discharged directly home often need continued supportive care on top of family support, both of which can be in short supply in our current society with its working adults and smaller families. Downstream healthcare facilities in the

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<sup>12</sup> Data from National Health Survey 2010 (Singapore).

Intermediate and Long Term Care (ILTC) sector include community hospitals, nursing homes, centre-based services and home-based services. Shortages of home support and ILTC places keep patients in acute hospitals longer than is absolutely needed for medical care. Great efforts are being made to increase the capacity and capabilities of the ILTC sector and for home support, but their current limitations remain key factors in the ability of the public sector to manage hospital waiting times.

- **Fragmentation of care services and resources.** The efforts of the Regional Health Systems notwithstanding, care services in Singapore remain relatively fragmented. The public sector is dominant in acute and inpatient services while primary care services (which is arguably as important if not more so for a large population of ageing patients) is dispersed over the largely private and independent general practitioner base. Singapore aspires to “seamless” care and yet her relative weightages of 80% public inpatient services and 80% private outpatient services [71] sets up the scenario of many seams to traverse. From the perspective of autonomy and choice, the ability of patients to choose their healthcare providers across public and private sectors, and in any combination and in any sequence, is a good thing. Yet, this is arguably the biggest and most refractory factor for the above fragmentation.

## Complex Adaptive Systems

The Iron Triangle [72] is a well-known paradigm used to describe the relationship between quality, access and cost in healthcare systems. The improvements to one side often involve trade-offs on the other sides. In making decisions about the healthcare system, process parameters like waiting times (access) must be balanced against the clinical indicators of outcomes (quality), and the costs of providing that care.

The healthcare system is in addition what is called a “complex adaptive system” [73], where a large number of parts interact dynamically in a non-linear manner, themselves constantly responding to these interactions.

To improve the quality of care across the entire spectrum of health services, we must not focus only on one parameter, or even one parameter at a time. Simple direct solutions do not work well. Addressing one part causes ripples of knock-on effects

across the system, often in unpredicted or even unpredictable ways. Not only may the original problem not be relieved, new ones may be created!

Undoubtedly, waiting times affect patients' overall experience, but focusing only on waiting times can have potential adverse consequences. To shorten the time from when the patient walks in to the consultation with a doctor, a facility could deploy more doctors from say the wards to the emergency department's frontline, which could adversely affect the quality of care in the wards. This would be a classic example of how localised optimisations lead to poorer system outcomes.

There are situations where speed is indeed critical (the P1 cases in the emergency departments). For example, as in the vignette above, waiting times for patients with heart attacks are measured from the time they arrive (at the door) to the time the obstructed artery is expanded (balloon procedure). These door-to-balloon times have improved in one Singapore heart centre from 72 minutes in 2007 to 47 minutes in 2015. Stroke patients who may benefit from Tissue Plasminogen Activator treatment are now currently treated within the hour compared to the three hours recommended in 2011.

Improving care for all people, including for those waiting in queues, requires a broader, systems-based approach that goes beyond the waiting times alone. There are newly emerging methodologies for managing complex adaptive systems, but they do not entail a focus on a single parameter like hospital waiting times.

## **Professionalism versus Commercialism**

The current focus on waiting times owes much to the mindset brought about by the commercialisation of healthcare over the last few decades. Today, hospitals and healthcare facilities are perceived, intentionally or not, as service providers, similar to restaurants, hotels and other sellers of services. Healthcare facilities are thought of as having a contractual relationship for which "customer service" can be similarly demanded.

It has not always been this way. Healthcare professionals are so-called because of their membership in a defined "profession" with both privileges and obligations. To serve patients, healthcare professionals necessarily handle confidential information, perform intimate actions, and access private spaces not permitted to others. For

example, what surgeons actually do to their patients would amount to assault and battery if attempted without license.

In return for the trust, society expects of them to hold the interests of the patient and the community as paramount and above their own. Society respect healthcare workers as those who strive compassionately for the well-being of their patients, fighting disease and disability on behalf of those who cannot do so for themselves. The respect that society accords to doctors, nurses and allied health professionals goes beyond competence to the compassion and character to strive for their patients' well-being, fighting disease and disability on behalf of those who cannot do so for themselves. Even when they are materially well rewarded, as are some, it is generally viewed as an indication of the appreciation and recognition of their value and contribution to the community.

The queues that patients encounter on their occasional visits to healthcare facilities are faced by healthcare professionals every working day. Hospitals work hard through quality improvement approaches like the LEAN methodology [74–78] to improve their service quality, not just for their patients but also for their staff's working environment. Healthcare professionals are as concerned for the delivery of good clinical care to the patients as the patients themselves.

## **Working Together**

Singapore faces a daunting future with more elderly living with more chronic diseases, relatively less social support, and increasingly expensive care. Healthcare is not primarily a commercial venture in which healthcare providers offer services for the primary purpose of making money in a business economy, but a collaborative relationship in which the professionals help patients fend off death and disease. This is more so at a societal level where healthcare is a cooperative struggle for the welfare of the community, where we all (patients, families, providers, professionals, organisations and government) have to work together for the benefit of all.

If healthcare is a community challenge framed as a war, then we must all play a part. As in a war, there will be shortages and privations but the challenge is not only for the care providers, professionals and government but for the whole of society. There are key roles for healthcare facilities and professionals, but everyone must contribute. A

major area where the population at large can support the cause is in reducing the 51 percent of low priority cases in the emergency departments.

To focus only on lowering hospital waiting times is not only seeking the inadequate answer but is asking the wrong question and risking the wrong response. It is not about how the public sector can further lower hospital waiting times (although they must and they do ask this question of themselves) but about how our society will respond together to the challenge of our ageing population, uncertain economic survival, and evolving social fabric.

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