

## Improving Access to Outpatient Cardiac Care at the National Heart Centre – A Partnership Between Specialists and Primary Care

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### Abstract

Ensuring timely access to specialist care is an important indicator of the quality of a health service. Demand for cardiology outpatient appointments has grown considerably in the last decade, leading to increased waiting time for cardiology appointments at public hospitals. This paper examines the effectiveness of past and ongoing strategies initiated by the National Heart Centre, many of which were in collaboration with SingHealth Polyclinics, documents the lessons learnt, and provides a framework for approaching this problem. Instead of a simplistic approach where institutions react to long waiting times by growing capacity to meet demand, this paper emphasises the need to focus on the final intended outcome (timely diagnosis and treatment) rather than on a single performance indicator, such as waiting time. A broad systems approach at the national level is advocated, rather than piecemeal, uncoordinated actions by individual hospitals.

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**Key words:** Access to specialist care, Cardiology outpatient services, Waiting time

### Introduction

There is evidence that shows that the use of healthcare delivered by private providers, particularly procedures and hospital care, depends on supply.<sup>1</sup> For example, in a population-based study of patients with pain that might signal arthritis of the knee, the number of patients in need of surgery (physicians determined following examinations) exceeded the rate of surgery for the corresponding age and sex groups by a factor of more than ten.<sup>2</sup> An early study in the Netherlands reported that the variation depends not just on medical evidence but also on the beliefs of the specialists in the region and number of hospital beds.<sup>3</sup> Conversely, the utilisation of public healthcare tends to be demand driven.<sup>4</sup> Such demand may not be entirely rational, for example, increased utilisation may increase without outcome improvement<sup>3,4</sup> and reduction in waiting times (WTs) may encourage a further increase in referral.<sup>5,6</sup> Long WTs for healthcare is a complex problem resulting from multiple causes,<sup>7</sup> some of which are specific to the healthcare organisation, financing system and/or local culture.

In Singapore, demand for subsidised outpatient cardiology specialist appointments has grown significantly since 1996 (Fig. 1) for all public hospitals, by more than 3-fold over 10 years. The largest increase has been for the National Heart

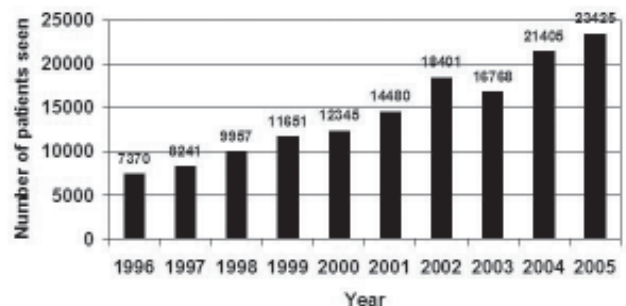


Fig. 1. Growth in volume of new subsidised patient referrals to cardiology specialist outpatient clinics of public hospitals in Singapore from 1996 to 2005. The volume of patients referred have grown by more than 3-fold over the past 10 years.

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Centre (NHC), which is the dominant provider of outpatient cardiac care in Singapore. Except for a slight dip in 2003 due to the severe acute respiratory syndrome (SARS) epidemic, the volume of subsidised new referrals at the NHC cardiology department has increased steadily from 2840 in 1994 to 10,634 in 2005. This is an average increase of 12.8% per annum. In the year 2005, NHC cardiology catered to 76,368 outpatient visits, of which about 19% were new visits and 71% of these new visits were subsidised patient-visits. Not surprisingly, WTs for new appointments have been a concern for all public hospitals including NHC. During the second quarter of 2006, public cardiology services registered the longest WT among the top 10 high-volume specialties and also registered the highest volume of new appointments, with a median WT of 27 days [unpublished data – Tan S, Chua BT, Tong MS. WTs for new specialist outpatient clinic appointments (2nd quarter 2006). Paper tabled for the information of Ministerial Staff Meeting dated 6 September 2006].

Since 2001, NHC has initiated various measures to reduce its WTs, many of which were carried out in partnership with SingHealth Polyclinics, which provides subsidised outpatient care for Singapore's eastern health cluster. This paper will examine the effectiveness of various strategies instituted and take a brief look at the demand and supply mechanics of cardiology services in the Singapore context. Another concurrent paper details how demand may be better managed by improving the quality of referral.<sup>8</sup>

### Background and Definitions

The discussion in this paper is limited to the new subsidised cardiology volume and the associated WT (unless otherwise stated), as this is the group where there has been significant growth in demand and WTs have been a problem. Subsidised cardiology referrals are largely seen in Singapore at the cardiology departments of major public hospitals: the NHC, Changi General Hospital (CGH) [both under the Singapore Health Services (SingHealth or SHS) cluster of hospitals], and under the National Healthcare Group (NHG), Tan Tock Seng Hospital (TTSH), National University Hospital (NUH), and more recently, Alexandra Hospital. Figure 2 shows the new subsidised volume in 2005 at the 4 larger cardiology departments in Singapore. NHC saw 47% of all new subsidised referrals, compared to 25% for TTSH, 14% for NUH and 14% for CGH.

WT for a new appointment is defined as the number of calendar days between the date of request for appointment from the referring source and the appointment date allocated for a cardiologist consultation. WT data that were excluded were: 1) patients who rejected the earliest/first available appointment date offered, and 2) self-referrals and referrals from the Emergency Departments who received medical

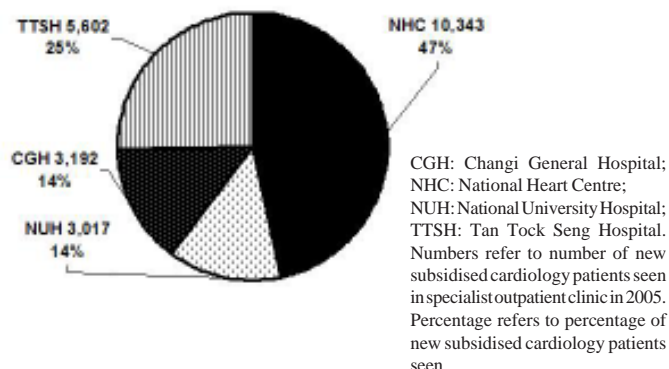


Fig. 2. Distribution of subsidised new case referrals to cardiology among public hospitals, January to December 2005.

consultation within the same day. WT is a proxy measure of readiness to receive new appointments and is dependant on the difference between demand and capacity. NHC WT data have been collected systematically since August 2001.

### Statistics to Report WT

Median and 95<sup>th</sup> percentile are used together to describe WT in the local context. Mean WT as well as interval measures, such as the proportion of patients who have waited for more than a certain number of days, are other ways of reporting WT. Because WT distributions are almost always highly skewed by small numbers of long waits, mean WT is not suited as a representation of expected waits. Proportion of patient measure will be suitable when WT is fairly stable or when a suitable benchmark WT has been set. In the studies on WT, it appears that median together with 90<sup>th</sup> or 95<sup>th</sup> percentile WT are suitable representation. Median WT alone is not adequate because distributions of WT may be skewed towards longer WT.

An associated problem is the variation in the methods of measuring WT in different hospitals, which makes it harder to compare different WT. For example, data keeping systems have been referred to as a key source of variability in perceptions about waiting lists and WTs in Canada.<sup>9</sup> Therefore, a standard methodology for determining WT is required in order to ensure comparability between institutions.

### Approaches to Address WT and Rising Volume at NHC

The approaches that has been adopted to address WT at NHC can be broadly categorised into internal processes, managing demand and referring back to primary physicians.

#### Internal NHC Processes – Increase Capacity

With median WT exceeding 50 days at the end of 2001, NHC undertook measures to increase its capacity for subsidised cardiology outpatients. These measures were as follows:

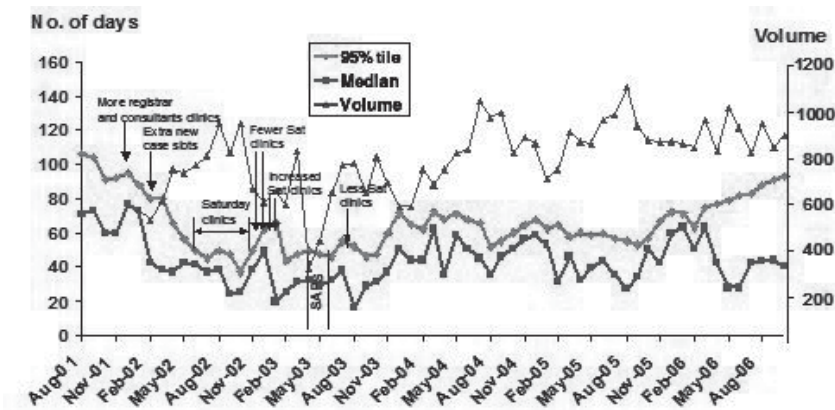


Fig. 3. Trends in waiting time for appointments 2001 to 2005 at NHC.

- The number of subsidised clinics (both for registrars and consultants) was increased
- The number of new case appointments per clinic was increased
- Additional clinics where only new subsidised cases were seen (including Saturday clinics) were opened.
- Additional doctors were hired to assist in more basic services such as running treadmill tests and anticoagulation clinics, thus freeing specialists to see more new referrals.

As a result of these measures, median WT was reduced from a peak of 77 days in December 2001 to 42 days in February 2002 (Fig. 3). These results were achieved by increasing the volume of patients seen, with a 37% increase in the number of new cases seen in 2002 compared to in 2001. However, the reduction in WT was not fully sustainable. Saturday clinics were gradually phased out when a 5-day workweek was introduced in Singapore in January 2005. The experience led the NHC team to the realisation that increasing capacity was only a limited part of the solution and would not result in sustained success. This observation that temporarily injecting more resources has only temporarily improved WTs is similar to the experiences in Europe, Canada and Australia.<sup>10,11</sup>

#### Managing Demand – Prioritisation

In August 2002, NHC introduced a new approach in collaboration with SingHealth polyclinics (SHP) comprising several measures:

- A “fast-track” priority appointment system so that patients with more urgent conditions would be seen earlier,
- A shared care scheme to promote follow-up of patients with primary care physicians, thus freeing capacity to see new referrals,
- Provision for patients previously referred to primary care to have rapid referral back to specialists through the “fast-track” appointment system, and
- Regular joint education sessions to promote the scheme

and improve the level of expertise at the primary care level, thus potentially reducing the need for referrals.

Under the fast-track scheme, patients with urgent conditions such as suspected acute coronary syndrome would be sent by ambulance to the emergency department (as before), patients with suspected serious heart disease (but not acute coronary syndrome) would be given fast-track cardiology appointments within 2 weeks and all other patients would be given routine appointments. The 2-week target was set because it was estimated that WT for 10% of new referrals was  $\leq 14$  days and proportion of urgent cases was expected to be less than 10%. The utilisation of the fast-track scheme was routinely audited for its WT.

The scheme was generally successful, with appointments given within 14 days for over 95% of fast-track requests between 2002 and 2006. With this scheme, polyclinic doctors now had the option of providing selected patient with appointments within 2 weeks. Guidelines as to which patients should be fast-tracked were provided, but the decision to fast-track a patient was left to the discretion of the referring polyclinic doctor and there was no vetting of referrals at the time the appointment was given. It was felt that the referring doctor was in the best position to decide based on the broad guidelines and an assessment of patient’s urgency, and that this would be preferable to an exhaustive list of criteria. The initial concern was the possibility that a high proportion of patients would be classified as fast-track appointments, thus overwhelming the system. However, in the initial 2 years of its inception, fast-track appointments comprised  $<10\%$  of all referrals and WT targets were easily met, suggesting that the majority of patients did not require fast-track appointments, based on the primary care physician’s assessment. This initiative addressed the concern that patients were not being provided with timely access to cardiac care, using an approach that went outside the more conventional response to a long WT, i.e. increasing capacity to meet demand as measured by a single indicator. With these results, NHC successfully sought approval from the Ministry of Health

to modify the target for cardiology WTs from a single indicator for all patients (target median: 14 days, 95<sup>th</sup> percentile: 28 days) to 2 separate targets for priority (fast-track) appointments (95<sup>th</sup> percentile 14 days) and routine appointments (95<sup>th</sup> percentile 42 days). One additional benefit of the scheme was that stable patients under the care of NHC could be referred back to the polyclinics with the reassurance that they could be sent back within 2 weeks should their symptoms recur. Previously, one reason for reluctance to be referred to polyclinics was the long WT for a referral back to NHC, should their condition worsen.

Although the fast-track initiative helped to allay concerns regarding access to care for more serious conditions, it did not address the long WT for routine appointments. Despite the fast-track programme and the increased volume of patients seen (a 37% rise in the number of patients seen between 2001 and 2002), WT for routine appointments continued to be lengthy. The most important factor that became apparent in attempts to resolve WT was the increasing demand and the distribution of that demand across different institutions.

#### *Managing Demand – Distribution of Demand*

Ideally, in order to minimise WT, each institution should plan manpower and capacity requirements based on the projected demand from historical data and workload should be distributed based on capacity. However, the public health referral system is open-ended, and there is currently no specific policy channelling the patient's choice of specialist centre for subsidised patients. Indeed, it is not unusual for polyclinic patients to be referred to geographically distant specialist outpatient clinics (SOCs).

For example, NHC receives cross-cluster referrals from many polyclinics such as Jurong and Choa Chu Kang, even when there are other hospitals with cardiology departments that are located closer to these polyclinics. This may be a result of its status as a national centre. In 2004, SingHealth polyclinics generated 5937 referrals to cardiology SOCs (53% of all referrals), while the NHG referred 5299 patients to cardiology SOCs (47% of all referrals). However, SHS hospitals received 7419 cardiology referrals (66% of all referrals) versus 3817 for NHG hospitals (34% of all referrals). The reason for this disparity is that SHS polyclinics referred 93% of its cardiology patients to SHS hospitals, with only 7% to NHG hospitals, while NHG referred 64% of its patients to NHG hospitals and the remaining 36% to SHS institutions. Thirty per cent of NHG polyclinic cardiology referrals in 2004 and 2005 went to NHC.

To understand the reasons for the choice of SOC for referral, a survey of 181 consecutive patients who had cross-cluster referrals to NHC between 7 and 21 April 2004

was performed. Overall, 27% of patients were former patients of NHC and hence were referred to NHC, 30% were not former patients of NHC but specifically requested to be referred to NHC and in the remaining 43% of referrals, the patients did not request a referral to NHC. Differences in WT between institutions did not appear to explain these differences, since appointment WT at NHC was often longer as a result of increased demand.

As a consequence of the open-ended referral system, demand for an individual institution may fluctuate considerably, depending on the choice of hospital made by the referring doctor or patient. This complicates the problem of planning capacity to meet demand. For example, between 2004 and 2005, referrals to cardiology from SHP and NHGP increased by 13% and 52% respectively. The increase in referral from SHP was accounted for largely by the addition of 1 polyclinic while the increase from NHGP was attributed to increased cardiovascular health screening, referrals from private GPs via NHGP and increased patient awareness (Personal communications between Dr Terrance Chua to SHP and NHGP management in March 2006). NHG polyclinics have acted to help reduce cross cluster cardiology referrals by minimising new referrals to NHC, unless patients were seen at NHC in the prior 12 months.

Whatever the factors driving the distribution of referrals, there is a potential impact on WT and efficiency. Should a patient or his doctor choose a particular hospital with a longer WT over a closer hospital with a shorter WT, this will result in sub-optimal use of resources with the overall effect of prolonging appointment WT, not only for himself but for other patients as well. Ideally, each polyclinic should refer routinely to the nearest hospital, with adjustments made based on capacity and WT.

There is a natural tendency to assume that WT is a useful indicator of a hospital's clinical service efficiency. Hospitals with long WTs might be failing to optimise the use of their resources, and publication of WT might be a useful driver to improve efficiency. Based on these assumptions, one would expect a relationship between WT and workload per doctor to exist. An institution with a long WT might be seeing fewer patients per doctor than an institution with a shorter WT. Figure 4 shows the median WT and 95<sup>th</sup> percentile for appointments for routine subsidised new cardiology cases in the last quarter of 2005 for the 4 public hospitals' cardiology departments. Figure 5 shows the workload per specialist as defined by MOH for various public hospital cardiology departments in 2005. Note the lack of any clear relationship between appointment WT and workload per specialist. The hospital with the longest WT in this period of observation, TTSH, was also the hospital with the highest workload per specialist, suggesting that long WT is not the result of poor performance as

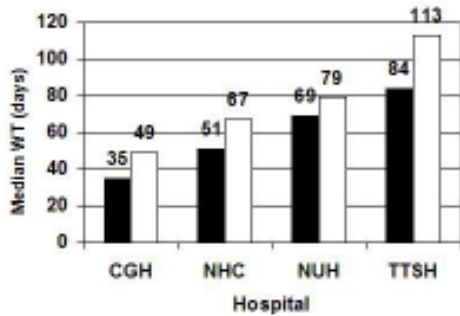


Fig. 4. Median waiting time and 95<sup>th</sup> percentile waiting time in days for routine appointments to cardiology specialist outpatient clinics in the last quarter of 2005 (October to December). Data were based on quarterly submissions to the Ministry of Health.

measured by the efficiency or number of patients seen per doctor, but may well be related to other factors, such as the relationship between demand and the hospital’s manpower and capacity to see patients.

In an ideal situation, the workload should be distributed based on capacity, but this will be difficult without some form of central planning. One way to address any unequal distribution of demand is to have a central waiting list of everyone waiting for a particular type of care,<sup>12</sup> in this case cardiology outpatient care. The central list for all public hospitals can address unequal demand or unequal WT in a given hospital. One shortcoming of this approach is that it may remove the incentive to be a more efficient provider, since demand would shift to the fastest provider. Another alternative might be an arrangement in which polyclinic referrals are based on geographical location, referral volume and capacity, which could be adjusted periodically, based on workload and WT.

*Managing Demand – Appropriateness of Referral by Outcomes*

To understand the reasons for the increased demand for cardiology appointments, it would be helpful to have long-term data on the final diagnosis of patients referred to cardiology and whether this pattern of referrals has changed. However, no such data exists. To address this, a prospective study was performed on all cardiology referrals to NHC over a 1-month period in December 2005, with a follow-up review of case-sheets 3 months later to determine the final diagnosis.<sup>8</sup> Although the details of the study are reported separately, a few key findings are relevant to this paper. In approximately 77% of referred patients, no definite abnormality was detected after 3 months of assessment and/or investigation. Many patients had symptoms such as chest discomfort or breathlessness, common complaints that might well be attributed to heart disease, resulting in a specialist referral. Others were asymptomatic, referred because of ECG findings that raised concerns about underlying silent heart disease. These findings are typical of the referral population of any cardiology clinic, with the

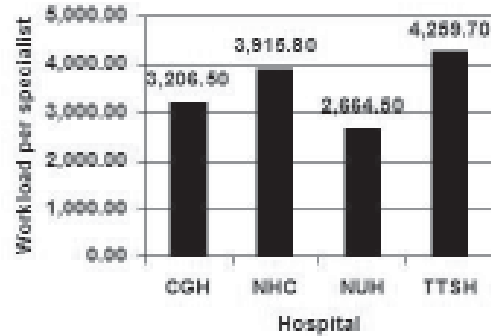


Fig. 5. Workload per specialist calculated from the number of patients seen in cardiology specialist outpatient clinics divided by number of specialists (Associate Consultants - Senior Consultants) in each institution in 2005. Data based on Ministry of Health submissions.

majority of patients seen to investigate symptoms or other findings, many of whom may not actually have any underlying disease. Indeed, less than 5% of patients were actually confirmed to have coronary artery disease (CAD) by cardiac catheterisation. However, because heart disease is a major cause of death in Singapore and can strike suddenly, patients and their doctors may be particularly concerned about the possibility of occult heart disease, particularly CAD. These findings remind us that demand for cardiac appointments depend not only on the incidence of heart disease but also on the perception of its likelihood.

One approach that is being explored is the use of outcome data from studies such as that conducted by Kwok et al<sup>8</sup> to refine the selection of patients for referral and further testing. The study identified 2 areas where the clinical quality of referral can be improved. Firstly, there is potential for a risk stratification categorisation of chest pain into typical, atypical and non-anginal as a tool to prioritise referral to cardiology.<sup>13</sup> Patients with typical chest pain had a 29% likelihood of CAD proven by angiography, compared to 5% for patients complaining of breathlessness and 0% for patients with non-anginal chest pain. The use of clinical risk stratification tools may help identify patients with a much higher likelihood of disease (or safely exclude a low risk group) so that the higher risk patients can have earlier access to care. Likewise, it may potentially reduce the overall volume of referrals, thereby reducing WT and improving access to cardiac care. The study suggests that the resting ECG was of little value in asymptomatic patients. While resting ECG is generally a useful investigation for patients with acute chest pain, it is not a sensitive or specific test for diagnosing ischaemic heart disease in patients who do not have cardiac symptoms. Apart from atrial fibrillation, the yield from referral of asymptomatic patients with abnormal resting ECG findings was very low. Only 0.8% (1/122) of patients referred for asymptomatic ECG findings were subsequently found to have CAD proven by angiography. These findings question the usefulness of

resting ECG screening as a means of detecting CAD. In asymptomatic patients with chronic conditions such as diabetes, hypertension or hyperlipidaemia, a more effective management strategy is to focus on the control of risk factors, healthy lifestyle and early recognition of symptoms by patients.

#### *Referring Patients Back to Primary Care Physicians*

One possible factor limiting capacity is the ability to refer patients back to primary care. To understand patients' perceptions of the transfer of their care, a survey was conducted on NHC cardiology patients (n = 58) for 1 week in November 2006. A majority of the surveyed patients (60%) were willing to be transferred to primary care. However, very few patients were advised when they were suitable to be discharged. It is conceivable that in an environment of stretched capacity, cardiologists may have the tendency to complete the consultation as fast as possible rather than to choose the more time-consuming option of discussing the transfer of care and do the associated paperwork. At NHC, discussion is underway to address concerns regarding patient expectations and the discharge process so as to facilitate the transfer of patients with stable disease to primary care. Policies and initiatives to enhance and promote care in the appropriate setting are expected to have an indirect but favourable impact on cardiology WT. External factors limiting appropriate discharge of patients or referral back to primary care may include health financing system, drug pricing and patients' perception of primary vis-à-vis specialist care.<sup>14</sup>

#### **Potential Application of Better Scheduling Methods**

Thus far, the methods adopted have been to address rising demand or insufficient capacity. Elsewhere, it has been argued that the delay of care is often the result of unplanned, irrational scheduling and resource allocation.<sup>15,16</sup> The application of queuing theory and principles of industrial engineering, adapted to clinical settings may reduce WT without having to increase resources.<sup>17</sup> A model known as the advanced access model has been used to reduce delay in primary care in the US.<sup>15</sup> The complexity of the appointment system, with different categories of patients assigned to different appointment slots, may add to WT because it increases mismatch between demand and capacity. A number of studies and simulations have shown that even when demand and capacity are equivalent overall across a specific time period, the inability to match demand exactly to capacity on a daily basis inevitably increases WT because capacity that is not utilised at a given point in time cannot be carried forward and is effectively wasted. On the other hand, unmet demand is always carried forward and adds to WT, leading to an increase in WT, even when capacity matches demand in the long term.

The advanced access model of patient scheduling is based on the understanding that if the capacity to provide patient appointments matches the demand for appointments, appointments can be offered on the same day.<sup>18</sup> One of the key principles of advanced access is the need to match demand with capacity. However, even when capacity has been increased to match demand, this will not reduce WT unless the backlog of requests has been met, so that there is a need to exceed demand temporarily in order to clear backlog (i.e. mobilising doctors to run additional clinics). However, because our current appointment system is open-ended, without a clear definition of which geographical location is being served by which institution, hospitals have limited incentive to clear backlog, since a shorter WT might attract even more demand from other locations.

#### **Towards a Systematic Approach to Understanding and Resolving WT Issues**

As a result of our experience, we have attempted to formulate a framework that helps to rationalise efforts to solve long WT using a systematic approach rather than isolated initiatives. This can be summarised as a checklist under the following headings:

##### *A. Referrals Based on Clinical Urgency and Needs*

1. Determine the volume of demand for specialist appointments and how this has changed over time. (The number of patients seen is not a true measure of demand but an indirect measure since it reflects capacity rather than demand. Demand should be measured by the total number of requests made for appointments. This is currently not a standard practice.)
2. Determine the range of symptoms and illnesses that patients are being referred for, and assess which are more serious and require more urgent attention. (The study by Kwok et al<sup>9</sup> addressed this question.)
3. Determine what are the acceptable targets for appointment WT for these conditions. If there is a wide range of severity and long WTs, there may be a role for the prioritisation of cases (e.g., fast-track appointments).
4. Assess which conditions can be treated at the primary care level and which require referral. Some conditions when less severe might be investigated or managed by primary care physicians through training and/or the availability of appropriate diagnostic tests. There are also doctors' and patients' concerns and fears of missing a diagnosis of CAD.
5. Determine if there has been a true increase in specific disease incidence or whether there is an increase in demand as a result of other factors (e.g., fear of disease, shift from private to subsidised care). If the increased demand is contributed by fears of missing disease, can this be addressed?

- Determine what is the outcome of patients who have been referred and whether there has been an increase in morbidity or mortality from the condition/s being referred.

#### B. Distribution of Cases Throughout the Healthcare System

- Determine if there is a system to ensure that patients are being sent to the hospital with the shortest WT. Assess how WT data are collected and ensure that these systems are uniform in their methodology.
- Determine how workload is distributed throughout the system. (Are patients referred according to a systematic allocation based on geographical location or based on patient/doctor's choice?)

#### C. Patient Education and Self Management

- Educate patients on the important role they play in self management, controlling risk factors and leading healthy lifestyles to reduce the risk of ischaemic heart disease and cardiovascular events.
- Educate patients on the relative usefulness of resting ECG as a diagnostic tool, especially if they are asymptomatic.
- Educate patients on the recognition of cardiac symptoms so that they can seek treatment early.

### Conclusion

Appointment WT is an important measure of timely access to care. Our experience has shown that the issue of long WT is considerably more complex than just provider capacity or efficiency.

In summary, 3 key lessons:

- Individual institutions have some ability to grow capacity to meet an increase in WT, but have limited influence to contain a rise in demand, referral pattern or distribution because of the open system and lack of policy on distribution of referral. WT alone is not an indicator of the provider's efficiency. Timely access to care requires a partnership between referring institutions and hospitals, as well as an overview of how the system works.
- It is essential to systematically identify the multiple factors many of which are external to provider, ranging from patient and physician perception to pricing of drugs and the chronic care guidelines towards better access to care.
- Rather than focusing only on a single indicator such as WT, it is helpful to ask what is the intended final outcome. To ensure timely access to care, there is value in identifying those patients who need faster access and which referrals are unnecessary. Analyses of the outcome of referrals can provide valuable insights.

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