



Reducing wait times to surgery – an international review

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Abstract: This study aimed to describe approaches used in Canada and internationally, targeting wait times from the decision to treat to surgery (wait time 2). Access to optimal care at the right place and at the right time remains a top priority for patients, healthcare providers and policymakers. Interviews with key informants from 14 countries and a scoping review were conducted to identify approaches targeting wait times. During interviews, participants were asked about their experiences with different approaches in their jurisdictions. The scoping review adhered to published guidelines and captured both peer-reviewed and grey literature. Results were compiled into tables and synthesized based on a conceptual framework describing the main policy types for improving wait times. The study included 32 interviews, 92 peer-reviewed studies and 242 documents from the grey literature. Information spanned 17 countries across multiple surgical areas. In total, 33 approaches were identified, with the majority [24] targeting the supply-side. Fifteen approaches had consistent or limited but promising evidence supporting their effectiveness. Approaches can impact wait times 2 by targeting demand, supply or both. Successful strategies require the implementation of multiple approaches, collaborations and investments. This study may help organizations plan and implement policies intended to improve timely access to surgical care.

Keywords: Elective surgery; time to surgery; scoping review; interviews; international comparison

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Introduction

There are wait times for health services (often seen as too long) in many countries, and are seen as a major challenge to many developed nations. In particular, long wait times for elective (i.e., non-emergent) surgical services have been the source of increased dissatisfaction among patients, impacting patient-centred care, and requiring health system decision-makers to develop policy actions to counter them. In 21 of 34 countries surveyed by the Organization for Economic Co-operation and Development (OECD) wait times was stated as either of high-priority or medium-high

priority for their health systems (1). The main concern in most of these countries is around wait times for elective treatments; e.g., in Canada, wait times for hip and knee replacements are approximately 3 times as long as they are in Denmark (1).

A companion paper (submitted for publication) reported on approaches implemented in several countries targeting wait times from referral to first appointment with a specialist, also known as “wait time 1”. In this paper, approaches implemented to reduce wait times from the decision to perform surgery to the actual surgical service (wait time 2) are examined.

Table 1 Quality appraisal and strength of evidence criteria

Quality appraisal criteria
Amount of evidence
Consistency of evidence
Certainty of evidence
Strength of evidence criteria
Consistent positive evidence of effectiveness*
Limited but promising evidence of effectiveness
Mixed evidence of effectiveness
Not possible to determine—no information on impact found
Not possible to determine—implemented alongside other approaches
Consistent negative evidence of effectiveness

*, at least three sources of information presenting the same findings of their impact on wait times.

Methods

For this study, wait times were defined as the time from decision to perform surgery to when the surgery takes place (2,3). Information was obtained in two ways: (I) through interviews with key informants who were identified across Canada, and publicly funded health care systems in 13 countries that outranked Canada on performance measures related to access to selected surgery [Australia, Denmark, France, Germany, Israel, Italy, Netherlands, New Zealand, Norway, Sweden, Switzerland, UK, and the United States (Medicare/Medicaid)] (4,5); and (II) a scoping review of the literature (to identify additional approaches not reported in the interviews) following the Arksey O'Malley methodological framework (6). Complete details of these methods are provided in the companion paper.

Interviews

Multiple sources including referral from experts were used to identify potential interview participants. Additional candidates were obtained through websites of health authorities of health, relevant surgical associations, personal contacts in the international health technology assessment community, and recommendations from individuals already interviewed. Recruitment continued until saturation of information was reached. Because this study was part of a quality improvement project, ethical approval was not required.

Interviews were conducted over the phone with one researcher leading the interview and up to two others taking notes. Interview questions asked about approaches used to improve access to scheduled surgeries, program design and implementation. Participants' responses were validated and analyzed to identify themes.

Scoping review

An experienced information specialist developed and validated the search strategy, which was applied to the following databases: Ovid MEDLINE®, Embase, the Cochrane library, CINAHL, EconLit and Web of Science. Search strategies were also developed to identify documents in the grey literature using the Google search engine, websites of ministries of health, health authorities and hospitals.

Documents were included if they: (I) described a method, system, policy or approach directly or indirectly intended to reduce wait times and (II) were in English or French. Documents were excluded if they described approaches targeting non-elective surgeries or transplants.

Two reviewers independently screened titles and abstracts and assessed the full-text documents against the eligibility criteria. In case of disagreement between reviewers, a third reviewer was consulted. Information was extracted using a standardized, pre-tested form.

Synthesis and quality appraisal of findings from the interviews and scoping review

Approaches were identified through both methods were separately analyzed for themes, each theme representing an approach. A common set of approaches was then compiled. Since wait times occur because of a mismatch of the demand for services and the supply of services to deliver them, the approaches identified were classified into supply-side strategies, demand-side strategies or both. For each approach, the quality and strength of evidence were assessed using categories from previous literature (7) and presented in *Table 1*. Findings from the synthesis of information were structured to comply with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) (8).

Results

The peer-reviewed search strategy identified 32,314

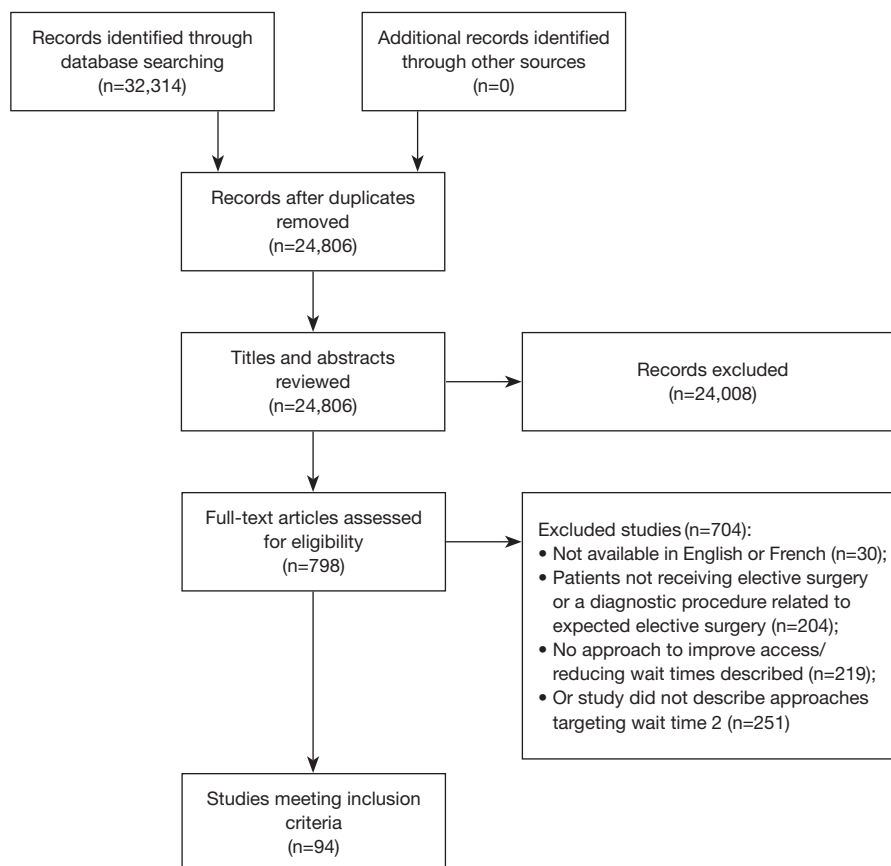


Figure 1 PRISMA diagram. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

records, out of which 798 were retrieved for full-text review after removal of duplicates and title screening. Ultimately, 92 articles met the eligibility criteria (*Figure 1*). A total of 242 documents from the grey literature and 32 interviews from seventeen different countries were also included in the study (*Table 2*).

Table 3 provides details on 33 approaches targeting wait time 2 identified in interviews and the literature. Among them, 24 were supply-side strategies, 5 were demand-side strategies and 4 targeted both supply and demand. Fifteen approaches had consistent or limited but promising evidence supporting their effectiveness. The supplemental material (available at <https://cdn.amegroups.com/static/public/jhmhp-21-96-1.pdf>) provides all references and detailed information regarding all approaches.

Expanded roles for non-physicians

Examples of expanded roles for non-physicians included

performance of pre-admission services (interviews, education and pre-anesthesia assessment) by nurses. One study from the UK reported the median waiting time from referral to surgery dropped by a half after the introduction of a nurse-run pre-operative assessment for hernia (9).

Five examples of nurses performing biopsies, hysteroscopy, carpal tunnel syndrome procedures, and anesthesia during pacemaker implantation were identified (10-14). Specialists assisted nurses when needed and were able to focus on complex cases. Studies reported an improvement in wait times for the service provided by nurses (12,14) and low complication rates (12). In one study where nurses were in charge of low complexity cases, doctors were able to focus on cases that were more complex which, in turn, improved wait times (14). However, in one study, the hiring of nurses to perform tasks typically done by physicians received criticism from surgeons, who felt that there was already a nursing shortage and a lack of evidence that such an approach was cost-effective (12).

Table 2 Overall characteristics of included documents

Characteristics	Publications, n [%]
Total	366 [100]
Source of information	
Peer reviewed studies	92 [25]
Grey literature	242 [66]
Interview	32 [9]
Region	
Australia	58 [16]
Canada	170 [46]
Denmark	6 [2]
Finland	1 [0]
France	1 [0]
Hong Kong	2 [1]
Ireland	5 [1]
Israel	4 [1]
Netherlands	3 [1]
New Zealand	14 [4]
Norway	11 [3]
Portugal	1 [0]
Spain	6 [2]
Sweden	13 [4]
Switzerland	1 [0]
United Kingdom	55 [15]
United States	7 [2]
Multiple	10 [3]
Specialty area	
Cardiothoracic	12 [3]
ENT	6 [2]
General surgery	9 [2]
Gynecology	1 [0]
Oncology	14 [4]
Ophthalmology	13 [4]
Orthopedic/neurosurgery	52 [14]
Pediatrics	3 [1]
Urology	2 [1]
Vascular surgery	1 [0]
Various	252 [69]
Not reported	2 [1]

ENT, ear, nose and throat.

Process improvement methodology

Process improvement methodologies aimed to improve quality and efficiency of healthcare services. LEAN, Six Sigma or both were the approaches. LEAN refers to a set of methods and philosophies whose goal is to eliminate waste through an ongoing process. Six Sigma is a data-driven approach focusing on preventing defects.

Peer-reviewed studies and non-peer-reviewed documents described LEAN/Six Sigma applied in different medical areas and healthcare settings. They demonstrated that such methods improved one or more of the following factors: wait times (to surgery), wait list numbers, surgical volumes, case throughput, numbers of no-shows and costs (15-26). Neither LEAN nor Six Sigma were mentioned during interviews.

Publicly funded, privately delivered services

To increase surgical capacity, countries like Denmark, Australia, and Norway have provided publicly funded surgical services in private facilities through contractual arrangements as a means of quickly obtaining access to additional capacity. Across peer-reviewed studies, it was reported that the provision of publicly funded surgeries through private facilities resulted in a decrease in the number of patients on public waiting lists (27-29). However, in Scotland, it was eventually determined that the program offered poor value for money and contracts were terminated (29). Evidence from other sources also demonstrated increased surgical volumes (30,31) and reduced wait times (30,32,33). Some unintended consequences of this type of funding were reports of patients being charged extra operating costs (34) and an influx of more complex cases into the public system (35). While no impact on wait times was mentioned during interviews, one participant reported that the Auditor General from Canada recommended better accountability and management of privately delivered services.

Same-day surgery and discharge

Many public healthcare systems are making efforts to increase the use of same day surgery to reduce wait times by increasing efficiency. Surgeries performed are often “less complex” or of “lower acuity” and patients may need to meet certain medical eligibility criteria. Some programs ensure patients have the right supports in place at home first before approving them for same-day surgery and discharge.

Table 3 Characteristics of approaches targeting wait time 2

Approach, source of information, n (%)	Categories	Strength of evidence
Supply-side approaches		
Expanded roles for non-physicians, n=16 (4%)	Non-physician-led surgery Pre-admission assessments	Consistent positive evidence of effectiveness
Process improvement methodology, n=15 (4%)	LEAN Six Sigma LEAN/Six Sigma Others	Consistent positive evidence of effectiveness
Publicly funded, privately delivered services, n=48 (13%)	Not applicable	Consistent positive evidence of effectiveness
Same-day surgery and discharge, n=18 (5%)	Not applicable	Consistent positive evidence of effectiveness
Standardized treatment pathways, n=16 (4%)	Not applicable	Consistent positive evidence of effectiveness
Streamlined pre-admission processes, n=18 (5%)	Centralized pre-admission clinics Telephone pre-admission services	Consistent positive evidence of effectiveness
Targeted funding, n=60 (16%)	Elective procedures Human resources Infrastructure Scheduling	Consistent positive evidence of effectiveness
Centralization of elective surgeries, n=14 (4%)	Centre dedicated to elective surgery Centre dedicated to elective surgery at a hospital OR dedicated to elective surgeries within a hospital	Limited but promising evidence of effectiveness
Centralized surgical scheduling, n=14 (4%)	Not applicable	Limited but promising evidence of effectiveness
Efficient use of ORs, n=9 (2%)	Parallel processing Concurrent run ORs	Limited but promising evidence of effectiveness
Family doctors-led surgeries, n=3 (1%)	Not applicable	Limited but promising evidence of effectiveness
Fast-track programs, n=4 (1%)	Not applicable	Limited but promising evidence of effectiveness
Patient choice, n=36 (10%)	Hospital Surgeon Surgery date	Limited but promising evidence of effectiveness
Mobile surgical clinics, n=4 (1%)	Not applicable	Mixed evidence of effectiveness

Table 3 (continued)

Table 3 (continued)

Approach, source of information, n (%)	Categories	Strength of evidence
Organization incentives, n=19 (5%)	Activity-based funding	Mixed evidence of effectiveness
	Pay-for-performance	
	Disincentives	
	Non-financial incentives	
Appointment reminders, n=1 (<1%)	Text	Not possible to determine—no information on impact found
Cancellation lists, n=5 (1%)	Not applicable	Not possible to determine—no information on impact found
Flex days, n=1 (<1%)	Not applicable	Not possible to determine—no information on impact found
Innovative surgical approaches, n=4 (1%)	Not applicable	Not possible to determine—no information on impact found
No-show policies, n=1 (<1%)	Not applicable	Not possible to determine—no information on impact found
Procedure rooms, n=1 (<1%)	Not applicable	Not possible to determine—no information on impact found
Pre-habilitation clinics, n=11 (3%)	Not applicable	Not possible to determine—implemented alongside other approaches
Provider incentives, n=3 (1%)	Financial incentives	Not possible to determine—implemented alongside other approaches
	Non-financial incentives	
Privately funded, privately delivered services, n=9 (2%)	Not applicable	Consistent negative evidence of effectiveness
Demand-side approaches		
Prioritization of patients, n=47 (13%)	Not applicable	Consistent positive evidence of effectiveness
Regular validation of wait lists, n=7 (2%)	Not applicable	Consistent positive evidence of effectiveness
Subsidies for private health insurance or privately funded health insurance, n=2 (1%)	Not applicable	Not possible to determine—no information on impact found
Wait list management policies, n=2 (1%)	Not applicable	Not possible to determine—no information on impact found
Patient-targeted appropriateness initiatives, n=2 (1%)	Not applicable	Consistent negative evidence of effectiveness
Supply and demand approaches		
Ongoing monitoring, analysis, and reporting of wait time and other outcomes data, n=55 (15%)	Not applicable	Not possible to determine—implemented alongside other approaches
Operations research and resource planning tools, n=12 (3%)	Not applicable	Not possible to determine—no information on impact found

Table 3 (continued)

Table 3 (continued)

Approach, source of information, n (%)	Categories	Strength of evidence
Public reporting of wait times, n=19 (5%)	Not applicable	Not possible to determine—no information on impact found
Wait time targets, n=55 (15%)	Legally binding wait time targets or guarantees enforced through positive and negative incentives	Mixed evidence of effectiveness
	Legally binding wait time targets or guarantees and mandatory offer of alternative provider enforced through negative or positive incentives	
	Legally binding wait time targets or guarantees and mandatory offer of alternative provider	
	Non-legally binding wait time targets or guarantees and offer of alternative provider	
	Non-legally binding wait time targets or guarantees	

ORs, operating rooms.

Evidence consistently showed a reduction in wait times, more efficient use of resources, fewer cancellations due to bed shortages, and increased numbers of operations (36-38). In interviews, participants from Canada, Denmark and Netherlands described same-day surgeries but no impact on wait times was reported. However, one interviewee mentioned satisfaction from patients after joint replacement as long as they had someone helping them at home. Another participant also found great return on investment from a same-day mastectomy program.

Standardized treatment pathways

Standardized treatment pathways prescribe the care patients should receive from referral to treatment. They aim to reduce wait times by standardizing and streamlining patient care.

Documents and interviews reported that standardized treatment pathways significantly reduced all wait time measures from referral to surgical procedure with one source describing a reduction of 12% in waiting times from decision-to-treat to surgery (39-42). Other benefits of standardized pathways included reduction in length of hospitalization, costs and cancellation rates (39-41).

Streamlined pre-admission process

Streamlined pre-admission processes are designed to make the pre-admission process more efficient. At centralized

pre-admission clinics, all pre-assessment services are provided in a single location to prepare patients for surgery and what to expect post-operatively. Streamlined pre-admissions can also be conducted via telephone for eligible patients to reduce burden of multiple travels.

Five peer-reviewed studies on pre-admission clinics were identified. The first examined a redesigned day-surgery centre in Norway, where patients cleared for elective surgery proceed directly to the laboratory for blood sampling and a drop-in anesthesia clinic for medical pre-assessment (43). The second study looked at the introduction of pre-operative consent clinics for patients with ear, nose and throat (ENT) issues 2 weeks prior to surgery to ensure their diagnostic tests are up-to-date (44). The third study examined the implementation of a pre-operative assessment clinic as part of a new direct-access day-case surgery process for general surgery. Patients were assessed by a nurse at the clinic 1 week before surgery (9). The fourth study reviewed the implementation of nurse-led multidimensional preoperative assessment for frail, older adults undergoing elective surgery (45). The fifth study reviewed the pre-admission process for cardiothoracic surgeries (16). The studies reported fewer cancellations (16,44,45) and a reduction in wait times for surgery (9,44,45). Other sources reported that cancellation rates decreased (46) and capacity increased (47).

Evidence on telephone pre-admission services was limited since the approach was implemented alongside other strategies. However, one source from Australia indicated that the service was more efficient and cost-effective (48).

Targeted funding

This is essentially a policy intervention whereby additional funds are made available to health authorities to increase the number of surgeries and work hours, improve infrastructure, and ensure that the necessary human resources are available to provide services in a timely manner. Across different sources, including one interview, targeted funding demonstrated reduced wait times and wait lists while also increasing the number of surgeries (49-54). However, this impact may not be sustained without continued funding (51).

Centralization of elective surgeries

To increase efficiency and quality of care, elective surgeries have been centralized in some jurisdictions through the establishment of dedicated operating rooms (ORs) or centres attached to or within hospitals. In general, dedicated centres only perform elective surgeries of low complexity. Thus, they need a robust process to select suitable patients.

One study reported on the centralization of low-complexity orthopedic surgery in British Columbia, Canada and found a decrease in the number of patients waiting longer than 26 weeks in the first 2 years. The waiting list also decreased in the first year, but slightly increased in the second year (49). The second study was on a prophylactic mastectomy program in which 5 ORs in an ambulatory centre were dedicated to the program once a month. The program successfully reduced wait times (55). Other sources reported reduced wait times following the centralization of cataract surgeries in Canada (56) and elective surgeries in England (57).

Centralized surgical scheduling

Central booking offices have been established to manage surgeons' wait lists and schedule their surgeries. Offices may serve surgeons at a single hospital or several hospitals within a region. The approach aims to improve management of surgical waitlists and patient experience.

Evidence relating to the effectiveness was limited. One peer reviewed study examined the impact of an electronic surgical planning system for all elective surgeries in a Norwegian hospital (43). The system was implemented alongside an electronic referral system, development of a day-surgery centre, and redesign of the elective surgery care pathway. While the results suggested a reduction in

cancellation rates and an increase in surgical volume, it was not possible to determine if these were attributable to the new scheduling system or other changes implemented at the same time (43). One unpublished report described a reduction in number of patients on the wait list after centralized scheduling was implemented alongside other strategies (58). One Canadian interviewee suggested that, while surgeons may resist giving up management of their wait lists and scheduling at first, most eventually appreciate central scheduling offices due to their positive impact.

Efficient use of ORs

Parallel processing has been used to reduce idle time by having patients sedated in one room while the OR is being cleaned and set-up. Concurrently run ORs (i.e., "swing" rooms or "flip-flop" rooms) allow surgeons to move between surgeries being performed in different ORs as the patients are ready for them. Both are viewed as innovative ways to increase OR efficiency.

One peer-reviewed study described a surgeon's experience using parallel processing while performing hernia repairs at a hospital in the US (59). It reported that the approach significantly shortened induction and turnover times sufficiently (without compromising patient safety or satisfaction) to allow the addition of new operative cases. One document from Australia also reported improvements in efficiency, capacity, and cancellation rates, minimizing overruns with consequent overtime staff costs (60).

The literature from Canada and the US in different specialty areas reported increased OR efficiency with concurrent ORs (55,61,62) and improvements in wait times (55,63). However, one study found a limit at which the two-room model could not further increase efficiency (62). One interviewee also reported that, while efficiency increased, it was not enough to allow for additional procedures to be performed.

Family doctors-led surgeries

Family doctors in New Zealand, Ireland and the UK received training to provide low-complexity surgeries including general surgery, ENT procedures and vasectomies, respectively. According to one source, surgery performed by family doctors were appropriate and waiting times from referral to treatment improved (46). No further information on impact was found.

Fast-track programs

Fast-track programs establish preferential pathways for patients with suspected cancer, who once have diagnosis confirmed, undergo treatment within a pre-established timeframe.

Studies reported reduction in wait times from referral to first treatment (64,65), and from time of diagnosis to treatment (66). However, one study found the success of the program depended on specialists extending their work hours (65), and another reported most patients still exceeded the wait time targets (64). Fast track programs were not mentioned during the interviews.

Patient choice

Patients have the option to choose a hospital or surgeon with the shortest waiting times. In some jurisdictions, waiting times and other quality indicators were made available or patients had the option of choosing their surgery date in an effort to decrease anxiety and cancellations.

Two documents reported that patient choice of surgeon reduced wait times (39,67). One peer-reviewed study described reductions in wait times from referral to treatment after choice of hospital was introduced in the UK (68). One hospital in Norway allowed patients to choose their surgery date, but no information on impact was found (69). According to interviewees, the approach was implemented in some Canadian provinces, but no information on impact was found.

Mobile surgical clinics

Mobile surgical clinics are self-contained units that deliver services in geographically isolated areas or small towns that may lack access to healthcare providers. These clinics typically operate as one-stop shops, treating patients from referral to discharge, and are able to perform some minor surgical procedures.

Evidence of effectiveness from New Zealand and the United Kingdom was mixed. According to different sources, mobile clinics increased surgical capacity and allowed wait time targets to be met (70,71). One interviewee also informed that the service provided work force training for rural areas, but mobile clinics were clinically inappropriate for many patients. One study also found the quality of services provided was not assessed, and initially, many

complications were reported. The study suggested mobile clinics made some staff at public hospitals obsolete by reducing volume of services at these facilities (72).

Organization incentives

Countries implement financial and non-financial incentives to encourage organizations to improve their services. Financial incentives can be further categorized into: activity-based funding, pay-for-performance, and disincentives. In activity-based funding, institutions are allocated funds based on the complexity of the patients (case-mix) and the type and volume of services they provide to the patients they serve. In pay-for-performance, the payment to an institution depends on it meeting pre-established benchmarks.

In 2000, England implemented a star rating system in which hospitals received rewards (greater autonomy) or sanctions (dismissal of managers) based on a set of indicators. One study reported positive outcomes after this policy (73). However, another study found many providers, while happy with the outcomes, experienced considerable pressure from the system (74).

In regard to activity-based funding, evidence from both peer-reviewed literature and one interview suggested that the approach increased surgical volumes and reduced wait times. However, in Denmark and Norway, complaints were reported about up-coding (i.e., reporting higher severity to increase income). In Denmark, it was also suggested that the process led to budgetary uncertainties (75,76). Finally, one unpublished document reported a decrease in number of patients waiting more than 90 days for treatment after introduction of pay-for-performance in Sweden (77).

Appointment reminders for surgeries

Appointment reminders comprised the use of text messages to send reminders to patients of their surgery in order to reduce cancellations. In some countries, such reminders are automated. Patients could either confirm or reschedule their surgery, allowing other patients to be booked into unfilled slots.

One study in Norway found a statistically significant reduction in cancellation rates, as well as stabilization of cancellation rates and an increase in the number of surgeries performed (43). One Australian report indicated that cancellation rates decreased after the approach was implemented (78). No impact on wait times was provided.

Cancellation lists

Cancellation lists include names and contact details of patients willing to have surgery at short notice if a cancellation occurred, thereby reducing wait times by supporting full utilization of ORs. While this approach was mentioned both in the literature and interviews with respondents from Australia and Canada, no information on impact was found.

Flex days

Flex days referred to days in which ORs were made available for all services to use for urgent or emergent cases. This was done to help ensure that elective cases were not bumped. One interviewee from Canada suggested flex days have helped reduce cancellations of elective surgeries. No other information was found.

Innovative surgical approaches

As medical research continues to advance, innovative surgical approaches designed to improve OR efficiencies and outcomes have been introduced. Some innovative approaches have allowed patients to be discharged the same day as their surgery.

Examples from the literature and interviews include: SuperPATH, a new approach for hip replacement used in some Canadian provinces; one-day vascular surgery; and 23-hour appendectomies (79,80). Information about the impact of these surgical approaches was not found.

No-show policies

In the UK, patients have been penalized for missing scheduled surgeries without prior warning, except under exceptional circumstances. Specifically, patients returned to the back of the queue if they did not show up for treatment (81). No information on effectiveness was found.

Procedure rooms

Hospital rooms designated for small procedures that do not require an OR have been established in some centres. One respondent from Canada described the use of procedure rooms for suture removals and lumbar punctures which helped to increase capacity. No further information was found.

Pre-habilitation clinics

Pre-habilitation services are designed to optimize a patient's overall health before they undergo elective surgery in order to ensure safer surgery, quicker recovery, and potentially reduce length of hospital stay. These services are commonly offered to patients undergoing orthopedic procedures, but have also been used for cardiothoracic, gynecology, and vascular surgeries. They may include education sessions, conditioning classes, and nutritional counselling depending on the targeted audience.

Based on findings from peer-reviewed studies, pre-habilitation programs were associated with reduced wait times for surgery and decreased length of stay; however, it was not possible to attribute either outcome to pre-habilitation programs, since they had been introduced alongside other approaches (40,42,46,49,80,82). One interview respondent suggested that pre-habilitation is costly and sometimes causes unnecessary delays in surgery.

Provider incentives

Providers who achieved pre-established targets have received financial or non-financial incentives. In 1996, in Spain, providers who managed to reduce the number of patients on the waiting list received bonuses in proportion to their salaries. Although the number of patients on the waiting list and mean waiting time decreased during this period, such incentives had been a part of a multipronged approach to reducing wait times (83,84). Non-financial incentives were identified in Canada, where surgeons received score cards comparing their performance to defined targets. One study found non-financial incentives alongside other approaches reduced wait times from referral to surgery (85).

Privately funded, privately delivered services

Several countries with publicly funded healthcare have a parallel private healthcare system, where patients can buy private insurance or pay out-of-pocket for privately delivered services. It has been suggested that parallel systems help to reduce wait times by allowing patients who can afford it to seek care in private facilities, while those who cannot are able to receive care in publicly funded facilities. One peer-reviewed study found that increased activity in the private healthcare system led to longer waits in Australia's public healthcare system (86). Similarly, the

grey literature did not demonstrate a positive impact of parallel private healthcare systems on wait times (87). No interview reported on the impact of the approach on wait times.

Prioritization of patients

Prioritization criteria have been used to identify surgical candidates and organize them on wait lists. Depending on the jurisdiction, they have considered: urgency or need alone; urgency and ability to benefit; or urgency and social/economic considerations, including ability to work, perform daily activities, and live independently, length of time waiting, and cost-effectiveness of the treatment. The development of these criteria has involved different groups (surgeons, family physicians, other health care providers, institutional administrators and patients) using different methods such as consensus, concept mapping, focus groups and Delphi panels. Criteria have been established for pediatric and adult surgery more broadly, and for specific procedures, including cataract surgery, cardiovascular surgery, and hip and knee replacement. In one case, health insurance has been used to create a priority ranking of patients (on sick leave) (88).

Regardless of the specific criteria, most examples from documents and interviews demonstrated that the use of criteria resulted in a reduction in wait times or in the number of patients waiting a specific amount of time (54,82,84,88,89). However, the extent to which other approaches implemented in addition to prioritization criteria contributed to the results was unclear.

The peer-reviewed literature also contained commentaries on some of the other benefits of prioritization. They primarily related to data collection and quality improvement. A uniform, standard way of prioritizing cases was seen as allowing for better benchmarking and leading to improved practices (90,91). The data collected for prioritization purposes had also facilitated comparisons across institutions and regions. It was felt that a prioritization approach increased consistency and fairness and ensured OR time was used with maximum effectiveness. In one case, it was noted that implementing the process brought to light previously undocumented issues, such as the simultaneous booking of both eyes for cataract surgery and variations in waiting time between surgeons (90).

At the same time, there have been concerns about how criteria are selected and weighted relative to one another.

Classifying patients into broad categories for elective surgery wait lists has largely been subjective, and it was felt that clinicians can vary in their assessment of clinical and non-clinical factors in assigning a priority level.

Regular validation of wait lists

Waitlist validation involved the active review of waiting lists to ensure that all patients on the list still required surgery. Its purpose was to reassess patients' clinical condition, update data and identify patients who were truly ready for care.

The literature reported that list validation reduced the number of patients on the waiting list, leading to reductions in wait times (50,92,93). However, according to one study, while the approach reduced wait times, the mean wait time still exceeded the recommended timeframe (50).

Subsidies for private health insurance or privately funded health insurance

Australia and Hong Kong provided patients with subsidies to encourage them to access privately funded, privately delivered surgeries in order to reduce strain on the public system. In Australia, the government began offering tax incentives in 1997 to encourage people to buy private health insurance after the percentage of the population covered by private health insurance fell from 50% to 30.5% between 1984 and 1998. This led to an increase in the percentage of both private health insurance coverage and the privately funded share of health care activity (84). In Hong Kong, the government implemented a public-private partnership program in which patients who chose to receive cataract surgery from a private ophthalmologist received a \$5,000 subsidy to help offset the cost of the procedure (31). The program achieved the set target of 10,000 surgeries. While both programs were considered successful, impact on wait times were not reported.

Wait list management policies

Wait list management policies are designed to help clinics better manage their wait lists and accurately measure wait times. In one Canadian province, the management policy provide guidance around ongoing wait list maintenance and management (54). No evidence on the impact from the scoping review and interview was found.

Patient-targeted appropriateness initiatives

Patient-targeted appropriateness initiatives aim to help patients understand their options and choose the most appropriate treatment, reducing wait lists by ensuring only appropriate patients receive surgery. In two randomized-controlled trials in Canada, patients with osteoarthritis received education materials with information on treatment options and their benefits and harms. Both studies found no statistically significant difference in median total waiting times from screening consultation to a definitive decision (i.e., surgery or off wait list) between the groups receiving and not receiving the intervention (94,95). However, in one of the trials, patients exposed to the education materials obtained higher decision quality compared to the unexposed cohort (94). The second trial found no difference in decisions quality between groups (95). No further information was provided during interviews.

Ongoing monitoring, analysis, and reporting of wait times and other outcomes data

Ongoing monitoring involved continuous collection and monitoring of wait times, quality and safety data at local, regional or national levels. It was used to: identify barriers and opportunities for improvement; assess new initiatives designed to improve surgical access; and measure, monitor and manage surgical access.

According to documents and interviews, the approach was usually part of policies to reduce wait times (96-99). Ongoing monitoring was viewed as critical to the development of wait time measures, benchmarks and comparison across institutions and regions. While the effects of monitoring, alone, on wait times were unclear, the process was considered essential for addressing this issue.

Operations research and resources planning tools

Operations research refers to mathematical models applied to retrospectively analyze the impact of interventions on wait times and to explore possible effects of different scenarios on wait times. Availability of data through ongoing monitoring is a key component to building models.

Twelve studies, identified in the literature, developed models to analyze the effect of supply-side and demand-side approaches (100-111). Two studies developed models that were subsequently used to support strategic planning, redistribute OR capacity, make decisions around

additional investments in infrastructure and staff, and revise eligibility criteria for surgery (104,110). During interviews, participants from Canada mentioned using hospital operations management tools as essential for capacity and resource planning.

Public reporting of wait times

Wait times have been made publicly available and regularly updated to increase transparency and accountability, document performance and reduce waiting times by allowing patients and physicians to make referral decisions based on such information. One Norwegian study found that wait times from referral to surgery were longer after public reporting was initiated (112). Several reports suggested few patients use information on waits to change surgeons or seek treatment in another hospital (83,84,112-114).

Wait time targets

Wait time targets or guarantees policies have been implemented in multiple countries with publicly funded healthcare systems. In theory, the policy guarantees patients receive surgery within a reasonable and clinically recommended timeframe. These policies may be legally or non-legally binding. Legally binding policies include: (I) those which specify legally binding wait time targets, enforced through positive or negative incentives; (II) those which specify legally binding wait time targets, have a mandatory offer of an alternative provider, and are enforced through positive or negative incentives; or (III) those which specify legally binding wait time targets, have a mandatory offer of an alternative provider, but do not indicate the use of enforcement mechanisms. Non-legally binding policies include: (I) those which specify non-binding targets with the offer of alternative provider or (II) those which specify non-binding targets.

A series of legally binding policies enforced using positive or negative incentives have been introduced in England (73,77,115-118). Several studies reporting on the impact of such policies found that while they reduced wait times 2 (77,116,119,120) and overall wait times (73,121-123), they also received criticism from healthcare professionals who felt they undermined professional autonomy, reduced staff morale, distorted clinical priorities (124), and manipulated signs of waiting lists (73,121-123).

In Norway, in the 1990s, a legally binding wait time

guarantee was given to patients with “needs”, and by law, it had to offer treatment to patients at another provider if the guarantee was not fulfilled. However, the number of patients on the wait list and waiting more than 6 months increased. Consequently, the policy changed in 2004. After that, an assessment by a specialist had to take place within 30 days of referral, and if the patient met the requirements, she/he was given an individual maximum waiting time until start of treatment. The policy demonstrated little effect on mean waiting times from referral to surgery, but from 2006 to 2011, there was a reduction in the number of patients being given a maximum waiting time guarantee (125).

In 1992, Sweden instituted a non-legally binding guarantee for 12 procedures. Additional funding was provided. Three peer-reviewed studies and 2 reports in the grey literature concluded that there was a temporary reduction in wait times, which stopped when no new funds were provided (77,126-129). In 2005, a new policy for all elective surgeries was enacted, in which patients could choose another provider (public or private) if the guarantee was not fulfilled at the expense of the region where they resided. However, the policy had limited effect on wait times, with many patients uninformed about their rights to choose another provider (77,130). This led to a policy change in 2010 that introduced economic incentives to Health Authorities achieving wait time targets. One study compared overall wait times in Sweden to those in Norway, where such incentives had not been implemented, and found that they were lower in Sweden (131).

In Scotland, a non-legally binding wait time guarantee and an offer of an alternative provider were instituted in 2003. Mean wait times decreased after the policy was introduced (105,132). However, analyses also showed that low priority patients experienced a reduction in wait times at the cost of high-priority patients, whose wait times did not change over time. In 2011, Scotland implemented legally binding targets, but no information on the impact of the policy was found.

In Denmark, a non-legally binding wait time guarantee had no effect on wait times (77,133). Consequently, a new policy was introduced, in which patients were offered the option of another provider if the guarantee was not met. Additional funding was provided. While wait times declined, the percentage of patients seeking private hospitals increased during the same period (77).

In Canada, the federal government offered extra funding to provinces that committed publicly to establishing wait time guarantees for at least one procedure. In the first

5 years, most provinces had made progress in reducing wait times. However, the impact of the target times has not been consistent over time or across the country (134-136).

Overall, we identified 8 approaches with consistent positive evidence of effectiveness, listed in order of the number of sources of information which we reviewed:

- (I) Targeted funding (60);
- (II) Publicly funded, privately delivered services (48);
- (III) Prioritization of patients (47);
- (IV) Same-day surgery and discharge (18);
- (V) Streamlined pre-admission processes (18);
- (VI) Expanded roles for non-physicians (16);
- (VII) Standardized treatment pathways (16);
- (VIII) Process improvement methodology (15);
- (IX) Regular validation of wait lists (7).

Six approaches were identified as having limited but promising evidence of effectiveness:

- (I) Patient choice (36);
- (II) Centralization of elective surgeries (14);
- (III) Centralized surgical scheduling (14);
- (IV) Efficient use of ORs (9);
- (V) Fast-track programs (4);
- (VI) Family doctors-led surgeries (3).

Two approaches were identified as having consistent negative evidence of effectiveness and none of the other strategies evaluated had enough information to determine their impact.

Discussion

This study included 366 different information sources describing 33 approaches with varying degrees of effectiveness in reducing wait times. Most were supply-side approaches, with 15 showing consistent or limited but promising positive impact.

The most effective policies were those comprising multiple supply and demand strategies targeting the whole patient pathway. They required collaboration between policymakers and healthcare providers, investment and even regulation changes.

Limitations

The intent of the review was to identify the range of approaches used in Canada and internationally to address wait times. Therefore, the search strategy did not include terms for specific approaches. As a result, it is possible that some studies of the effectiveness of specific approaches

may have been missed. Those interested in implementing one or more of the approaches identified in this review may need to conduct a more in-depth systematic review to assess their effectiveness. This would involve critically appraising studies, selecting and synthesizing outcomes of interest, including patient and provider experience, length of stay, and emergency room (ER) readmissions. Strength of evidence criteria used in this review defined a positive effect as a documented reduction in any wait time metric (mean, median, number of patients on the waitlist). Third, the quality assessment relied on the amount of evidence available, regardless of type (grey or peer-reviewed study). Fourth, the research team used Google as one of the search engines. Currently, there are no guidelines on how to use this search engine in such reviews (137,138). Finally, the study was limited to English and French.

Conclusions

This study identified eight different strategies with consistent positive evidence of effectiveness in reducing the wait time for elective surgeries and an additional six strategies with more limited but promising evidence of effectiveness. The approaches reviewed reduced referral times by affecting supply, demand, or both.

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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