Table 1 Expanded roles for non-physicians

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Type of provider	Description of role	Description of additional training	Impact
Perform pre-admission assessment							
Finland (1)	Regional (2002)	Orthopedic	Not reported	Nurse specialist	• Completed pre-anaesthesia assessment	Not reported	Not reported
New Zealand (2)	Not reported	Various	Not reported	Nurse	• In 2011 the service established nurse-led preoperative assessment clinics with a focus on preadmission assessment process redesign	Not reported	
New Zealand (2)	Regional (Not reported)	Cardiothoracic	Not reported	Nurse	• As part of a new anesthetic preadmission process, pre-anesthesia assessment by anesthetic clinic nurses was implemented to determine whether the patient requires an anesthetist review, 'chart' review by an anesthetist or no further review • The anesthetic clinic nurse triaged orthopedic surgery patients at their clinic visit so they know if they're 'fit for surgery' and on the waiting list before they go home	Not reported	*Grey literature:* • Pre-anesthesia assessment by anesthetic clinic nurses results in only 15% of patients requiring anesthetist review. • The anesthetic preadmission process resulted in minimal cancellations on day of surgery and 85-88% OR utilization
New Zealand (2)	Regional (2004)	Orthopedic	Not reported	Nurse	• As part of a new orthopedic initiative, nurses were responsible for admission and anesthetic support and preadmission for the central intake process	Not reported	*Grey literature:* • Nurse-led admissions account for 80% of elective orthopedic patients on the day of surgery
United Kingdom, England (3)	Regional (2004)	General surgery (hernia)	To reduce wait times between GP referral and surgical procedure.	Nurse	• As part of a direct-access day-case surgery process, patients were evaluated in a pre-operative assessment clinic and assessed by a nurse the week before their operation	Not reported	*Peer reviewed literature:* • Retrospective review of the case notes of 427 patients between 1998 and 2002* • Median waiting time in the direct access group was 69 days • Total median time for patients who had a surgical appointment before surgery was 142 days • Patients had to wait a median of 83 days for the surgical appointment and 57 days for surgery • There were no mortality and major complications registered in the study. •Direct access surgery appointments have allowed other patients to be seen in the out-patient department *Note: impact based on implementation alongside other approaches
United Kingdom, Scotland (4)	Not reported	Elective surgery	To reduce cancellations and increase flow	Nurse	• Led pre-admission clinics with support from anesthetists • Pre-admission clinics allowed patients to be admitted on the day of their procedure and ensured patients have been properly prepared, informed consent has been obtained and a discharge date and plan was agreed beforehand	Not reported	*Peer reviewed literature:* • "The NHS Modernisation Agency's Pre-operative Assessment Project has shown that implementing preoperative assessment can decrease the number of patients who do not attend. Although the numbers are small, DNA rates for patients who have been pre-operatively assessed are consistently lower than DNA rates for patients who have not been pre-operatively assessed."

United Kingdom, Scotland (5)	Hospital pilot (2009)	Various	To increase the likelihood of safe return to patient's own home with a reduction in institutionalization, death or deterioration, and improved cognitive functioning	Nurse and occupational therapist	• Performed multidimensional preoperative assessment for frailer older adults (age>65 years old) undergoing surgery • Protocols for assessment and referral were developed, as were referral pathways to deal with issues identified during preoperative assessment and potentially avoid prolonged admission and complex discharge planning	• Nurse with experience in the care of frailer older people	*Peer-reviewed literature:* • Observational study of 141 patients in the pre-intervention phase and 172 patients recruited in the intervention phase • Surgery cancelled: - Pre-intervention group- n(%): 25 (17.7%) - Intervention group- n(%): 9 (5.2%) (p<0.001) • Number of patients with delays to surgery: - Pre-intervention group- n(%): 14 (9.9%) - Intervention group- n(%): 4 (2.3%) (p<0.004) • Length of hospitalization: - Pre-intervention group- mean± SD: 8.9±7.6 days - Intervention group -mean ±SD: 4.9±5.0 days (p<0.001) • Patients with complications: - Pre-intervention group- n(%): 12 (8.5%) - Intervention group- n(%): 4 (2.3%) (p=0.01) • No other wait times data were reported
United Kingdom, Scotland (6)	Hospital (Not reported)	Orthopedic	To address staff's confusion with the current orthopedic pathway for pre-operative assessment	Nurse	• As part of the orthopedic pathway improvement program, nurses pre-assessed patients independently of the surgeon's consultation	Not reported	*Grey literature:** • Data from July 2013 to February 2014 shows that majority of patients being treated within 9 weeks from referral to admission • Data from August 2013 to February 2014 shows that the mean monthly attendance is 500 patients *Results refer to the entire improvement program
Perform procedures							
Canada- British Columbia (7)	Regional (Not reported)	Cardiothoracic	To streamline procedures and reduce wait times	Nurse	• Replaced anesthesiologists during pacemaker implants for patients who meet defined criteria • Part of the Implantable Cardiac Electrical Devices program • ICED program also involved consolidation of elective surgeries, centralized intake, standardized reporting system, etc.	• "Specially trained"	*Grey literature:** • Within 6 months of implementation of the program, cardiac services were consolidated across the health authority from 4 sites to 2 • Cardiac implants increased from 22/week to 30/week • Wait list was reduced from 120 to 40 patients • No cancelled procedures days due to lack of staffing • Feedback on model from staff and patients has been positive *Note: impact based on implementation alongside other approaches

Canada- Ontario (8)	Hospital (2011)	Oncology	To improve quality of care	Sonographers	• Performed thyroid biopsies independently, under the supervision of a radiologist • Radiologist assistance for difficult cases only	• Training included didactic instruction (i.e. lectures on neck anatomy, thyroid ultrasonography, features of malignant nodules, informed consent, and various biopsy guidelines), observation, hands-on training (beginning with thyroid phantoms AKA models), and one-on-one training in a biopsy centre.	*Peer-reviewed literature:* • In a retrospective study, wait from referral to for biopsy to completion of biopsy decreased from an average of 80.7 days to 28.3 after implementation of the program • No major procedural complications occurred • Patients, sonographers, and radiologists did not report any issues
United Kingdom, England (9)	Pilot (1999)	Orthopedic	To reduce waiting times for patients with carpal tunnel syndrome	Nurse	• Managed entire care pathway for patients with carpal tunnel syndrome, from first clinic appointment through to surgery and discharge • Nurse and surgeon reviewed referral letters to determine if referral was appropriate • Nurse performed the surgery as a day-case procedure under local anesthetic without a tourniquet • Anesthetists were available for advice at all times	Not reported	*Peer-reviewed literature:* • Observational study • Before the program, average wait time from first appointment to follow-up discharge was 105 weeks • After pilot study, the wait time was reduced to 6 weeks • Overall complication rate was 2.5% • 1.3% of patients reported no improvement in their symptoms • A surgeon opinion was required at least once in each clinic during the first year, but this reduced in frequency as the nurse's experience developed • Authors reported considerable criticism from patients and surgical groups on the approach
United Kingdom, England (10,11)	Regional (2003)	Oncology	To reduce wait times for biopsy and improve care delivery	Nurse	• Performed biopsies on patients with suspected skin cancer • The role included obtaining consent, administering local anaesthetic, surgical removal of a section of skin, and insertion of sutures • A one-stop service is now available	• Training package developed in accordance with The Scope of Professional Practice Guidelines (UKCC, 1992)	*Peer-reviewed literature:* • Observational study • Wait times from referral to biopsy were reduced from 8 weeks to 0 weeks (due to the one-stop service) • Doctors were able to focus on more complex types of surgery and wait times from referral to more complex dermatology surgery were reduced from 8 weeks to 2 weeks • In a patient questionnaire administered in a month period in 2003, patients were happy to have their biopsy performed by a nurse • Given a choice, they would rather have the biopsy performed on the day of their visit by a nurse than return at a later date to have it performed by a doctor
United Kingdom, Scotland (10)	Regional	Gynecology	Not reported	Specialist nurse hysteroscopist	• Diagnosed and referred patients for specialist treatment • Carried out minor procedures such as biopsies and polypectomies, which would otherwise require a separate appointment with a specialist	Not reported	*Grey literature:* • It is expected that 10% of the nearly 200,000 patients see in gynecology can be diverted to nurse clinics by the 3rd year of this program (date not given)

United Kingdom, Scotland (11)	Hospital (Not reported)	Oncology	To reduce wait times for biopsy and improve care delivery	Nurse	•Performed biopsies on patients with suspected skin cancer • The role included obtaining consent, administering local anaesthetic, surgical removal of a section of skin, and insertion of sutures • A one-stop service is now available	• Training package developed in accordance with The Scope of Professional Practice Guidelines (UKCC, 1992)	Not reported

Table 2 Process improvement methodology

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Lean					
Canada, British Columbia (12,13)	Regional (2012)	Various	To reduce wait time, achieve provincial wait time targets and avoid provincial wait time penalties	Lean • Review by external consultant on how surgical services are delivered across all IH sites, and provide recommendations for improvement. IH Steering Committee recommendations included: increase OR capacity; centralized wait list management processes with adequate IT support; dedicate 1 or 2 ORs for access to long wait list patients; implement an IH-based wait list validation procedure for follow-up of patients with long wait times; continue to utilize private surgical clinics to reduce wait times; implement a model where patients ready for discharge from PARR are transferred to Phase II space to wait for beds; utilize a 1:4 or 1:5 staffing ratio and free up PARR space to avoid OR holds; enhanced communication between medical and other staff and patients; improve case times; Lean training to identify bottlenecks; implement the NSQIP in all hospitals within 5 years	*Grey literature:* • The goals of these actions (established in 2012/13) were to have less than 10% of hip and knee patients waiting longer than 26 weeks, and less than 10% of cataract patients waiting longer than 16 weeks. No information was found on the impact.
United Kingdom, England (14)	Hospital (2007)	ENT	To increase efficiency in order to comply with the Department of Health's maximum wait time target of 18 weeks for cochlear implantation	Lean The 5 steps of Lean were followed and improvement opportunities were identified • A single experienced clerical staff member appointed to oversee the patient pathway • Management workload devolved to management and clinicians encouraged to concentrate of patient care • Production of a pre-patient pack containing critical information about the procedure and technology and an invitation to book a number of key appointments • Appointments to be booked in blocks • Patients found unsuitable for implantation identified early and brought to the multidisciplinary committee (MDT) for agreement to discharge • MDT meetings held to manage patient decisions • Expansion of working hours	*Peer-reviewed studies:* • 141 long waiting patients included • 43 patients were lost to follow up/died/withdrew from assessment • 10 patients were had been assessed or were awaiting implant • Remaining 88 were assessed; 42 were deemed unsuitable for implantation and 46 were offered the implant (3 declined) • Of the 46, 11 went on to a trial of the implant • Of the remaining 35 who went on to implantation, 31 (89%) met the 18 week target. 3 of the remaining 4 were unless at time of scheduled implantation, and the last patient needed another intervention prior to implantation
United States (15)	Hospital (2013) *pilot*	General surgery	To reduce current delay and wait times in VA institutions	Lean The Value Stream Analysis (in 2013) identified several "Just Do Its" (JDIs) and conducted raid process improvement workshops (RPIWs), and projects for simple, medium and complex solutions. Improvements learned in JDIs were implemented immediately, and more complex reforms from RPIWs and projects were rolled out in stepwise fashion. Committees continued to meet to review ongoing metrics.	*Peer-reviewed studies:* • Mean (SD) of wait time for general surgery statistically significantly decreased from 33.4 (8.3) days in 2012 to 26.0 (9.5) days in 2013. This appeared to coincide with the rollout of several RPIWs. In 2014, these numbers fell further to 12.0 (2.1) days. • Total operative volume increased from 931 patients in 2012 to 1090 in 2013 and 1072 in 2014, with no changes in surgeons or patient mix, despite the closure of one OR in early 2014. • Clinic volume fluctuated from 3131 visits in 2012 to 3241 in 2013, and to 3084 visits in 2014, but this was offset by increased use of telehealth approaches, including e-consultations, where medical record review is used to answer a specific question without necessitating a clinic visit, and clinical video teleconferencing (CVT). E-consultations rose from 50 in 2012 to 64 in 2013 to 129 in 2014. Clinical video teleconferencing visits, which were not available in 2012, rose from 155 visits in 2013 to 304 in 2014. Thus, combined clinic, CVT, and e-consultation encounters increased from3131 in 2012 to 3460 in 2013 and 3517 in 2014.

					• Despite the increased number of patients seen, no shows decreased from 366 in 2012 and 346 in 2013 to 227 in 2014 (*P* = .02)
United States (16)	Five hospitals/health systems (Not reported)	Various	To reduce wait times	Improving flow: • Kaiser Permanente addressed elective surgery wait times by examining the entire care pathway and instituting process changes, e.g., longer use of ORs, Saturday procedures, and simple process changes. This improved efficiency and OR utilization rose to 85% • Using Lean principles, and reviewing workflow and improvements to OTR processes, scheduled operations in Seattle Childrens' Hospital start on time with a 99% success rate. Balancing supply and demand: • Lean approaches have been used in Seattle Childrens' Hospital to improve scheduling and wait time challenges. A centralized scheduling centre coupled with a standardized process to manage schedules and fill vacancies has yielded a more efficient and streamlined process. Evening clinics have been instituted based on trending data for hourly, weekly and seasonal variations. • At the Mayo Clinic, flexibility of provider supply has been increased. Full schedules are set as the expectation for specialty physicians. Rather than allowing schedule gaps, specialists are scheduled to see general patients. • In Denver Health, appointment utilization was maximized using same-day appointments. • Kaiser Permanente evaluated historical data to staff appropriately with fluctuations in time.	Not reported
Six sigma					
United States (17)	Hospital (2002)	General surgery	To reduce turnaround times (the time between when a surgeon eaves the OR after completing a case to when a surgeon arrives for the next case). The turnaround time comprises (1) surgeon-out to patient-out, (2) patient-out to patient-in and (3) patient-in to surgeon-in	Six Sigma *Note:* Obstacles, problems and resistance to this initiative were minimal because of the extensive education in Sigma Six tools and strong administrative leadership.	*Peer-reviewed studies:* • The mean (SD) of patient-out to patient-in time fell from 22.8 (17.3) mins, a drop of 32%. The number of cases which fell outside the upper limit specified by the OR committee and OR staff (which was 20 mins.) fell from 49% to 26%. • The mean (SD) of surgeon-out to surgeon-in time fell by 32% (15%). The number of cases which fell outside the upper limit specified (which was 60 mins.) fell from 47% to 34%. • No direct association with wait times was reported
Lean Six Sigma					
Canada, New Brunswick (18,19)	Hospital (2016)	Cardiovascular surgery	To improve patients access to services	Lean Six Sigma 5 year partnership with industry. Initially, review of programs/operations, stakeholder interviews, analysis of hospital data. One team focused on surgical processes from decision to operate to completion of surgery; another focused on activities related to patient flow before and after surgery. At a 4 day workshop, 4 areas of improvement were defined: increasing OR capacity, reducing OR cancellations and reducing average LOS in both the ICU and the step-down unit. Plans were implemented with weekly reporting of results	*Grey literature:* Within 6 months: • OR capacity increased by 14% • Average wait times reduced by 44% (from 118 to 66 days) • Maximum wait times for 9 out of 10 patients reduced by 31% (from 283 to 195 days) • Patient waiting time during the discharge process by an average of half a day

Ireland (20)	Hospital (2016)	Cardiothoracic	To improve rates of day of surgery admission	• A Lean Six Sigma approach was introduced in the thoracic surgery department • An ERAS-based patient pathway was instituted • A multi-disciplinary project team was created • A pre-thoracic surgery checklist was developed and implemented; a weekly audit of this checklist was done • The team met weekly	*Peer-reviewed literature:* • The proportion of DOSA rose from 10.9% to 75.3% in an 19 month period • Duplication of pre-operative tests fell from 83% to <2% • Staff and patient surveys showed increased satisfaction
Others					
Canada, Alberta (21-25)	Provincial (2015)	Various	To reduce wait times through quality improvement initiatives	• National Surgical Quality Improvement Program – NSQIP helps care teams measure and improve care. Each team collects data from a sample of patients from an identified population and reports this sample to NSQIP which compares these results to data collected from 900 participating NSQIP hospitals around the world. Every few months, surgeons and teams receive 'report cards' to understand where they rank, where they excel and where they need to improve their performance in any given area.	*Grey literature:* • NSQIP – Following a 2-year pilot in 5 hospitals (started in 2015), it was shown that average LOS for cystectomy patients was reduced from 14 days to 8 days. Surgical teams improved their processes to minimize blood loss, reducing the need to perform blood transfusions. Every $1 of investment in quality improvement brought $4.30 in return for a net savings of $8.8 million at the five sites
Canada, Alberta (21-25)	Provincial (2012)	Ophthalmology	To reduce wait times through quality improvement initiatives	• Development and implementation of the Alberta Coding Access Targets for Surgery (ACATS), a standardized diagnosis-based priority system for booking cataract surgeries throughout the province	*Grey literature:* • The wait time for cataract surgery 29.0 weeks in 2012-13, down from 37.3 weeks at the same time in 2011-12, a 22% improvement. More than 34,400 cataract surgeries have been done in 2012-13.
Canada, Alberta (21-25)	Provincial (Not reported)	Cardiothoracic	To reduce wait times through quality improvement initiatives	• Several improvement projects were implemented in cardiac surgery including scheduling systems and optimizing the use of OR utilization. A registered nurse navigator is working with surgeons to identify when to schedule patients for surgery and to monitor volume and duration of all-day cases for optimized scheduling. In addition, ongoing quality improvement work is occurring in the areas of patient flow, patient education, OR utilization and surgical site infection, as well as improvement of the surgical wait time database. Together, Calgary and Edmonton Zones are working collaboratively on surgical wait times, in conjunction with surgeon's offices to identify strategies for continuous improvement	Not reported

Table 3 Publicly funded, privately delivered services

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Restrictions or regulations	Impact
Australia, Queensland (26,27)	Regional (2019)	Ophthalmology	To provide great quality care at the right time	• Queensland government has made agreements with private facilities (Bundaberg Private Day Hospital and a private provider in Hervey Bay) for cataract procedures	Not reported	*Grey literature:* • There is good access to cataract surgery for public patients from across the region • Previously, patients had to sit on long waiting lists for treatment in Brisbane or pay privately for cataract procedures, but partnership agreements both in Hervey Bay and Bundaberg mean they can access surgery in their own region
Australia, Queensland (28)	State (2017)	Various	To facilitate treatment of patients within clinically recommended timeframes	• The mandatory Elective Surgery Services Implementation Standard outlined the suite of business rules and processes for ensuring equitable access for all patients requiring elective surgery at Queensland public hospitals by providing best practice, waitlist management processes aimed • One option for treating patients within the clinically recommended timeframe outlined in the Standard was to outsource patients to a private facility with appropriate service capability to deliver the service and where a shorter waiting time for elective surgery is available	• It is the responsibility of the contracting entity to establish and monitor the safety, quality and efficiency of agreements with private providers to enable the transfer of patients in a timely manner	Not reported
Australia, Queensland (29)	Regional (2016)	ENT	To provide children with access to ENT surgery	• Torres and Cape Hospital and Health Service, Queensland partnered with CheckUp (not-for-profit) and Apunipima (Aboriginal Health Organization) to give 16 children ENT surgery through the private hospital system	Not reported	*Grey literature:* •16 children were able to have ENT surgery through the private hospital system bypassing excessively long surgical wait times within the standard Queensland Health referral pathway for non-urgent ENT surgery
Australia, Queensland (30)	Regional (2015)	Oncology	To expand services and support for those in cancer treatment	• In the Wide Bay Hospital and Health Service Cancer Care Strategic Plan 2015-2018, it was stated that strong public-private partnerships will be used to expand services and support for those in cancer treatment • The six key goals of the plan were to ensure earlier detection; ensure shorter wait times; ensure timely access to effective diagnosis; ensure delivery of consistent high quality cancer care; improve the patient experience along the cancer journey; invest in multi-level research	Not reported	Not reported
Australia, Queensland (31)	Regional (2015)	Ophthalmology	To provide access to new services	• Wide Bay Hospital and Health Service, Queensland developed a private partnership for elective ophthalmology; this service was not available prior to 2015	Not reported	*Grey literature:* • The private partnership for elective ophthalmology has led to >2000 procedures being carried out
Australia, Queensland (32)	Regional (2012)	Various (ENT, general, orthopedic, and urology)	Not reported	• In May and June, 221 patients in Queensland were outsourced for ear, nose and throat, orthopedic, urology and general surgery • Additional surgery capacity will be available under a service agreement with the Sunshine Coast University Private Hospital	Not reported	*Grey literature:* • Despite not meeting the end-of-year target for Category 2, significant improvement was made from the previous quarterly result ending in March 2013, and continues to be better than the state average
Australia, South Australia (33)	State2018 (current); 2000 (original)	Various	To ensure patients receive surgery	• Local Health Networks through South Australia Health have overall responsibility for	Not reported	Not reported

			within assigned clinical urgency	the efficient management of their elective surgery booking lists • Staff managing booking lists can transfer patients to a private hospital when capacity in a public hospital prevents a patient from receiving their procedure within the assigned clinical urgency		
Australia, South Australia (34)	State (2017)	Various	To reduce overdue patient lists	• South Australia Health developed a range of strategies to reduce the overdue patient lists including working with the private sector to carry out some low complexity surgery • Reductions in wait times will result in timely and equitable access to elective surgery for all South Australians with treatment prioritized based on clinical need	Not reported	Not reported
Australia, Tasmania (35)	State (2016)	Various	To increase capacity for publicly funded surgery	• Under the Tasmanian Health Action Plan 2015-2017, a total of $ 13.4 million has been provided in 2016-17 for the targeted purchase of additional elective surgery/non-surgical cases from the private sector in Tasmania and interstate, and through existing public sector arrangements, specifically targeting: all current long-waiting children and all current Category 2 and 3 patients who have waited >2 years; all Category 2 and 3 patients on a treat-in-turn basis who are currently >6 months over boundary; all Category 2 patients on a treat-in-turn basis currently >90 days over boundary; general over boundary patients once the long-waiting cohort of patients has been removed from the waiting list or are not ready for care	Not reported	Not reported
Australia, Tasmania (35,36)	State (2016)	Various	To increase capacity for publicly funded surgeries	• Under the One Health System reforms, the Tasmanian Health Service has directed funding towards, among other initiatives, partnerships with private providers to provide surgeries to public Tasmanian patients in private facilities under a contract arrangement • The Tasmanian Government invested significant additional funding to boost elective surgery with its $76 million election commitment • In addition to this, the Government is investing a further $14.3 million in funding for elective surgeries and endoscopies, which includes $6.4 million of Commonwealth funding	Not reported	*Grey literature*:* • The waiting list was reduced to 5, 430, down from 5, 758 in June 2016; a reduction of 3,100 people since June 2015 • During the 2016-17 financial year, the THS exceeded its annual target for surgeries by 331; delivering a total of 19,180 surgeries • In 2016-17: the waiting list was reduced from 5,779 to 5,416; the number of patients waiting longer than clinically recommended was reduced from 1,222 to 794 in June 2017; the number of patients waiting for surgery for >400 days was reduced from 320 patients in June 2016 to 12 patients in June 2017; and, there was a reduction in the average overdue days from 146 days in June 2016 to 69 in June 2017 *Note: impact based on implementation alongside other approaches
Australia, Tasmania (37)	State (2014)	Various	To provide surgery for long-waiting patients	• Government's *Rebuilding Health Services Elective Surgery Program* provided over $10 million and >800 additional elective surgery procedures during the financial year • Patients were long waiting overdue patients • Under the Tasmanian Health Assistance Package a further $4 million in Australian Government funding was spent by Tasmanian Health Organizations in 2014-15 to help	Not reported	*Grey literature*:* • Over 1,400 additional procedures performed for Tasmania's longest waiting patients *Note: impact based on implementation alongside other approaches

				Tasmania's longest waiting patients receive their surgery • Under these arrangements, the Department of Health and Human Services establish a panel of local and interstate private providers, alongside existing public sector measures, to help sustainably reduce Tasmania's elective surgery waiting times		
Australia, Tasmania (38)	State (2008)	Various	To increase capacity for publicly funded surgeries	• The Elective Surgery Waiting List Reduction Plan has stipulated that patients can elect to be referred to hospitals where waiting times are shorter • Public hospitals will be able to purchase additional capacity from private hospitals if necessary	Not reported	Not reported
Australia, Tasmania (39)	State (2008)	Various	To deliver shorter waiting times for elective surgery	• The Tasmanian Government's $8.4 million Improving Time to Treatment: Elective Surgery Improvement Plan included, among other initiatives, purchasing up to 1000 additional procedures in the private sector • A $2 million surgery blitz was directed to remove cataracts from the eyes of > 1000 Tasmanians from around the state by the end of the year; the cataract program was intended to provide an extra 437 cataract procedures performed at the Royal Hobart Hospital (RHH) • RHH delivered the additional procedures partly by increasing surgery contracted through private hospitals	Not reported	*Grey literature:** • The additional 1,002 cataract removal procedures will address many long-wait cases from the cataract surgery waiting list and significantly reduce the extent of the list overall *Note: impact based on implementation alongside other approaches
Canada, Alberta (40,41)	Regional (Not reported or Not reported)	Various (Ophthalmology, pediatric dental, oral maxillofacial, podiatry, and orthopedic)	To increase surgical volumes	• Alberta Health Services (AHS) Calgary Zone has contracted insured surgical procedures to accredited non-hospital surgical facilities	• Facilities are accredited by the College of Physicians & Surgeons of Alberta • The AHS Calgary Zone is responsible to ensure that Surgical Contracts Facilities patient care is consistent with AHS Calgary Zone standards	*Grey literature:* • The Surgical Contracts Facilities enable the AHS Calgary Zone to optimize capacity across the entire region and therefore to increase surgical case volumes, to reduce patient wait times and to alleviate some pressure on surgical beds
Canada, Alberta (42)	Province (Not reported)	Ophthalmology	Not reported	• Cataract surgeries provided in privately owned day-surgery facilities	Not reported	*Grey literature:* • A 1998 survey in AB comparing wait times for cataract surgery in 3 cities found that in Edmonton and Lethbridge (where the vast majority of surgeons worked in public hospitals) average wait times were between 4-7 weeks • In Calgary (which had the most surgeons/capita and where all surgeons operated out of privately owned day-surgery facilities) average wait times were between 16 to 24 weeks • This study also found that many private clinics aggressively marketed "upgraded" lens implants at significantly marked up prices.
Canada, British Columbia (43-45)	Regional (Not reported)	Not reported	To create more OR capacity within the hospitals	• Two private surgical facilities in Victoria and Nanaimo have provided publicly-funded day surgery procedures	Not reported	Not reported
Canada, British Columbia (46,47)	Regional (2017)	Various	To increase surgical capacity	• Surgical Centres Inc. was contracted to provide publicly funded surgeries and colonoscopies at a new facility near Victoria General Hospital operating as an extension to Island Health's ORs	Not reported	Not reported

				with patients booked from Island Health's wait lists and the same surgeons that operate at Island Health will operate at the new surgical centre • Procedures included carpal-tunnel surgery, hernia repairs, gallbladder removals, arthroscopies, knee ligament repairs, rotator cuff repairs and varicose vein surgery • Day care cases were moved from the main hospitals, Victoria General Hospital and Royal Jubilee Hospital, to the surgical clinic		
Canada, British Columbia (48)	Regional (Not reported)	Not reported	To reduce wait times past the Ministry of Health's target of no patients waiting > 26 weeks for surgery	• Vancouver Coastal Health Authority (VCHA) has shifted services to make use of staffed and available OR capacity, including private facilities	Not reported	Not reported
Canada, British Columbia (49)	Regional (2003)	Various	To increase surgical capacity at Richmond Hospital	• Richmond Hospital issued a call for contractors to perform some day surgeries • The hospital has about 6000 people on its surgical waiting list, half of whom wait at least 90 days; the problem is exacerbated because the hospital can afford to operate only 5 of its 8 ORs • VCHA invited private sector facilities that provide surgery to bid to perform about 3000 procedures, such as arthroscopies, annually	• Under the contractual arrangements, the health authority controls the waiting list so that "there is no risk of cherry picking" by private providers • To meet requirements of the *Canada Health Act*, the surgeons bill the provincial government directly; patients are not charged	*Peer-reviewed literature:* • This will potentially free 16 to 20 hours of OR time weekly • Initially, only about 750 procedures will be assigned to contractors • In North Vancouver, low-risk cataract surgery has been provided by a private facility for 4 years; this "very successful" arrangement resulted in a 23% decrease in the surgical waiting list at the Lions Gate Hospital in the first year and the waiting time is now about 45 days • The president of the BC Medical Association says he favors "anything that expands our operating room capacity, but we need to be sure that facilities have appropriate safeguards." • Dr. John Turner does caution that while the private sector may help reduce waiting lists, "not every surgery can be done on an outpatient basis"
Canada, British Columbia (interview)	Regional (Not reported)	Various	Not reported	• The Island Health Authority has partnered with private providers to do day surgeries • A new stand-alone facility with 5 ORs was built	Not reported	Not reported
Canada, Manitoba (interview)	Regional (Not reported)	Various	Not reported	• Maples Surgical Centre has been contracted to perform some hernia repairs, cataract surgeries and orthopedic surgeries	Not reported	Not reported
Canada, Ontario (50) (interview)	Provincial (1990)	Not reported	To increase surgical capacity	• Independent Health Facilities (IHFs) have provided a range of services, including low-risk surgical procedures and diagnostics (e.g. Kensington Eye Institute provides cataract procedures) • Between 2013 and 2014, the ministry continued to shift procedures that are traditionally provided in acute care hospitals into specialty clinics, where appropriate, based on clinical evidence	• New non-profit IHFs may be licensed under the IHF Act (1990) • Existing IHFs may participate in the Community-Based Specialty Clinics Strategy by applying to become ministry-licensed IHFs, but they must be willing and able to convert to non-profit status • The Ministry licenses IHFs through a formal application process and funds facility fees to provide insured diagnostic and surgical/treatment procedures • Only the Ministry or an entity prescribed by regulation can pay a	*Interview:* • The Auditor General has highlighted the need for accountability and quality management for these resources

					facility fee; it is illegal to charge patients facility fees to cover overhead costs • IHFs are required to participate in a quality assurance program to protect patient care • Certain corporations and services are exempt from the IHFA, including corporations that operate public hospitals and private hospitals and services that are provided by a chiropodist, dentist, optometrist, osteopath, physiotherapist, or podiatrist	
Canada, Quebec (51)	Provincial (2006)	Surgeries where timely access is an issue (e.g. cataract surgery; hip/knee replacement)	To improve access to surgeries where timely access is an issue	• Quebec's government passed legislation (Bill 33) permitting Specialized Medical Centres (SMCs) that are staffed by doctors participating in the public system • The doctors, specialists for the most part, provide interventions that are more complex that those traditionally performed in doctor's offices • SMCs can be associated with hospitals by virtue of contractual purchase of care agreements that guarantee them a minimum number of interventions in predetermined priority areas where timely access to service is an issue	Not reported	*Grey literature* • Since the passage of Bill 33 Quebec has seen the emergence of private medical complexes with ORs where specialists paid by the public system provide services, with operating costs paid by patients (e.g. equipment and salaries of support staff); the province's public insurance agency eventually proscribed this activity
Canada, Saskatchewan (52-55)	Provincial (2010-11)	Various	To add capacity to the health system	• As part of the Saskatchewan Surgical Initiative (SSI), Saskatchewan began allowing third party health facilities to provide outpatient surgery within the province's publicly funded and administered system in 2010-2011 • 34 procedures were selected in the areas of ophthalmology, orthopedics, dental, and ENT**(52)** • Saskatoon Health Region contracts Saskatoon Surgical Centres Inc. to provide outpatient knee -p shoulder arthroscopies •RQHR contracts Radiology Associates of Regina to provide patients with CT scans • Surgical procedures vary by site but include cataracts, dental, knee and shoulder arthroscopies, knee ACL repair, select gynecological procedures, select ENT repairs, and select plastic surgeries • Regina Qu'Appelle (RQHR) contracts Regina Surgical Centres Inc. to provide dental surgeries and knee arthroscopies	• Third party providers are selected through a Request for Proposal process managed by the RHAs (now RHA) and the Ministry • Regina and Saskatoon health regions were permitted to contract directly with existing surgical centres to help meet surgical targets • The following principles guide third party delivery of publicly funded services: supportive of a patient-first approach; in compliance with the *Canada Health Act* and all relevant provincial legislation/regulations; fully integrated with the public health system; must meet al.l necessary health system safety and quality standards; must be implemented through an open, consistent, equitable, and fully transparent selection process; must be financially responsible and the cost of services must be equal to or less than what is offered in the by the public system • The clinics were required to submit human resources' plans showing that they would not	*Peer-reviewed literature:* • Total cost of performing the 34 procedures in the clinics was 26% less than the cost of performing these procedures in hospitals **(52)** • Public opposition to the clinics abated, in part, due to the government's communication plan; effective communication was key to the success of the initiative • Communications were "crisp, clear, and written in plain English" • Their website won an award for being "user friendly, accessible, and reliable" • The focus was on improving wait times for patients, not saving money **(52)** • Wait times were reduced but no details were provided

					compete with public facilities for staff • Contracts with the private clinics specified the number of procedures to be performed, the cost, and the timeframe • Patients do not pay extra fees, are not able to 'jump the queue', and are scheduled through the health region booking system so all patients are on a single list ensuring clinics cannot "cherry pick" patients	
Denmark (56)	National (1990)	Various	To meet a 4-week maximum wait for consultations and surgeries	• In the 1990s, a 4-week maximum wait was given for surgeries in public hospitals • If meeting that target wasn't possible, the government would pay for the patient to undergo surgery at a private clinic • If an appointment for the patient's pre-operative visit wasn't possible within 4 weeks, an appointment could be provided by a physician in a private clinic • Elective orthopedic surgery for specified procedures, including lower limb joint replacement, can now be delayed up to 3 months at public clinics before patients are transferred to a private clinic	Not reported	*Grey literature:** • Initially, it was nearly impossible to comply with the 4-week limit • As a result, several cases were moved to private clinics which led to the start-up of more private clinics as well as the growth of existing ones • A few years later, waiting lists for most orthopedic surgical procedures "more or less disappeared" and this allowed patients requiring surgery to be treated as soon as possible with some patients requesting surgery immediately • A downside of short wait lists is they pose a difficulty in planning and executing a clinic's surgical programs *Note: impact based on implementation alongside other approaches
Hong Kong (57)	Regional (2008)	Ophthalmology	To meet growing service demand for cataract surgery	• The Government of Hong Kong Special Administrative Region implemented the first ever public-private partnership (PPP) pilot program to provide additional cataract surgeries to meet the growing service demand • Patients who choose to receive cataract surgeries performed by private ophthalmologists could receive a fixed amount of $5,000 subsidy, and may need to co-pay an amount of not more than $8000 for the service package, which consists of one pre-operative assessment, the cataract surgery including intraocular lens, and two post-operative checks	Not reported	*Grey literature:** • Cataract Surgeries Programme (CSP) commenced in February 2008 and achieved the target of delivering 10,000 cataract surgeries in 2010/11 • Additional funding has been approved since 2011/12 for the continuation of the CSP • CSP has been largely supported by patients and private ophthalmologists; views were expressed in a survey conducted by an independent market research agency. Most individuals agreed that the CSP could provide more choices to patients and shorten waiting time to receive cataract surgeries • CSP provided an alternative for eligible cataract patients to undertake cataract surgeries in the private healthcare sector, and helped other cataract patients indirectly by shortening the waiting list and national waiting times • It also helped to address the imbalance between public and private sectors in the provision of healthcare services by enabling optimal use of the service capacity in the private sector, as well as creating a channel to flow Hospital Authority patients to the private sector on a voluntary basis through the PPP delivery model

						*Note: impact based on implementation alongside other approaches
New Zealand (58)	National (2009)	Cardiothoracic	To ensure patients are operated on as soon as possible	• The National Cardiac Surgery Clinical Network formed to lead and oversee reform of New Zealand's cardiac surgical system and improve the delivery of cardiac surgery • A newly formed New Zealand Cardiac Network (2011) includes a wider range of stakeholders and will focus on the entire cardiac care pathway • The Network plans to implement a number of initiatives, including outsourcing to private facilities	Not reported	*Grey literature:** • Significant progress was made in increasing the volume of cardiac surgery operations, improving the geographic equity of cardiac surgery provision, enhancing the effectiveness of clinical prioritization, and reducing the number of patients waiting for surgery *Note: impact based on implementation alongside other approaches
Norway (59)	National (2000)	Various	To quickly access additional capacity	• Patients can opt out of public hospitals and receive elective treatment at private hospitals with costs covered by the public purchaser	Not reported	*Peer-reviewed literature:* • No results of the approach on wait times were reported • Based on pricing data collected from the formal contracts awarded to PFP hospitals day surgeries were performed at markedly lower prices than public hospitals • The authors speculated that the private hospitals' lack of acute services, less severe patient population and ability to streamline production explained the lower prices
Spain (60)	OECD countries	Various	To increase capacity for publicly funded surgeries	• An alternative to increasing capacity in the public sector is to use existing capacity, or to stimulate the building of extra capacity, in the private sector • Initiatives can take the form of a public purchaser of health services contracting out to privately-owned providers some volume of activity for publicly-funded patients (as in Australia, Denmark, Ireland, England, New Zealand and Spain (INSALUD) • Buying from the private sector may be a faster way to obtain access to additional capacity compared to, for example, building new public hospitals • The governments of Norway, Denmark, Ireland, England and the Netherlands purchased some treatments abroad; usually, in these countries, the private sector may be fairly small and already working at full capacity • This approach may introduce an element of competition between private and public facilities • A potential disadvantage is competition with the public sector for surgeons and nurses	Not reported	*Peer-reviewed literature:* • In Spain, the increase of contracted activity to the private sector, may have contributed to the overall success of the initiative in reducing waiting times
Spain (61)	National (1996)	Various	To reduce wait times	• Since 1996, INSALUD, responsible for providing health services in Spain, formally developed an institutional policy for the reduction of wait times for elective surgery in order to ensure equal and adequate access to surgery over its territory • One approach to reduce wait times was to refer patients to private contracted hospitals with an agreed financial arrangement	Not reported	*Grey literature:** • 18% of patients over 12 months on the list were referred to private contracted hospitals • 10,751,147 euros were designated to contract arrangements with private hospitals (7, 273 procedures) *Note: impact based on implementation alongside other approaches

Sweden (62,63)	Regional (2009)	Orthopedic	To reduce wait lists	• OrthoChoice was implemented in Stockholm to supplement public hospitals with private providers • The Stockholm County Council reimburses providers using bundle payments • The bundle payment covers: pre-operative evaluation, diagnostic tests, surgery, and follow up visits	Not reported	*Grey literature:* • A 5-year evaluation of the OrthoChoice model reported waiting times had decreased and average cost decreased by 20% because of a drop in readmissions and productivity gains**(63)**
United Kingdom, England (64,65)	National (2007 limited; 2008 full)	Various	Not reported	• Private providers in England registered with the government quality regulator can provide care to NHS funded patients • The private hospitals offer elective secondary care with overnight beds to NHS-funded patients at no charge, if the hospitals agreed to be paid based on standard NHS tariffs • Procedures included: hip/knee replacements, hernia repairs and arthroscopies • To facilitate referrals, these hospitals were included on the NHS 'Choose and Book' website • These private sector hospitals have, on average, <50 beds and are predominantly focused on delivering elective surgical care • Private hospitals account for only 6.5% of the total hospital beds in the country • Every private provider was founded prior to the introduction of patient choice for providers in 2008	• Private facilities are allowed to refuse treatment to certain patients based on a set of exclusion criteria that were agreed to with the Department of Health's commercial directorate (e.g. patients with medical conditions considered to be 'a constant threat to life' or had American Society of Anesthesiologist (ASA) scores of ≥3)	Not reported
United Kingdom, England (66)	National (2004)	Ophthalmology	To increase surgical capacity	• In September 2003, the South African healthcare corporation Network Healthcare Holdings Limited (Netcare) was awarded the contract to establish two treatment centres (TCs) • A 'chain' of mobile ophthalmology Independent Sector Treatment Centres (ISTCs) were contracted to carry out 41,600 cataract procedures over a 5-year period • The units operate as one-stop cataract clinics confirming the diagnosis and assessing suitability for surgery in one visit • The date for surgery is confirmed prior to the patient leaving the clinic • A single ophthalmologist is able to see 20–25 new patients with uncomplicated cataracts in a single clinic day	Not reported	*Peer-reviewed literature:* • As of 31 August 2004, 6731 cataract operations have been performed by Netcare staff • Netcare TCs may have contributed to reduced waiting times for cataract surgery in some districts; however, the quality of care provided by Netcare TCs has yet to be established • There are ongoing concerns about both the continuity of care and the management of postoperative complications, as well as the economics of neighboring NHS units (e.g. the Oxford Eye Unit (OEU) was at risk of losing £680,000 (£850 X 800) as Netcare had a 'take or pay' contract for 800 cataract cases even when there was no need for extra capacity) • As a direct result of this financial situation, the viability of maintaining consultant and/or nursing posts has been brought into question, and with it the ability of the OEU to provide comprehensive eye services to the local community (some nursing staff were made redundant in September 2004)
United Kingdom, England(64,67-69)	National (2005)	Various (ophthalmology, orthopedic, diagnostic imaging)	To increase surgical capacity, offering patients more choice and stimulating competition with NHS hospitals	• Independent Sector Treatment Centres (ISTCs) are private for-profit surgical centres that have been used to provide routine, uncomplicated, high volume elective surgical procedures to public patients • NHS-funded patients use ISTCs free of charge	• Although the NHS had long made use of private providers in England, ISTCs were distinctive in three ways: they were created as a deliberate government policy; they provided services exclusively to NHS patients; and the first wave of	*Peer-reviewed literature:* • The ISTC program was fraught with problems and by mid-2006, there were only 21 ISTCs established to deliver care to NHS patients, and the program was eventually heavily curtailed**(64)**

				• ISTCs were established to rapidly expand capacity in regions deemed at risk of not meeting waiting times targets • Initially, ISTCs focused on cataract removal and orthopedic procedures; most were single-site, often newly-built and co-located with an existing NHS hospital • Services were later expanded to include diagnosis and ISTCs were often on the same site as an existing private hospital (these ISTCs were permitted to recruit NHS staff and employ NHS consultants and were also required to provide NHS training placements)	ISTCs were not allowed to use NHS doctors • This restriction ensured that ISTCs represented genuine new additions to capacity, rather than drawing away physician labor from nearby public hospitals • ISTC contracts specified a range of 'exclusion criteria' – acceptable grounds for refusing to treat NHS patients – on the basis that ISTCs did not possess the emergency or intensive care units required to treat sicker and more complex patients • ISTCs were typically able to refuse to treat patients with an ASA score of ≥3	• One study used administrative data of patients undergoing elective joint replacement to assess the impact of competition from the private system on the efficiency (measured by pre-surgery length of stay) of public hospitals. The study found that the entry of a private hospital led to a decrease in pre-surgery length of stay at public system. Thus, authors concluded that public hospitals exposed to competition from private facilities became more efficient. However, data also suggest the entry of private facilities led to an influx of more severe cases to the public system. In principle, the policy intended for private facilities to focus on routine cases, but that does not imply that the division was devoid of negative consequences.**(64)** *Grey literature:* • At the end of 2007, the ISTCs carried out 4% of cataract operations, 7% of hip operations and 9% of arthroscopies performed in the UK • Waiting lists fell although this effect was not attributable overall to the ISTCs • ISTCs increased patient choice but in the absence of information about quality patients were not able to make an informed choice • ISTCs were paid less, which had contributed to a fall in care costs paid by the NHS
United Kingdom, England (70)	Regional (2002)	ENT	To treat patients waiting more than 12 months for treatment	• Patients travelled to a private facility to undergo routine tonsillectomy	Not reported	*Peer reviewed literature:* • One survey was conducted in patients who chose to undergo elective surgery in the private sector found 69% of patients were 'happy to speed up the operation', 33 (25%) patients were 'extremely happy and wondered why it had not happened before', and 6 (5%) patients were 'horrified' or 'very unhappy but accepting of pressure in the NHS' • 91 (70%) of patients rated the level of post-operative care provided by surgeon as excellent and 31 (24%) as satisfactory • 117 (90%) of patients were satisfied with the adequacy of information provided on their post-operative recovery at home • 122 (94%) of patients felt they were given adequate instructions for a point of contact in the event of a complication • 92 (71%) of patients rated the experience of having the operation performed at the private hospital as excellent and 32 (25%) of patients rated it as satisfactory • 127 (98%) of patients regarded the outsourcing of their operation to a non-regional private hospital as 'an efficient way to reduce the waiting time for other operations'**(70)**
United Kingdom, Scotland(68,71)	National (2002)	Various	To treat patients whose waiting times have exceeded the	• Spare capacity in the private sector has been used to treat patients whose waiting times have exceeded the national guaranteed limit	Not reported	*Peer reviewed literature:* • Median waiting times fell from 156 days in 2005/06 to 78 days in 2009/10**(71)**

			national guaranteed limit	• Negotiated through block contracts between the NHS and the private healthcare sector (first one signed in 2006) • For example, an Independent Sector Treatment Centre (ISTC) provides NHS funded diagnostics and elective treatment		• The authors stated that the use of the private sector to deliver elective treatments to NHS funded patients in Scotland has been controversial due to poor value for money • In January 2010, the Scottish Government terminated the ISTC contract (Scotland's only ISTC contract to date) when academic analysis revealed a £1.6 million gap (62% of total cash paid) between what had been paid and what had been delivered in treatments to NHS patients in the first 13 months of operation" • In 2010-2011 only 0.8% of NHS-funded hip arthroplasties were performed privately**(68)**

Table 4 Same-day surgery and discharge

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Description	Eligibility	Post-discharge protocol	Impact
Australia, Tasmania (38)	State (2008)	Various	• As part of plans for the redevelopment of the Royal Hobart Hospital (2009), one of the major strategies for delivering responsive surgery services was the use of surgical short-stay units and a 23-hour care suite, as the majority of surgical care could be performed within a 24-hour period in a non-ward environment	Not reported	Not reported	Not reported
Australia, Tasmania (72)	State (2008)	Various	• At the North West Regional Hospital, a $2 million redevelopment of the Operating Theatre and Day Surgery Units was undertaken • The project was anticipated to increase elective surgeries performed by up to 15% and enable more emergency surgery to be undertaken within working hours • The redevelopment included opening a fourth Operating Theatre and the expansion of the Day Surgery Ward from six to 12 chairs • The expansion to the Day Surgery and Recovery Wards was expected to reduce pressure on the existing restricted space and also increase patient privacy through the creation of separate consulting cubicles	Not reported	Not reported	*Grey literature:** • In 2009-2010, the funding has supported improvement in the performance of Tasmania's public hospitals with the Median Waiting Time for patients admitted for surgery falling from 54 days in June 2009 to 34 days in June 2010 *Note: impact based on implementation alongside other approaches
Australia, Victoria (73)	Regional (2008)	Urology	• As part of "Active Management via audit and intervention" additional staff were hired at the day surgery unit	Not reported	Not reported	Not reported
Canada, Alberta (74)	Provincial (Not reported or Not reported)	Various	• Significant efforts have been made to increase the use of day surgery in Alberta, to maximize utilization through extending operating room time, and to decant lower acuity cases to rural locations and non-hospital surgical facilities	Not reported	Not reported	Not reported
Canada, Alberta (interview)	Provincial (2016-17)	Oncology	• A same-day mastectomy pathway was implemented at all 11 facilities that perform the majority of mastectomies in Alberta	Not reported	Not reported	*Interview:* • 633 bed days per year forecasted to be released to the system with same-day mastectomy target for 2018/19 (net present value of $1,648,350; 87% return on one-time investment of $421,866 over 5 years)
Canada, Alberta (interview)	Regional (Not reported)	Orthopedic	• The SuperPATH approach has been used to provide same-day hip replacements in Calgary	Not reported	Not reported	Not reported
Canada, British Columbia (7)	Regional (Not reported)	Oncology	• Services for about 64% of patients in the Implementable Cardiac Electrical Devices program have been performed in an outpatient surgical facility • The ICED program is a centralized intake model with a standardized reporting system to monitor, track and adjust cases	• Patients pre-selected based on suitability (no other details provided)	Not reported	*Grey literature:** • Within six months of implementation, the ICED program consolidated and standardized cardiac services across the health authority from four sites to two • Cardiac implants increased from 22/week to 30/week, the waitlist was reduced from 120 to 40 patients and there were no cancelled procedure days due to a lack of staffing • Staff and patient feedback on the new care model and service has been positive

						*Note: impact based on implementation alongside other approaches
Canada, British Columbia (75)	Regional (Not reported)	Orthopedic	• At the Burnaby Hospital Central Intake and Optimization Clinic, some patients have received SuperPATH hip replacement and been discharged on the same-day as surgery	Not reported	Not reported	*Grey literature:* • The wait time at Burnaby Hospital is approximately 6-8 months after a surgical consultation • The average length of stay in the hospital after a hip or knee replacement is between 1 to 3 days
Canada, Nova Scotia (76)	Provincial (2017)	Orthopedic	• As part of the province's wellness model, healthy patients have returned home the day of surgery with the right supports and follow-up in place	• "Healthy" patients	• "right supports and follow-up in place"	Not reported
Canada, Ontario (77)	Hospital (2018)	Orthopedic	• Grand River Hospital began offering same day hip replacement surgery	• Patients must meet certain medical criteria, not specified, for same day discharge	• Follow-up telephone call from surgeon or nurse.	*Grey literature:* • The program director suggested that same day surgery allows hospital to use resources more effectively and prevent surgery cancellations due to be shortages
Canada, Quebec (78)	Hospital (2003)	Ophthalmology	• As part of a cataract efficiency program aiming to reduce time delays between cases, surgeries were performed in ambulatory care centres • The program also used the newest technology, trained surgical technicians, and increased OR time	Not reported	Not reported	*Peer-reviewed literature:** • % of patients waited for more than 6 months for surgery (39% in 1999), reduced to (29% in 2006) • The mean wait time in 2006 cohort was 1.1 months shorter, falling from 6 to 4.9 months (p, 0.001) • The 75th percentile wait time in 1999 was 8.5 months, decreasing to 6.6 months in 2006 (p 5 0.01) *Note: impact based on implementation alongside other approaches
Denmark (interview)	Hospital (Not reported)	Orthopedic	• Patients at Siilkeborg Hospital have received same day hip and knee replacements	Not reported	Not reported	*Interview:* • Discharge within 12 hour was found to be safe and possible for hip replacements • Many patients want to go home and are happy to do so, but it is important to have someone at home to take care of them
France (79)	National (Not reported)	Various	• Surgical day cases, defined as a patient who is admitted for an operation on a planned non-resident basis and who nonetheless requires facilities for recovery, have been performed in France	Not reported	Not reported	Not reported
Netherlands (interview)	National (Not reported)	Various	• Many day surgery procedures have been performed in the Netherlands	Not reported	Not reported	Not reported
Norway (80)	Hospital (2013)	Various (orthopedic, gastric, urology)	• The Lillehammer Hospital surgical department introduced same-day surgery and Lean for orthopedic, gastric and urological surgery • All preliminary examinations and patients' assessment by the surgeon were conducted on the same day and at a single location • Patients were given the operation date at the examination day so they have the opportunity to choose an available date that is suitable for them • Hospital aimed to complete 90% of surgery as same day surgery (target set by Norwegian government) • Based on interview, "in week 5 in 2017, 82% of patients were same-day surgery patients	Not reported	Not reported	Not reported
Norway (81)	Hospital (2008)	Various	• A day-surgery center was created within the existing premises of the Forde Hospital in order to increase the number of day surgeries in the health authority	Not reported	Not reported	*Peer-reviewed literature:** • Results are based on data collected at the hospital between 2010 and 2012

			• At the day-surgery, patients cleared for surgery proceed straight to the laboratory for blood sampling and medical pre-assessment at the drop-in anesthesia outpatient clinic • All patients undergoing elective surgery met at this center before their operation • Patients were discharged without admission to a surgical ward			• Mean cancellation rate was reduced from 8.5% to 4.9% (p<0.001) • After interventions, the cancellation rates were more stable • The median number of operations per month increased by 17% • The median number of scheduled operations per month increased from 373 to 400 after the interventions (p=0.04)"
Sweden (82)	Pilot (2014) Hospital (2016)	Various (orthopedic, gynecology)	• A highly specialized outpatient surgery unit was established at Karolinska University Hospital • Patients with a specialist-defined need for surgery were informed and prepared for the outpatient surgery procedure	Not reported	• Patient follow-up is performed the next day by phone and later via a return visit to outpatient care	*Grey literature:* • The pilot project managed to reduce the waitlists for orthopedics and gynecology • Now 30% of orthopedic surgeries are outpatient (goal is 50 – 60%) • Gynecology outpatient surgeries have increased from 12 to 30% (goal is 70 – 80%)
United Kingdom, Scotland (83)	Regional (Not reported)	Orthopedic	• NHS Greater Glasgow and Clyde introduced a new structure for day surgery shoulder care • Patients who met the criteria at the pre-assessment service were added directly to the day surgery list instead of previously being added to the inpatients waiting list	• Patients who met criteria (not specified) at the pre-assessment service	• Liaison nurse delivered home care on first post-operative day	Not reported
United Kingdom, Wales (84)	Hospital (2006)	Ophthalmology	• A new day surgery unit was built in Swansea with two operating theatres, 18 bed ward, a 6 bed post anaesthetic recovery area, pre and post-operative assessment rooms • The unit cost £5.2M	Not reported	Not reported	*Grey literature:* • The unit has had an impact on general elective waiting times • With patients being treated in the new day unit, man theatre space has been freed up increasing the capacity of the Trust to carry out operations
United States (79)	National (2014)	General surgery	• Ambulatory Surgery Centres have been established, which are units separate from the hospital facility that only provide surgical services to patients who do not require hospital admission and who are not expected to have an overnight stay	Not reported	Not reported	Not reported

Table 5 Standardized treatment pathways

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Australia, Queensland (85,86)	Regional (2014)	Orthopedic	To reduce orthopedic surgery wait time through early outpatient assessment and streaming non-operative and operative patients into separate pathways	• The Musculoskeletal Pathway of Care (MPC) model was implemented to assess non-operative pathway patients through attendance at an outpatient appointment • A care plan is established in consultation with each patient and sent to their GP with recommendations	*Grey literature:* • In a document released by the health authority in 2013-14, it was reported that of the 1325 referrals triaged from the Category 2 orthopedic wait list, 722 (46%) were referred to MPC, indicating nearly 50% of patients may not be suitable for surgery and could be treated conservatively • 11% (35 patients) were assessed as not requiring management and were discharged off the wait list. Of the 274 patients seen so far, 226 GP care plans have been developed and sent to the patients GP with recommendations for management • The data indicates a very high satisfaction rate from patients in regards to the service and being able to achieve their care plan. • In a document realised by the health authority in 2014-15, it was reported that over the past 18 months, 4168 patients on SCHHS orthopedic wait lists were triaged with 60% being referred to the advanced physiotherapy clinicians across the health service for assessment and development of a care plan • This resulted in reduced orthopedic surgery wait times for those remaining on the operative pathway of care • Of these patient referrals to physiotherapy clinicians, 85% were assessed as being able to proceed with treating their condition with non-operative care; only 4% of these have been referred back by their G.P. to the surgical wait list
Canada, Alberta (87,89)	Pilot (2005) Provincial (2010)	Orthopedic	To reduce lengthy waiting times for consultation and surgery and to improve care for patients	• In 2003-04, the Alberta Orthopedic Society (AOS) undertook an initial comprehensive analysis and redesign of the continuum of care for hip and knee replacement in an effort to reduce lengthy waiting times for consultation and surgery and to improve care for patients • The work comprised all components of the continuum: referral, patient assessment by a specialist including a treatment plan for non-surgical patients, patient optimization, surgery, inpatient care, sub-acute care, recovery at home and ongoing monitoring • All services, other than family doctor and in-hospital, are provided in or through a hip and knee clinic - Care is fully integrated, provided by a multidisciplinary team and coordinated by a case manager in the clinic - Surgeons, nurses, and physiotherapists are involved in the care of the patient from consultation through to surgery and back into the community • Patients have the choice of first available surgeon or a specific surgeon • The addition of specific criteria was intended to reduce non-evidence based medical screening that is costly and consumes public health care resources • The new continuum applied evidence-based criteria to patient referral for home care following surgery	*Peer reviewed literature:* • In the pilot study, patients who followed the new care path had significantly greater improvement in general health, less pain after surgery, and greater ability to perform normal daily activities than those who received conventional care • Waiting times from referral to first consultation and consultation to surgery decreased dramatically • LOS decreased by 1.3 days • The number of patients mobilized the day of surgery increased significantly (31 to 85%) • The degree of improvement among patients in the new continuum of care exceeded that of patients in the conventional approach as measured by the WOMAC and SF-36 • Patients in the new continuum of care had a 36% improvement in their average WOMAC score, compared with a 31% improvement for patients in the conventional approach • The lower total cost to public health care together with improved patient outcomes indicate the new continuum is more cost-effective than the conventional approach to hip and knee replacement • Results of the pilot suggested that the new continuum can achieve a standard for consultation waiting time of 17 working days or less on average by eliminating the backlog of patients and providing sufficient central intake resources

				• Evidence-based criteria were also applied when considering patient transfer to sub-acute care following surgery in the new continuum	• Alberta can achieve significantly higher standards in wait times in the two major components of access – consultation and surgery – through improved processes and better allocation of health care resources • Reduced LOS could be due to adherence to the new continuum's target length of stay, to improved patient optimization prior to surgery, or to a combination of these two factors *Grey literature:* • The Hip and Knee Replacement Program has reduced the time between the decision to have surgery and the surgery date to 19.2 weeks, down 12% or almost 3 weeks from when the program launched in 2010 • The average hospital stay for hip and knee patients has been reduced from 4.9 days for hip replacements and 4.6 days for knee replacements, to 4.1 days for both • Almost all patients returned to normal function for their age, indicating no ill effects from the shorter hospital stay • The patient satisfaction rate has increased from 86% to 98%. Rate of hospital readmission following surgery, already low at 4.3%, has improved even further to 4.1% • Reductions in length of hospital stay have freed up about 33,000 days of hospital bed space since 2010, enabling AHS to perform more than 1,600 additional hip and knee surgeries with the same bed capacity
Canada, Alberta (interview)	Provincial (2016-17)	Oncology	To deliver best practices for perioperative care and mastectomies as a same-day surgery	• A major breast cancer day surgery pathway was implemented in across the province for 11 surgical facilities that perform the majority of mastectomies in Alberta • Aspects of the pathway include: - Provincial consensus among the breast cancer surgical community on principles of care - Development and dissemination of a provincial breast cancer surgery patient education package (booklet, online, videos) - Delivery of in-services to nursing staff and physiotherapists to reinforce best practices and orientation to provincial patient education standards and content - Implementation of same-day mastectomy pathway at all 11 facilities (2018/19 target 50%) - Development and dissemination of a quarterly provincial site-based dashboard report on same-day mastectomy rates and adverse outcomes	*Interview:* • Over 80% patients satisfied or very satisfied with information received before and after surgery • 46% provincial same-day mastectomy rate for Q1-Q3 2018/19, on track to reach 50% target for year-end resulting in majority of patients receiving best practice perioperative care • 633 bed days per year forecasted to be released to the system with same-day mastectomy target for 2018/19 (net present value of $1,648,350; 87% return on one-time investment of $421,866 over 5 years) • Provincial standard for breast cancer perioperative care to benchmark for other cancer surgeries
Canada, British Columbia (7)	Regional (Not reported)	Cardiothoracic	To improve patient access to services, consolidating implant sites and enhancing the efficiency of scheduling device implants and replacements	• The Implantable Cardiac Electrical Devices (ICED) program has implemented standardized pre- and post-procedure care (including clinical practice tools, processes, and inventory management) across Fraser Health's twelve sites in accordance with evidence-informed practices	*Grey literature:* • Within six months of implementation, the ICED program consolidated and standardized cardiac services across the health authority from four sites to two • Cardiac implants increased from 22/week to 30/week, the waitlist was reduced from 120 to 40 patients and there were no cancelled procedure days due to a lack of staffing • Staff and patient feedback on the new care model and service has been positive • Work is underway to develop a province-wide plan
Canada, British Columbia (90)	Regional (Not reported)	Orthopedic	Not reported	• Beginning at the Burnaby Hospital's Central Intake and Optimization Clinic, hip & knee programs have been implemented at several centres across Fraser Health	*Grey literature:* • Program will increase the number of hip and knee replacement surgeries in the region by 23%; (approximately 836) in 2018-19. The new arthroplasty centre at Burnaby

				• These programs include dedicated OR time and standardized care pathways for patients, including pre- and post- surgical support, centralized intake, standardized assessment, access to first available surgeon, and coordination of care by a nurse liaison • Ongoing evaluation of the program is performed	Hospital has helped patients to not only better prepare for their hip or knee surgeries, but also to feel more informed about their options for rehabilitation following their procedures, which is why the region is expanding this model to other hospitals • In 2016-17 approximately 14,390 hip and knee surgeries were performed throughout the province and by 2018-19 more than 19,250 will be done • The additional surgeries will mean a 34 % increase in hip and knee surgeries. This will significantly reduce the number of patients waiting. As of March 31, 2017, province-wide, 30% of people waiting for hip surgery and 38% of people waiting for knee surgery waited > 26 weeks
Canada, Newfoundland (91)	Provincial (Not reported)	Orthopedic	Not reported	• As part of the Strategy to Reduce Hip and Knee Joint Replacement Wait Times (2012), the provincial government indicated that the Department of Health and Community Services has been encouraging the use of national, standardized patient care pathways for hip and knee joint replacement surgeries across the province • No other details about the pathways were provided	*Grey literature:* • In a 2012 document published by the provincial government, it was reported that there are lengths of stays in excess of those expected for certain patient populations suggesting that inefficiencies in the in-hospital orthopedic programs and that the national, standardized patient care pathways for hip and knee joint replacement surgery have not been fully implemented
Canada, Nova Scotia (76)	Provincial (2017)	Orthopedic	To improve care, promote wellness and provide Nova Scotians more timely access to hip and knee replacement surgeries	• The Nova Scotia Health Authority has developed standardized clinical pathways for hip and knee replacements. • The pathways begin within the Orthopedic Assessment Clinics and will guide patient care leading up to and during surgery, while they recover, and when they return home • Goals of the pathways are: - Patients are supported from referral to recovery - They are well-informed and prepared for surgery - Surgery is safe and successful. Recovery is smooth and complication free - Patients have improved mobility, reduced pain and a better quality of life - Patients are satisfied with their overall experience • Pathways were developed based on a wellness model, which includes new approaches to care that focus on helping patients be well • Patients are encouraged to have a "coach" to support them (e.g. friend or family member) and attend appointments, classes, etc. • Patients are supported to improve their strength and mobility before surgery, and to help them get moving as soon as possible after surgery (e.g. taking first steps hours after surgery; group exercise classes; wearing own clothes after surgery) • They also emphasize reducing the time that patients stay in hospital, as less time in hospital promotes mobility and aides recovery • Healthy patients may return home the day of surgery with the right supports and follow-up in place	NA
Canada, Ontario (92)	Regional (2013)	Cardiothoracic	Not reported	• The Hamilton Niagara Haldimand Brant LHIN implemented the Integrated Cardiac Program, which operates across multiple sites and is led by a single medical director • Includes standardized referral and patient care processes that provide evidence-based care	Not reported

				• Sites share policies, procedures and protocols, including common clinical policies, procedures, admission and discharge criteria • They also share common quality of care monitoring, reporting and identification with a commitment to joint monitoring of quality performance indicators	
Canada, Saskatchewan (93)	Provincial (Not reported)	Orthopedic	Not reported	• The Saskatchewan hip and knee pathway was implemented for patients with hip and knee osteoarthritis who may need joint replacement surgery • All patients are referred to a multi-disciplinary clinic where they are assessed and care options are discussed • The clinics offer a standard patient assessment process; provide consultations with an experienced health care team dedicated to improving patients' quality of life and health; confirm patients' need for surgery and provide surgical consults and surgical bookings (if patient is a surgical candidate); provide faster referral to specialists and surgeons; provide patient education, educational sessions, and take-home information to prepare patients for surgery; follow up with patients after surgery to speed recover; and offer access to community partners, other health professionals, and ongoing follow-up and support • When surgery is not the preferred option, the clinics also help patients access non-surgical care in the community • Clinics are located in multiple cities across the province (Saskatoon, Regina, Prince Albert, and Moose Jaw)	Not reported
Denmark (interview)	Hospital (Not reported)	Various	Not reported	• The Centre for Planned Surgery, Silkeborg Hospital has established care pathways for several elective surgeries, including hip and knee replacements • A physician and nurse at the hospital's clinic see all hip and knee replacement patients • That same day, they go through all preparation for surgery (e.g. testing, etc.) • Patients are only at the hospital one time before surgery	*Interview:* • Discharge within 12 hours was found to be safe and possible • Many patients want to go home and are happy to do so, but it is important that they have someone at home to take care of them
Netherlands (94)	Hospital (2012)	Oncology		• A multidisciplinary breast cancer care pathway (IOCP-integrated oncological care pathways) was implemented in three hospitals • Central elements of the IOCP model were 'process,' 'organization' and 'planning.' • These elements are intended to lead to a certain 'performance'. E.g. agreements about the moments of transfer (process), a better organization of the multidisciplinary meeting (organization and structure) or a better planning of operations (planning) may improve the performance of the care pathway and results in better quality of care • The IOCP model has frequently been used for introducing cancer care pathways of several tumor types in Dutch hospitals	*Peer-reviewed literature:* • There was an improvement in waiting- and throughput times • There was an overall increase the number of surgeries per year per surgeon • The time between the first visit to the hospital and confirmation and the time between the first visit and the fist surgery improved slightly
Norway (81)	Hospital (2008)	Various	To reduce cancellation rates for surgery	•An elective surgery pathway has been established for patients receiving elective surgery at Forde Hospital day surgery centre •The pathway includes centralized referral and pre-admission, patient choice of first available surgeon, patient choice of date of surgery, and a capacity coordinator to manage the program across all departments • A data management system is in place provide an overview of referrals, waiting lists, and surgery schedules across all departments	*Peer-reviewed literature:* • Mean cancellation rate was reduced from 8.5% to 4.9% ($p<0.001$) • Median number of operations performed per month increased 17% • Median number of scheduled operations per month increased from 373 to 400 ($p=0.04$)

Sweden (95)	National (2015)	Oncology	To shorten the care process between reasonable suspicion and the start of treatment.	• A national system of standardized care pathways for patients with suspected cancer were implemented: - The pathways describe which examinations and initial treatments are to be carried out for a particular cancer diagnosis - The pathway sets time limits for the entire process and each individual stages - Counties will receive incentives in two stages: the first amount is paid to all counties following a decision by each county council on the introduction of the pathways and once they had submitted an action plan; the second amount is paid once the councils submit a report on how work has progressed	Not reported

Table 6 Streamlined pre-admission processes

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Findings
Pre-admission clinics					
Australia, New South Wales (96)	Hospital (2016)	Orthopedics	To reduce the LOS for patients undergoing elective hip and knee replacement, and better prepare patients to manage at home following discharge	• As part of the "Totally hip (and knee)" project, the hospital established an Allied Health Preadmission Clinic with a database to track patients through so all staff contributing to preoperative assessments could monitor their progress • The clinic was expanded to allow individual assessments by both physiotherapists and occupational therapists, with a focus on preparing the patient for discharge • Patients information booklets are under development to help patients understand their journey through the hospital and discharge instructions	*Grey literature:** • In a newsletter published by the health authority, it was reporting on the period July 2016 – February 2017 • Average LOS for total hip replacements was reduced from 4.9 days to 3.9 days • Average LOS for total knee replacements was reduced from 5.3 days to 4.0 days • ED presentations within 21 days of surgery was reduced from 11.7% to7.4% • Attendance at the Allied Health Preadmission Clinic increased from 35% to 90% • 86% of patients surveyed (n=29) reported they were given enough information to manage at home (previously 40%) • 100% of patients felt that staff did everything they could to help manage their pain Lessons learned: • Having the support of a key medical champion is imperative • The development of protocols and documents is very resource intensive and takes longer than anyone expects • Make friends early with executive assistants and receptionists – they will be your strongest allies *Note: impact based on implementation alongside other approaches
Australia, New South Wales (97)	Hospital (2016)	Various	To improve first case on time performance, reduce monthly day of surgery cancellations, improve elective surgery patient experience, and improve co-ordination and integration of pre-operative care	• The Pre-Op to Theatre Ready & on Time project involved the redesign of preoperative screening & triage processes, preadmission staff work allocation schedules and improve systems that included preoperative wellness checks and text messaging reminders Preadmission clinic was redesigned with new work schedules to ensure dedicated time for request for admission (RFA) screening process of all patients prior to surgery • New clinical guidelines for preoperative screening and triage processes were developed • Phone calls to patients the day before surgery were made earlier in the day and included a wellness screening • Text messaging reminders were implemented for all elective surgical patients • Morning team communication was introduced during weekdays that consisted of Surgeon, Anesthetists & Nursing staff to enhance collaboration amongst clinicians • Theatre Nurse start time was changed to 7am to allow for adequate setup time and reduce risk of delays • Daily forecast meeting was introduced weekdays to review anesthetic requirement for all patients scheduled first on list, staffing and equipment required	Grey literature:* • First case on time performance increased to an average of 62% in November 2016 • Patient related day of surgery cancellations were reduced by 65% between August and October 2016, with median cancellation rate 1% (Target 1.5%) • 86% of patients were triaged to appropriate preadmission process (n=22) • Number of RFA forms screened within 2 days of receipt increased from 0% in August 2016 to 17% in October 2016 (n=22) • Number of patients with no documented screening on RFA form reduced from 22% in August 2016 to 0% in October 2016 • Improved patient experience with preoperative information from 60% to 90% (n=10) • Patients reporting a positive experience with coordination & integration of care increased from 50% to 100% (n=10) *Note: impact based on implementation alongside other approaches

				• Patient information on bowel preparation and preoperative instructions were revised	
Australia, South Australia (98)	Regional (2014)	Various	Not reported	• As part of an elective surgery pre-operative reform trial, a streamlined pre-operative assessment clinic was established • The trial involved a workflow redesign based around computer-assisted triage processes	*Grey literature:* • The elective surgery preoperative reform trial has demonstrated that a workflow redesign based around computer assisted triage processes can enhance patient care and experience, and improve capacity
Canada, Alberta (interview)	Regional (Not reported)	Various	Not reported	• Pre-admission clinics have been implemented in some urban centres • Some still need further streamlining of services	Not reported
Canada, British Columbia (99)	Regional (Not reported)	Various	To make sure patients awaiting surgery have everything in place for the procedure go smoothly	• Interior Health Authority implemented a Pre-Surgical Screening (PSS) Program that includes proper screening tests done prior to surgery and information on what patients should expect when they come in for surgery • It was anticipated that, when patients were properly prepared for surgery, there would be fewer delays or cancellations, better surgical outcomes, better use of surgical resources and reduced wait times for everyone	*Grey literature:* • Earlier this year, patients who were involved in a Pre-Surgical Screening (PSS) Program at any Interior Health hospital were asked a number of questions relating to the care, attention and instructions that they received within the program • A total of 639 responses were received from nine hospitals, and the results were very positive; the average response in all hospitals was never < 90% • Patients reported that they were given prompt attention and clear instructions, and were at ease sharing their information and questions with staff and physicians throughout the PSS process
Denmark (interview)	Hospital (Not reported)	Orthopedic	Not reported	• Silkeborg Hospital implemented a process for all pre-admission preparation to be completed on a single day	Not reported
Finland (1)	Regional (2002)	Orthopedic	Not reported	• At a public-private partnership specialist centre for joint replacement surgery, a "one-stop" pre-admission process has been implemented in which all patients have a standard work-up at one visit • Elective orthopaedic services were withdrawn from five district hospitals and now concentrated at one centre • Since 2012, the centre has been in full public sector ownership) •Pre-anaesthesia assessment is led by nurse specialist	Not reported
Ireland (20)	Hospital (2016)	Cardiothoracic	To improve rates of day of surgery admission	• A Lean Six Sigma approach was introduced in the thoracic surgery department • An ERAS-based patient pathway was instituted • A multi-disciplinary project team was created • A pre-thoracic surgery checklist was developed and implemented; a weekly audit of this checklist was done • The team met weekly	*Peer-reviewed literature:* • The proportion of DOSA rose from 10.9% to 75.3% in an 19 month period • Duplication of pre-operative tests fell from 83% to <2% • Staff and patient surveys showed increased satisfaction
New Zealand (2)	Regional (2011)	Various	Not reported	• Nurse-led preoperative assessment clinics were established with a focus on pre-admission assessment process redesign	Not reported
New Zealand (2)	Regional (Not reported)	Various	Not reported	• Pre-anesthesia assessment by anesthetic clinic nurses were implemented to determine whether the patient requires an anesthetist review, 'chart' review by an anesthetist or no further review • The anesthetic clinic nurse triaged orthopedic surgery patients at their clinic visit so they know if they're 'fit for surgery' and on the waiting list before they go home	*Grey literature:* • Pre-anesthesia assessment by anesthetic clinic nurses results in only 15% of patients requiring anesthetist review • Anesthetists performing echocardiograms dramatically reduced the waiting time for patients to achieve 'fitness for surgery' • The anesthetic preadmission process resulted in minimal cancellations on day of surgery and 85-88% OR utilization
Norway (80)	Hospital (2013)	Various (orthopedics, gastric, and urology)	To provide a more effective visit to the hospital, reduce	• As part of a same-day surgery initiative, all preliminary examinations and patients' assessment by	*Grey literature:*

			surgery queues, and cut costs	the surgeon were conducted on the same day and at a single location • Patients were given the operation date at the examination day (patients had the opportunity to choose an available date that is suitable for them)	• Based on interviews from the hospital: "in week 5 in 2017, 82% of patients were same-day surgery patients"
Norway (81)	Hospital (2008)	Various	To reduce high cancellation rates	• As part of a redesign of the elective surgical pathway at a hospital, a day-surgery center was created within the existing premises • At the day-surgery, patients cleared for surgery proceed straight to the laboratory for blood sampling and medical pre-assessment at the drop-in anesthesia outpatient clinic	*Peer reviewed literature:* • In a study based on data collected at the hospital between 2010 and 2012* • Mean cancellation rate was reduced from 8.5% to 4.9% ($p<0.001$) • After interventions, the cancellation rates were more stable • The median number of operations per month increased by 17% • The median number of scheduled operations per month increased from 373 to 400 after the interventions ($p=0.04$) *Note: impact based on implementation alongside other approaches
United Kingdom, England (100)	Pilot (2015)	ENT	To improve waiting times and reduce on the day cancellations	• As part of the introduction of "rapid turnover" lists, patients attended a pre-operative consent clinic run by a ENT registrar 2 weeks before surgery • The clinic checked if diagnostic tests were up to date and if patients still needed surgery. • Patients no longer requiring surgery were cancelled at the clinic instead of waiting until the day of surgery • Rapid turnover lists were then designed to have 8 to 12 patients that had gone through the pre-operative consent clinic	*Grey literature:* • Before pilot, the rate of cancellation on the day of surgery was 8% • During pilot, there were 0 cancellations on the day of surgery; children not requiring surgery were cancelled at the consent clinics (24%) • Before pilot, 78% of children had to wait more than 18 weeks of referral • After pilot, all children had treatment within 18 weeks of referral
United Kingdom, England (3)	Regional (2004)	General surgery (hernia)	To reduce wait times between GP referral and surgical procedure.	• As part of a direct-access day-case surgery process, patients were evaluated in a pre-operative assessment clinic and assessed by a nurse the week before their operation	*Peer reviewed literature:* • In retrospective review of the case notes of 427 patients between 1998 and 2002* • Median waiting time in the direct access group was 69 days • Total median time for patients who had a surgical appointment before surgery was 142 days • Patients had to wait a median of 83 days for the surgical appointment and 57 days for surgery • There were no mortality and major complications registered in the study. •Direct access surgery appointments have allowed other patients to be seen in the out-patient department *Note: impact based on implementation alongside other approaches
United Kingdom, England (101)	Not reported	Various	To increase productivity in elective surgery	• One- stop clinics have been implemented to provide assessment during a single outpatient visit that includes: initial surgical assessment, further diagnosis if required, decision on type of anesthesia and type of prosthesis (if required), assessment of anesthetic risk and referral to risk-stratified pre-assessment, booking of procedure, and brief education on preparing for surgery and what to expect postoperatively	Not reported
United Kingdom, Scotland (4)	Not reported	Various	To reduce cancellations and increase flow	• Nurse-led pre-admission clinics with support from anaesthetists were established • Pre-admission clinics allowed patients to be admitted on the day of their procedure, and gave surgeons and	*Grey literature:** • The NHS Modernisation Agency's Pre-operative Assessment Project has shown that implementing

				anaesthetists the confidence that the patient had been properly prepared, informed consent had been obtained and a discharge date and plan agreed on beforehand	preoperative assessment can decrease the number of patients who do not attend (DNA) • Although the numbers are small, DNA rates for patients who have been pre-operatively assessed are consistently lower than DNA rates for patients who have not been pre-operatively assessed *Note: impact based on implementation alongside other approaches
United Kingdom, Scotland (5)	Hospital (2009)	Various	To increase the likelihood of safe return to patient's own home with a reduction in institutionalization, death or deterioration, and improved cognitive functioning	• Nurse-led multidimensional preoperative assessment were implemented for frailer older adults (Age>65 years old) undergoing elective surgery • A nurse with experience in the care of frailer older people and an occupational therapist provided the assessment • Protocols for assessment and referral were developed • Referral pathways were created to deal with issues identified during preoperative assessment to potentially avoid prolonged admission and complex discharge planning where many would be considered late in the course of a patient stay and require remedial planning • The program included patients with one or more 'red flags' identified at the first part of their routine pre-assessment. • 'Red flags' were: cognitive problems, mobility concerns, a history of falls, difficulties with active daily living, concerns regarding home circumstances, neurological pathology, nutritional concern, polypharmacy, use of psychotropic medications and multiple medical problems	*Peer reviewed literature:* • In a single study of 141 patients in the pre-intervention phase and 172 patients recruited in the intervention phase • Surgery cancelled: - Pre-intervention group- n(%): 25 (17.7%) - Intervention group- n(%): 9 (5.2%) (p<0.001) • Number of patients with delays to surgery: - Pre-intervention group- n(%): 14 (9.9%) - Intervention group- n(%): 4 (2.3%) (p<0.004) • Length of hospitalization: - Pre-intervention group- mean± SD: 8.9±7.6 days - Intervention group -mean ±SD: 4.9±5.0 days (p<0.001) • Patients with complications: - Pre-intervention group- n(%): 12 (8.5%) - Intervention group- n(%): 4 (2.3%) (p=0.01) • No other wait times data were reported
Telephone pre-admission service					
Australia, Queensland (102)	Region (2015)	Various	To ensure that no patient would wait longer than clinically recommended for surgery	• A nurse-led, telephone pre-operative assessment service was implemented	*Grey literature:* • The service has resulted in a more efficient and cost-effective service, and importantly has reduced the burden of travel and waiting for many patients • In 2012, patients were routinely waiting >3 years to complete their elective surgery • Since 2015, no patient has waited longer than clinically recommended for surgery
Canada, British Columbia (103)	Hospital (2006)	Orthopedic	To improve access to surgery	• Centre for Surgical Innovation at University of British Columbia Hospital has implemented telephone preoperative anesthetic consultations for suitable patients after review of the appropriate consultation paperwork, blood tests and electrocardiogram results	*Peer reviewed literature:* • The results* of the CSI program are assessed annually by the management team in terms of the following patient access, service quality and efficiency, and finance • In the 2006/07 and 2007/08 fiscal years, the CSI program achieved its headline target by performing 1609 and 1600 joint replacements, respectively, or about 16% of the total number of provincial cases •Total number of patients waiting > 26 weeks in BC decreased by 15% from 3878 at the end of 2005/06 to 3203 in 2006/07 and by a further 14% to 2768 in 2007/08 • Total number of patients on the waiting list decreased by 16% over the first year of the program

					• The result is a median waiting time of 3 months for hip replacements and 4 months for knee replacements • The 2 health authorities that are local to the program achieved their patient participation targets, whereas the 3 distant health authorities did not • Patient satisfaction with the service provided at the CSI remains high, with a mean satisfaction score recorded at 4.7 out of 5 on a Likert scale for 599 patients randomly surveyed after discharge • Any reported concerns were mainly related to waiting time and travel rather than service quality • Targets were well met for an average OR time of 1 hour and 45 minutes, an average length of stay in post-anesthesia recovery of 2 hours and 4 minutes and an average postsurgical length of stay in hospital of 3.4 days • Changes have already taken place in Vancouver to accommodate ASA grade 3 patients within the program to more directly and effectively deal with the backlog of patients waiting > 26 weeks. • Increased staffing levels and medical coverage on the surgical observation unit have been instrumental in facilitating this change • The change has been successful and, at present, very few patients are ineligible for the CSI program, thus alleviating concerns of so-called "cherry-picking" *Note: impact based on implementation alongside other approaches
United Kingdom, Scotland (4)	Not reported	Various	To reduce cancellations and increase flow	• A telephone pre-operative assessment process for minor procedures was implemented	*Grey literature:** • The NHS Modernisation Agency's Pre-operative Assessment Project has shown that implementing preoperative assessment can decrease the number of patients who do not attend (DNA) • Although the numbers are small, DNA rates for patients who have been pre-operatively assessed are consistently lower than DNA rates for patients who have not been pre-operatively assessed *Note: impact based on implementation alongside other approaches

Table 7 Targeted funding

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Description	Impact
Elective procedures				
Australia (104)	National (2008)	Various	• 50% increase in funding for hospitals resulted in more public elective surgery being done	*Grey literature:* • As reported in 2010, the proportion of those waiting >1 year for elective surgery has decreased to <3%, compared with almost 5% in 2004-05 • The biggest improvement is in the amount of elective surgery performed, with 38,239 more surgical admissions in 2008-09, than in 2006-07 • More public elective surgery being done, average waiting time levelling out, fewer long waits and increased admissions for elective surgery from waiting lists suggests improving access to public elective surgery (comment from Australian Institute of Health and Welfare spokesman)
Australia, New South Wales (105)	State (2017)	Various (Hip and Knee replacements, cataract extraction)	• The Ministry of Health provided "spot purchasing" to reduce the number of overdue elective surgery patients • Under the Increasing Access to Elective Surgery Initiative, the New South Wales Government invested an additional $3 million to further improve access to elective surgery services in NSW • The funding was provided to districts and networks to complete additional cataract extraction, hip replacement and knee replacement procedures	Not reported
Australia, South Australia (106,107)	State (2010)	Various	• In support of the Elective Surgery Strategy in South Australia, there was an investment of an additional $88.6m to support up to 259,007 elective surgery procedures in metropolitan and country hospitals over the four years of the plan • An investment of $23m in 2012-13 (the third year of the plan) was committed to achieve up to 65,000 elective surgery procedures	*Grey literature:* • 64,130 procedures undertaken in metropolitan hospitals in 2012-13, an increase of 5230 procedures (8.9%) compared with 2007-08
Australia, South Australia (108)	State (2005)	Elective surgical procedures and additional cochlear implants	• The Four Year Plan for Elective Surgery 2003–04 – 2007–08 in South Australia outlines short and long-term initiatives to improve the management of metropolitan hospital waiting lists and meet national waiting time targets • $16 .8 million for elective surgery was provided through targeted funding • There was also funding for additional cochlear implants being performed at Flinders Medical Centre	*Grey literature:* • Targeted funding enabled an additional 2,631 elective surgery procedures to be undertaken (98 .8% of the targeted 2,691 procedures) • A deliberate strategy to focus on the very long-wait patients has seen a 52.9% reduction in the number of people waiting > 12 months for elective surgery from 2003–04 to 2005–06 • This strategy has resulted in a slight deterioration in the percentage of people seen within the thresholds for each of the three categories
Australia, Tasmania (35)	State (2016)	Various	• Under the Tasmanian 2015-2017 Action Plan, a total of $13.4 million (excluding any unexpended funds carried forward from 2015-16) has been provided in 2016-17 for the targeted purchase of additional elective surgery/non-surgical cases from the private sector in Tasmania and interstate, and through existing public sector arrangements • The following patients were specifically targeted: all current long-waiting children, and all current Category 2 and 3 patients who have waited >2 years; all Category 2 and 3 patients on a treat in turn basis who are currently >6 months over boundary; all Category 2 patients on a treat in turn basis who are currently > 90 days over boundary; general over boundary patients once the long waiting cohort of patients has been removed from the waiting list, or are not ready for care	Not reported
Australia, Tasmania (109)	State (2012)	Various	• The Tasmanian and Australian governments signed an agreement to deliver about 2600 procedures throughout the state over 4 years; at least 500 and up to 700 procedures carried out in the current financial year	Not reported

			• In the North West there will be an additional 57 joint procedures; in the North another 200 cataract procedures along with 42 joint replacements and hernia and gallbladder procedures • The South will carry out 72 joint replacements, hernia and gallbladder procedures as well as tonsillectomies, spinal fusions and septoplasty • The first year will see around $8.8 million invested in elective surgery procedures from a total of $30.5 million over 4 years; this is on top of an additional $4 million of State Government funding for endoscopy and elective procedures in the current financial year	
Australia, Tasmania (110)	State (2008)	Various	• An amount of $8.1 million was allocated to Tasmania from the national pool to treat 895 patients who have been waiting longer than the clinically recommended time for elective surgery; the amount is more than twice Tasmania's weighted average share • The program was to begin immediately and funding spent by 31 May 2009 • Under the 4-year Elective Surgery Waiting List Reduction Plan, up to $300 million in dividend payments was available to States and Territories that completed all elective surgery within clinically recommended time by the end of the four year plan	Not reported
Australia, Tasmania (39)	State (2008)	Ophthalmology (cataract)	• A $2 million surgery blitz will remove cataracts from the eyes of more than 1000 Tasmanians from around the state by the end of the year • The cataract program will see an extra 437 cataract procedures performed at the Royal Hobart Hospital (RHH), 325 at the Launceston General Hospital and 240 in the North West (the RHH will increase surgeries contracted through private hospitals) • The North West Area Health Service is increasing the number of cataract sessions at the Mersey Community Hospital to provide an extra 20 cases a week	*Grey literature:* • There was a 50% increase in eye surgery at the Mersey Community Hospital
Australia, Tasmania (35,111)	State (Not reported)	Various	• The Tasmanian Government invested significant additional funding to boost elective surgery with its $76 million election commitment • $76 million was allocated to provide up to 15,000 additional elective surgical procedures, focusing on treating long waiting patients (239) • In addition to this, the Government is investing a further $14.3 million in funding for elective surgeries and endoscopies, which includes $6.4 million of Commonwealth funding	*Grey literature:* • In 2013-14, of all the patients' admitted from the waiting list, 17% waited >365 days for their treatment (Supplement No.5) • Over the past 12 months, the Tasmanian Health Service has performed additional surgeries to reduce the waiting list to 5, 430, down from 5, 758 in June 2016; a reduction of 3,100 people since June 2015 • During the 2016-17 financial year, the THS exceeded its annual target for surgeries by 331; delivering a total of 19,180 surgeries
Canada, Alberta (112)	Provincial (2018)	Orthopedics	• The Alberta Government added $40 million (in the 2018 budget) to address the backlog of patients requiring hip/knee replacements • Albertans needing a hip or knee replacement were, on average, waiting at least one month longer to receive their surgeries in 2017	*Grey literature:* • Reductions likely to happen in the months following Alberta Health Services' full budget release in June 2018
Canada, Alberta (113)	Provincial (2010)	Ophthalmology (cataract)	• Funding allocation to maintain increased volumes of cataract procedures in 2011/12 in order to reduce wait times	*Grey literature:* • The preliminary result for 90th percentile wait time for cataract surgery for Q4 2010/11 was 46.1 weeks (target 36 weeks) • Cataract volumes for the 2010/11 year increased to 12,180 in Calgary and 13,961 in Edmonton, an increase of 2,889 and 2,136 cases from the previous year, respectively • Calgary continues to have the highest backlog of cases, yet this was reduced from 9,500 people waiting in October 2010 to 6,050 people waiting in April, 2011 • The average wait time in Calgary decreased from 28 (April 2010) to 24 weeks (April 2011)
Canada, British Columbia (114)	Provincial (2018)	Various (hip and Knee replacements, dental surgeries and other surgeries)	• Targeted funding of $75 million starting in 2018-19 and increasing to $100 million in 2019-20 supports a surgical strategy that includes providing more surgeries in areas with long wait times • Start with hip and knee surgeries and incrementally tackle other surgeries with long waits • Expand access to dental surgery	*Grey literature:* • In 2016/17, approximately 14,390 hip and knee surgeries were performed; by 2018-19, more than 19,250 will be done annually • The additional surgeries will mean a 34% increase in hip and knee surgeries

			• Invest to keep up with growing demand for all other surgeries	• In total under the surgical strategy, 9,400 more surgeries – 4,000 additional hip and knee, 900 dental and 4,500 other surgeries – will be done throughout the province by the end of March 2019, compared to the previous year
Canada, British Columbia (44, 45)	Regional (2018)	Orthopedics	• In 2018/19, there was a funding increase to perform 1,100 additional hip and knee surgeries in Island Health over the previous year	*Grey literature:* • This measure has already improved as a result • As of November 2018, 17% of hip replacement surgery patients and 24% of knee replacement surgery patients were waiting > 26 weeks for their surgery; this is an improvement - the previous year, 38% of hip patients and 47% of knee patients were waiting > 26 weeks
Canada, British Columbia (103)	Hospital (2006)	Orthopedics	• The University of British Columbia Hospital (UBCH) Centre for Surgical Innovation (CSI) was resourced to perform an additional 1600 hip and knee replacements annually to help reduce provincial waiting times to < 26 weeks for 90% of patients	*Peer-reviewed literature:* • In the 2006/07 and 2007/08 fiscal years, the CSI program achieved its headline target by performing 1609 and 1600 joint replacements, respectively, or about 16% of the total number of provincial cases • The total number of patients waiting > 26 weeks in BC decreased by 15% from 3878 to 3203 (15% reduction) in the first year and a further 14% to 2768 in the second year. The total number of patients on the waiting list decreased by 16% over the first year of the program. The result is a median waiting time of 3 months for hip replacements and 4 months for knee replacements. The 2 health authorities that are local to the program achieved their patient participation targets, whereas the 3 distant health authorities did not
Canada, British Columbia (115)	Provincial (1998 and 2003)	Cardiothoracic	• Target funding of $2 million in 2003-04 for additional open heart surgery • Additional funding was also available for open heart surgery in 1998	*Peer-reviewed literature:* • When additional funding was available, the length of time from decision to treat to CABG surgery was shorter than when additional funding was not available. • In the 2 years supplementary funding was available, the weekly rate of undergoing surgery was, respectively, 50% and 90% higher than when funding was not available • 40% of patients underwent surgery within 16 to 20 weeks when supplementary funding was provide, while it took between 27 and 37 weeks for the cohorts registered in the years when supplementary funding was not available. Times between decision and surgery were shorter for direct admissions than for wait-listed patients • Among patients who were directly admitted to hospital, the rate of surgery among these patients was the highest in 1998–1999, and has not changed afterwards, even for years when supplementary funding was provided
Canada, Manitoba (116-118)	Regional (2005)	Various (Hip and Knee replacements, cataract, pediatric dental, and other surgeries)	• Subsequent to the First Ministers' meeting in September 2004, Manitoba established its Wait Time Reduction Strategy aiming to improve access in the 5 priority areas identified by the First Ministers (cardiac care, cancer care, joint replacement, sight restoration and diagnostic imaging) • As part of the Strategy, MB established a Wait Times Reduction Task Force and, within the Task Force, The Priority Procedures Wait Times Reduction Committee (284) • The implementation of the Strategy included a number of investments for specific surgical areas, i.e. providing more hip and knee, cataract, pediatric dental, and other surgeries • In some cases, the Government has also provided targeted wait time funding to assist the regions in performing a minimum number of hip/knee and cataract removal procedures, in order to reduce their wait times; this targeted funding is in addition to the global funding provided to each region **(116)**	*Grey literature:* • In the Winnipeg Regional Health Authority (WRHA) the target and actual volumes for hip/knee replacement surgery were 3100 joints (target for 15/16 and 16/17), 3176 joints (2015/16 actual) and 3117 joints (2016/17 actual) **(116)** • At the Misericordia Health Centre (WRHA) the target and actual volumes for cataract surgery were 9,045 (target for 15/16 and 16/17), 9,115 (actual 2015/16) and 8,996 (actual 2016/17) **(116)**
Canada, Newfoundland (91,119)	Provincial (2012)	Orthopedics	• The Strategy to Reduce Hip and Knee Joint Replacement Wait Times five-year Strategy was implemented in 2012 to reduce wait times for hip and knee joint replacement surgeries	Not reported

			• The Strategy included the following investment in the Provincial Government's 2012 budget: $900,000 for 60 additional joint replacements in 2012-13 to address current wait list • The provincial government also provided additional one-time funding to address the back log of patients waiting for hip and knee replacements beyond the benchmarks**(91)** • Funds were only provided to facilities that could accommodate additional surgeries**(91)** • The methodology to find additional capacity was determined by the Department of Health and Community Services in consultation with the RHAs**(91)**	
Canada, New Brunswick (120) (interview)	Provincial (2018)	Orthopedics	• In early 2018, the provincial government announced an investment of $3 million to increase surgical capacity at two hospitals in NB • Hip and knee joint replacements represent the vast majority of the long-waiting orthopedic surgeries • Moncton has the longest waiting times and so was given funding to reduce the backlog for hip and knee replacements	*Grey literature:* • Reducing the number of people waiting long periods will improve the quality of life of those needing this surgery; it will also avoid added health-care costs by ensuring more timely surgeries, which in turn will reduce the chances of their health deteriorating
Canada, New Brunswick (121)	Provincial (2005)	Cardiothoracic	• In 2005, the province invested $2.45 million into the NB Heart Centre to equip a third cardiac catheterization lab; patients will be able to have electrophysiology procedures not previously available within New Brunswick, including the implanting of defibrillator pacemakers • The investment is part of New Brunswick's share of equipment funding resulting from the 10-year health agreement negotiated in 2004 by the federal, provincial and territorial governments	*Grey literature:* • Wait for New Brunswickers will be reduced • Some of the pressure in those jurisdictions that have been serving New Brunswickers as well as their own residents will be relieved
Canada, Nova Scotia (76,122)	Provincial (2017)	Orthopedics	• The Hip and Knee Action Plan was announced in October 2017**(76)** • The 2018-2019 budget for NS HA includes $8.8 million to strengthen the province's orthopedic surgical services**(122)**	*Grey literature:* • 8.1% more Nova Scotians were able to have their surgery in 2017/18**(76)**
Denmark (123,124)	National (2000)	Various	• In 1993, it was agreed informally that waiting times for elective surgical patients should be reduced to 3 months • The national government allocates additional funds to municipalities or counties for priority areas such as surgical wait times**(124)** • In 2000 and 2001, an additional 20,000 operations were funded • In 2002, an additional 1.5 billion DKK was pledged to increase surgical activity by 14-18%	*Peer-reviewed literature:* • The additional 1.5 billion DKK funding was successful in increasing surgical activity by the 14-18% target
Spain (61)	National (1996-2000)	Various	• Since1996, INSALUD, responsible for providing health services in Spain, formally developed institutional policies for the reduction of wait times for elective surgery in order to ensure equal and adequate access to surgery over its territory • One policy was supplementary funding paid by the central authority for additional hospital production • This extra budget was calculated from the number and type of procedures to be treated under the Waiting List Initiative, with a specified fixed calculated cost for each type of procedure • This supplementary budget was sent to hospitals at the commencement of the programme with the communication of number and type of patients to be treated with the additional funding	*Grey literature:* • By December 1997, patients over 9 months on the list were reduced from 19,052 to 876 • Total cost of the Surgical Waiting List Reduction Programme was 18,612,137 Euros for 13,461 procedures • Total cost of the program in 1999 was 45,666,595 Euros for 41,535 surgical procedures
United Kingdom, England (125)	Hospital (2014)	Cardiothoracic	• Additional financial investment was made to enable the implementation of weekend service; cardiac surgeries are performed in 2 elective theaters on Saturday and one elective theater on Sunday • Procedures include coronary artery bypass grafting, aortic valve replacement, mitral valve surgery and arrhythmia surgery	*Grey literature:* • An additional 90 cases in one year which has effectively reduced the waiting lists for cardiac patients and improved flows through critical care as a result of this increased capacity
United Kingdom, Northern Ireland (126)	National (2017)	Various	• At the end of November 2017, targeted funding of £7m was made available for patients with the highest clinical need and those who have been waiting the longest	*Grey literature:* • It is expected that around 25,000 patients will benefit from this
Human resource- Increased staff				

Australia, Tasmania (35)	State (2016)	Various	• The Tasmanian Government invested significant additional funding to boost elective surgery with its $76 million election commitment • In addition to this, the Government is investing a further $14.3 million in funding for elective surgeries and endoscopies, which includes $6.4 million of Commonwealth funding • Under the One Health System reforms, the THS is directing this funding towards, among other initiatives, recruiting additional specialists and surgical support staff	*Grey literature:* • Over the past 12 months, the Tasmanian Health Service (THS) has performed additional surgeries to reduce the waiting list to 5, 430, down from 5, 758 in June 2016; a reduction of 3,100 people since June 2015 • During the 2016-17 financial year, the THS exceeded its annual target for surgeries by 331; delivering a total of 19,180 surgeries
Australia, Tasmania (39)	State (2008)	Ophthalmology	• Tasmanian Government's $8.4 million Improving Time to Treatment: Elective Surgery Improvement Plan includes almost $285,000 to introduce dedicated elective surgery managers in hospitals • The North West Regional Hospital employed an additional general surgeon • The Mersey Community Hospital employed an additional ophthalmologist	*Grey literature:* • There was a 50% increase in eye surgery at the Mersey Community Hospital through the addition of an ophthalmologist
Australia, Victoria (73)	Regional (2008)	Urology	• A full-time urologist was appointed resulting in the region to significantly increase OR utilization at the main treatment site, which also enabled the network to commence a urology service from the smaller satellite hospital • The appointment of the full-time urologist could be considered the greatest resource that was implemented in this initiative as it provided the best ability for the health service to provide treatment to a larger number of patients	*Peer-reviewed literature:* • The number of patients assessed as 'ready for care' reduced from 579 to 190 (a 67% reduction) and the number of patients classified as 'overdue for surgery' went from 390 to 85 (a 78% reduction) • The average waiting time for semi-urgent and non-urgent (Category 2 and 3) patients went from 248 days to 180 days in the 10-month period • Because a large number of these patients fall within the DHS defined semi-urgent category and their waiting times still exceeded the recommended 90 days, although a 28% reduction in waiting time is a positive outcome, it still falls below the benchmark required
Canada, Alberta (127)	Regional (2011)	Orthopedics	• A new orthopedic surgeon has started in the North Zone in July and additional staff have been hired in the Zone to meet target levels	*Grey literature:* • The wait time for knee replacement surgery in Q2 2011/12 was 49.9 weeks which is worse than the prior quarter and the Year to Date (YTD) wait time was 49.2 which is longer than the Alberta target for 2011/12 of 35 weeks • The wait time for hip replacement surgery in Q2 2011/12 was 39.7 weeks; slightly better than Q1, but the Year to Date (YTD) wait time was 41.4 weeks, which is longer than the Alberta target for 2010/11 of 27 weeks
Canada, British Columbia (128)	Regional (2017)	Various	• Vancouver Coastal Health (VCH) opened a second OR at Squamish General Hospital in order to reduce surgical wait times • The additional OR will be staffed five days per week with surgeons from Squamish and Lions Gate Hospital • Six additional nursing positions will be added to assist with the additional surgeries	*Grey literature:* • With the expanded OR capacity, residents of the Sea to Sky Corridor and the North Shore won't have to wait as long for several types of surgery • VCH anticipates an additional 576 surgeries will be performed annually at Squamish General Hospital
Canada, New Brunswick (121)	Provincial (2005)	Cardiothoracic	• In 2005, the province invested $2.45 million into the NB Heart Centre to equip a third cardiac catheterization lab; patients will be able to have electrophysiology procedures not previously available within New Brunswick, including the implanting of defibrillator pacemakers • Three new positions were allocated to the New Brunswick Heart Centre - a cardiac surgeon and two cardiac interventionalists	Not reported
Canada, Nova Scotia (76,122,129,130)	Provincial (2017)	Orthopedics	• As part of their Hip and Knee Action Plan (2017), the Nova Scotia Health Authority provided funding for 4 new orthopedic surgeons, 4 new anesthesiologists, and other supporting roles in the OR**(76)** • Over 60 providers are joining the Orthopedic Assessment Clinics, ORs or inpatient units**(76)** • The 2018-2019 budget for NS HA includes $8.8 million to strengthen the province's orthopedic surgical services**(122)**	*Grey literature:* • 8.1% more Nova Scotians were able to have their surgery in 2017/18**(76)** • Those added to the surgery list from April 2020 onward, should expect their surgery within six months**(76)**
New Zealand (131)	Hospital (2004)	Various	• Expansion of the Wellington Hospital's ICU; increasing beds from 14 to 15 or 16 and hiring 5 more nurses to cut the cardiac surgery waiting list	*Grey literature:* • Taking on more ICU nurses would mean the hospital could increase the number of heart operations each week by two, to a total of 11 or 12

Denmark (60)	National (Not reported)	Various	• In Denmark, following the national Heart Plan in 1992, the Government committed to 700 million Danish Crowns to increase investment in operating theatres and to hire more staff	*Peer-reviewed literature:* • In Denmark doctor numbers increased by 50% between 1980 and 1995
Norway (132,133)	National (2007)	Various	• The Government added funds to hospitals providing the Faster Return to Work (FRW) scheme • The funds were used to hire more staff (among other initiatives) • The Government spent approximately NOK 500 million (around EUR 70 million) yearly between 2007 and 2009 on additional treatment capacity • Facilities were not given any explicit goals regarding staffing	*Peer-reviewed literature:* • Surgical patients receiving treatment on the FRW waiting list have waiting times that are 14 days shorter than surgical patients in the regular system (from GP referral to consultation/treatment) • The average length of the sickness absence is almost the same for FRW patients (238.7 days) and regular patients (234.8 days) • The scheme costs more than it contributes in reduced productivity loss
Switzerland (134)	National (2010)	Various	• In 2009 >60 positions in surgery were created • The cost was about 6 million francs	Not reported
United Kingdom, England (125)	Hospital (2014)	Cardiothoracic	• Additional financial investment was made to enable the implementation of weekend service; cardiac surgeries are performed in 2 elective theaters on Saturday and one elective theater on Sunday • Ongoing competency training for staff successfully facilitated the development of additional roles and shared cover for the critical care unit • A hybrid model was developed based on a rotational cycle of anesthetists and intensive care medical staff and has been successful in addressing the 7 day workforce issues, although the drive for recruitment is continuous • Weekend theatre lists are supported by consultant delivered care in theatres	*Grey literature:* • Despite challenging recruitment issues, the unit was able to provide services across seven days • There is a commitment to use permanent staff to cover gaps where possible and the drive for recruitment remains a priority
United Kingdom, Northern Ireland (126)	National (2017)	Orthopedics	• An additional seven orthopedic consultants will be appointed; this will increase capacity to enable more patients who have upper limb, foot and ankle and back/spinal complaints, which account for approximately 75% of the current waiting list, to be seen and/or treated in a more timely manner	Not reported
United Kingdom, Scotland (135)	National (2018)	Various	• The Waiting Times Improvement Plan sets out a range of actions that will deliver major change in access to care - its actions are short term – with clear deliverables at different points over the 30-month timeframe • The Scottish Government will invest a total of £535 million on resource and an additional £120 million on capital over the next three years to make a sustainable and significant step-change on waiting times • The Plan will initiate investment of £4 million in domestic and international recruitment • The Plan will also improve career pathways for key specialties (e.g. advanced nurse practitioners and general nurses) and enhance workforce capacity in urology, dermatology and general surgery	Not reported
United Kingdom, Scotland (136)	Hospital (Not reported)	Oncology	• Extra clinical staff were recruited through the cancer programme • An additional breast surgeon was hired to reduce waiting times	*Grey literature:* • Waits for first clinic appointments were reduced to 10 days
Human resource- New types of providers				
Australia, South Australia (108)	State (2005)	Various	• The Four Year Plan for Elective Surgery 2003–04 – 2007–08 for South Australia outlines short and long-term initiatives to improve the management of metropolitan hospital waiting lists and meet national waiting time targets • Plan funded elective surgery coordinator positions to improve management of waiting lists and support the achievement of performance targets	*Grey literature:* • Targeted funding enabled an additional 2,631 elective surgery procedures to be undertaken (98 .8% of the targeted 2,691 procedures)
Human resource- Increased short-term staff				
United Kingdom, England and Wales (66)	National (2001)	Ophthalmology	• In 2001, the NHS plan concluded there was a significant lack of capacity within current NHS structures to deliver adequate volumes of cataract surgery for England and Wales • The initial central 'solution' was to invite in overseas surgical teams to existing NHS centres for short-term surgical initiatives • Such schemes had 'ring fenced' funding only for overseas' teams	*Peer-reviewed literature:* • Plans were usually not coordinated with local NHS clinicians • These plans did not receive widespread support perhaps because of patient safety incidents, such as the German surgeon in the Midlands who had several serious intraoperative complications and abandoned his scheduled list

Infrastructure- New or redeveloped OR space				
Australia, Tasmania (35)	State (2016)	Various	• The Tasmanian Government invested significant additional funding to boost elective surgery with its $76 million election commitment • In addition to this, the Government is investing a further $14.3 million in funding for elective surgeries and endoscopies, which includes $6.4 million of Commonwealth funding • Under the One Health System reforms, the Tasmanian Health Service (THS) is directing this funding towards, among other initiatives, opening more theatres	*Grey literature:* • Over the past 12 months, the THS has performed additional surgeries to reduce the waiting list to 5, 430, down from 5, 758 in June 2016; a reduction of 3,100 people since June 2015 • During the 2016-17 financial year, the THS exceeded its annual target for surgeries by 331; delivering a total of 19,180 surgeries
Canada, Alberta (137)	Hospital (2016)	Various	• Redeveloped OR space which features five operating rooms and two procedure rooms along with modern infrastructure and equipment	*Grey literature:* • An additional 2,800 cases a year over two years
Canada, British Columbia (interview)	Hospital (2018)	Various	• In January 2018, they opened an additional OR at the Royal Jubilee Hospital dedicated to orthopedic surgery	*Interview:* • The total number of joint replacements was increased by 800 cases and only 1% of patients are waiting longer than 26 weeks
Canada, British Columbia (interview)	Hospital (2018)	Various	• To increase volume, two new hospitals were built in the Island Health Authority: one in Campbell River (4 ORs) and one in Comox (3 ORs)	
Canada, Nova Scotia (130)	Hospital (2017)	Various	• In 2017, plans were unveiled to renovate an unused OR in a community hospital in Nova Scotia • The project is expected to cost about $3.8 million • The Hants Community Hospital Foundation is fundraising to support this development	*Grey literature:* • The redeveloped OR will allow 800 more surgeries per year
Denmark (60)	National (Not reported)	Cardiothoracic	• In Denmark, following the national Heart Plan in 1992, the Government committed to 700 million Danish Crowns to increase investment in operating theatres and to hire more staff	*Peer-reviewed literature:* • In Denmark, doctors increased by 50% between 1980 and 1995 and procedure rates increased rapidly by 70% for CABG • Data on median waiting times suggest a decline by about 50% for PTCA and CABG between 1996 and 2001 - in Denmark, waiting times for procedures fell, in England they rose sharply
United Kingdom, England (60)	National (Not reported)	Cardiothoracic	• In England, a Government plan for coronary heart disease was announced in 1999; £50 million was earmarked for extra facilities and staff	*Peer-reviewed literature:* • Wait times in England are negatively associated with the number of available beds; international evidence suggests similar results, with waiting times for several common surgical procedures being significantly negatively associated with the number of acute care beds, the number of specialists and the total public health expenditure per capita
United Kingdom, Wales (138)	Regional (2009)	Various	• £5.44 million of Welsh Assembly Government funding was allocated for three new operating theatres in north Wales • The money will help to provide two Laparoscopic Theatres and a Urology Day Care Unit	*Grey literature:* • By the end of the year (2009), no patient in Wales will wait >26 weeks from their primary care referral to the start of their treatment
Infrastructure- New or upgraded equipment				
Australia, South Australia (106,107)	State (2010)	Various	• In support of the Elective Surgery Strategy, there was an investment of an additional $88.6m to support up to 259,007 elective surgery procedures in metropolitan and country hospitals over the four years of the plan • The Plan provided additional operating theatre equipment for country and metropolitan hospitals	*Grey literature:* • 64,130 procedures undertaken in metropolitan hospitals in 2012-13, an increase of 5230 procedures (8.9%) compared with 2007-08
Canada, British Columbia (139)	Regional (Not reported)	Various	• Vancouver Coastal Health wants to exceed the Ministry of Health (MoH)'s target that no patients are waiting > 26 weeks for surgery by continuing to shorten the time for their longest waiting patients - Purchasing additional equipment and implants so that surgery isn't limited by a shortage of necessary equipment or implants is one initiative, among others, to increase capacity to treat more patients who have been waiting >26 weeks for treatment	*Grey literature:* • As of Dec. 2018: scheduled surgeries waiting >26 weeks was 31.4% vs the target of ≤ 10% and scheduled surgeries completed within 26 weeks was 86.4% vs the target of ≥ 95%
Canada, New Brunswick (121)	Provincial (2005)	Cardiothoracic	• In 2005, the province invested $2.45 million into the NB Heart Centre to equip a third cardiac catheterization lab; patients will be able to have electrophysiology procedures not previously available within New Brunswick, including the implanting of defibrillator pacemakers	Not reported

			• The investment includes $500,000 in electrophysiology equipment • The new lab will be equipped with imaging cameras as well as cardiac monitoring and support equipment • It is expected that waits for New Brunswickers will be reduced and some of the pressure in those jurisdictions that have been serving New Brunswickers as well as their own residents will be relieved	
Infrastructure- Dedicated ORs				
Australia, Tasmania (111)	State (Not reported)	Various	• The Tasmanian Government allocated $76 million over four years to provide up to 15,000 additional elective surgery procedures, focusing on treating long waiting patients • One of the initiatives to increase surgical capacity was the establishment of 'Surgical Precincts' at the Royal Hobart Hospital to separate emergency and elective surgery to reduce the incidences of cancellation	Not reported
Canada, British Columbia (114)	Provincial (2018)	Orthopedics	• Targeted funding of $75 million starting in 2018-19 and increasing to $100 million in 2019-20 supports a surgical strategy that includes providing more surgeries in areas with long wait times • Will add dedicated OR time for dental surgeries • Starting in January 2018, the provincial hip and knee replacement program strategy will include program efficiencies such as dedicated operating rooms for surgical procedures	*Grey literature:* • Under the surgical strategy, 900 more dental surgeries and 4,000 additional hip and knee surgeries will be done throughout the province by the end of March 2019, compared to the previous year
Canada, British Columbia (103)	Regional (2006)	Various	• In December 2005, the provincial and territorial governments of Canada announced national waiting time benchmarks in 5 priority areas: cancer treatment, cardiac care, hip and knee surgery (joint replacement and hip fracture fixation), sight restoration and diagnostic screening • Following this announcement, the British Columbia (BC) Ministry of Health (MOH) announced a $60.5 million waiting time management strategy • The plan included an investment of $21.8 million in each of the 2006/07 and 2007/08 fiscal years to fund the development and implementation of a provincial specialty resource surgical program • The University of British Columbia Hospital (UBCH) Centre for Surgical Innovation (CSI) was opened on Apr. 3, 2006, accommodating 2 new ORs and a 38-bed inpatient ward • The CSI operating plan was based on a pilot model of preoperative, operative and postoperative care practised at the Richmond General and Vancouver General hospitals; these programs were successful at decreasing OR times and postoperative length of stay in hospital by 25%, resulting in a 27% reduction in waiting list times • Designated hospital ward bed and OR capacity that is geographically remote from the emergency intake of patients minimizes the risk of surgical cancellation ("ring-fenced" capacity")	*Peer-reviewed literature:* • In the 2006/07 and 2007/08 fiscal years, the CSI program achieved its headline target by performing 1609 and 1600 joint replacements, respectively, or about 16% of the total number of provincial cases • The total number of patients waiting > 26 weeks in BC decreased by 15% from 3878 at the end of 2005/06 to 3203 in 2006/07 and by a further 14% to 2768 in 2007/08 • The total number of patients on the waiting list decreased by 16% over the first year of the program; the result is a median waiting time of 3 months for hip replacements and 4 months for knee replacements • The 2 health authorities that are local to the program achieved their patient participation targets, whereas the 3 distant health authorities did not • Patient satisfaction with the service provided at the CSI remains high, with a mean satisfaction score recorded at 4.7 out of 5 on a Likert scale for 599 patients randomly surveyed after discharge; any reported concerns were mainly related to waiting time and travel rather than service quality • "low" complication rate
New Zealand (2,140)	Regional (2001)	Various	• Separation of acute from elective surgery either geographically or by creating separate streams for acute and elective surgery patients within the same facility (need to set aside dedicated OR time, beds and workforce for each activity) • Counties Manukau decided to geographically separate acute and elective workflows; the Manukau Surgical Centre (MSC) for electives was opened in 2001 and expanded in 2005 (added a 4-bed High Dependency Unit) • Surgery performed at the MSC includes: orthopedic surgery (including joint replacement), general surgery, colorectal surgery, breast surgery (including breast reconstruction), gynecological procedures, plastic surgery, otorhinolaryngology/ENT and ophthalmology	*Grey literature:* • Separating acute and elective surgical streams was endorsed by the Royal Australian College of Surgeons in 2011; no Australian or New Zealand hospital that made the change ever opted to revert to previous arrangements • Since 2005, the proportion of elective discharges out of total surgical discharges has increased from 32% to 42%
United Kingdom, England (125)	Hospital (2014)	Cardiothoracic	• Additional financial investment was made to enable the implementation of weekend service; cardiac surgeries are performed in 2 elective theaters on Saturday and one elective theater on Sunday	*Grey literature:* • The number of people on the elective cardiac surgery waiting list was reduced from 556 patients in April 2014 to 288 by January 2015; 90 additional cases were performed in one year

				• 86 Sunday cases and 300 Saturday cases have been performed since the start of the improvements
Infrastructure- New or renovated surgical units				
Australia, Tasmania (39,110)	State (2008)	Various	• Following discussions between the Australian Government and all States and Territories, the 4-year Elective Surgery Waiting List Reduction Plan included a further $150 million to make systemic improvements to the hospital system and improve elective surgery throughput in the long term, including the construction of day surgery units • The North West Regional Hospital is working to open a 4th OR to boost capacity **(39)** • A $100 million investment in the Royal Hobart Hospital will include an upgrade and expansion of the intensive care and high dependency units that will help increase levels of surgery in the main theatres; the departments will get 8 more beds bringing the total to 25 **(39)**	Not reported
Australia, Queensland (141)	Hospital (2019)	Various	• The new 20-bed medical ward at Bundaberg Hospital, Queensland is part of a strategy to improve patient flow • Investing in an additional 20 medical beds will help cut wait times and improve performance, not just in the medical ward but across the hospital by improving patient flow • This will help alleviate the problem of medical patients sometimes taking up surgical beds resulting in further improvement of surgery wait times	Not reported
New Zealand (131)	Hospital (2004)	Various	• Expansion of the Wellington Hospital's ICU; increasing beds from 14 to 15 or 16 and hiring 5 more nurses to cut the cardiac surgery waiting list	*Grey literature:* • Increase the number of cardiac surgeries by two/week
United Kingdom, England (142)	Hospital (2005)	Various	• In an attempt to increase the availability of level 2 beds for patients undergoing elective surgery, the Postoperative surgical unit (POSU) was opened in August 2005 • The aim was to provide short-term level 2 care in the immediate postoperative period for patients with a relatively low comorbidity • Funding was obtained from commissioners for level 2 beds, within the critical care contract; this came directly from the local primary care trusts • The POSU is a purpose-built facility • All 7 POSU beds are 'ring fenced' for patients requiring major elective surgery	*Peer-reviewed literature:* • Prior to implementation 503 patients required surgery, 186 were cancelled due to the unavailability of level 2 beds; in the POSU's first year, 877 patients required surgery, 33 were cancelled due to an unavailability of beds • In the year prior to the POSU opening, 142 elective orthopedic patients were admitted to the High Density Unit (HDU); in the following year, 445 similar orthopedic patients were admitted to the POSU • In the year prior to the POSU opening, 70 patients having elective colorectal surgery were admitted to the HDU; in the following year, 142 similar patients were admitted to the POSU • The cost of a POSU bed is calculated at £801 per bed per night against HDU £1139 per bed per night
United Kingdom, Wales (84)	Hospital (2006)	Various	• £5.2million was set aside for a purpose-built day surgery unit at Singleton Hospital • The unit is open 12 hours a day, five days a week and provides an additional 80 to 100 operations each week • The new day surgery unit incorporates two operating theatres; an 18-bed ward; a 6-bed post-anesthetic recovery area; pre- and post- operative assessment rooms; waiting areas and staff amenities	*Grey literature:* • The unit has had an impact on general elective waiting times; with patients being treated in the new day unit, main theatre space has been freed up increasing the capacity of the Trust to carry out operations
Infrastructure- new facilities				
Canada, Alberta (113,143)	Provincial (2010)	Orthopedics	• The Royal Alexandra Hospital transferred and consolidated low-intensity hip and knee surgeries into one, high-efficiency surgical environment • The OSC has new operating rooms, where 1,400 existing low-intensity arthroplasty procedures are being completed • The new 56-bed facility includes in-house central services, rehabilitation and basic diagnostic imaging capability • New computerized laser navigation equipment, funded by the Royal Alexandra Hospital Foundation, allows for precise implant placement and improves surgery and patient outcomes	*Grey literature:* • Within 2 weeks of opening its doors, trimmed the stay for hip and knee replacement patients by a full day • Shorter stays increases capacity for more surgeries • The OSC will support 3,500 to 4,000 cases a year

Canada, Alberta (113,144)	Regional (2010)	Orthopedics	• Provincially funded, $550-million acute care facility opened in phases, starting with: a new, 31-bed orthopedic surgical unit; two new ORs equipped with state-of-the-art technology; 4 new day surgery beds; 4 new post-anesthesia recovery beds; one new X-ray room; and a new, expanded central sterile reprocessing unit for surgical instruments • Design-built for orthopedic surgeries and orthopedic care • When fully operational, the facility will be home to 23 ORs, 93 acute care beds, a 36-bed intensive care unit, new lab and diagnostic imaging areas as well as a muscular-skeletal clinic and other out-patient services	*Grey literature:* • A 10% increase in surgical capacity at the FMC
United Kingdom, Scotland (135)	National (2018)	Various	• The Waiting Times Improvement Plan sets out a range of actions that will deliver major change in access to care - its actions are short term – with clear deliverables at different points over the 30-month timeframe • The Scottish Government will invest a total of £535 million on resource and an additional £120 million on capital over the next three years to make a sustainable and significant step-change on waiting times • This is in addition to an existing £200 million capital investment plan for delivering elective and diagnostic treatment centres • The plan will increase capacity at the Golden Jubilee Hospital and bring unused physical capacity on stream • The plan will also increase clinical effectiveness and efficiency at specialties with poor performance (e.g. use of artificial intelligence and automation to reduce waiting times)	Not reported
Infrastructure- expansion of surgical services				
Canada, Alberta (145,146)	Regional (2010)	Various	• Addition of plastic surgery and retinal surgical services to the OR at the Innisfail Health Centre • To accommodate the additional programs, new equipment was also purchased; a new operating table, an anesthetic machine, a cautery machine, additional surgical instruments and a nerve stimulator have been added to support the expansion of surgical services	*Grey literature:* • Bringing ophthalmology to Innisfail was part of a surgical-capacity-increase initiative in the zone that saw the program moved from the Red Deer Regional Hospital Centre to free up OR time there for more complex emergent and elective surgeries • The additional surgical services means reduced wait times and better access to care for residents in central Alberta
Scheduling- Increased OR time for specialty area				
Canada, Nova Scotia (76,122)	Provincial (2017)	Orthopedics	• The Hip and Knee Action Plan was announced in October 2017 • Additional hip and knee cases are being performed during longer operating room hours, doing cases during peak vacation times where possible, providing OR time for hip and knee cases when time is freed up from other surgeries**(76)** • The 2018-2019 budget for NS HA includes $8.8 million to strengthen the province's orthopedic surgical services**(122)**	*Grey literature:* • 8.1% more Nova Scotians were able to have their surgery in 2017/18**(76)**
Spain (61)	National (1996 – 2000)	Various	• Since 1996, INSALUD, responsible for providing health services in Spain, formally developed institutional policies for the reduction of wait times for elective surgery in order to ensure equal and adequate access to surgery over its territory • One policy was allocation of additional theatre time with a separate remuneration • Financial support for the additional hospital capacity needed to lower the waiting list was allocated only when the hospital demonstrated that the existing facilities were already efficiently utilized (operating theatres usage > 75%)	*Grey literature:* • By December 1997, patients over 9 months on the list were reduced from 19,052 to 876 • Total cost of the Surgical Waiting List Reduction Programme was 18,612,137 Euros for 13,461 procedures • Total cost of the program in 1999 was 45,666,595 Euros for 41,535 surgical procedures
Scheduling- Extended OR hours				
United Kingdom, England (125)	Hospital (2014)	Cardiothoracic	• Additional financial investment was made to enable the implementation of weekend service; cardiac surgeries are performed in 2 elective theaters on Saturday and one elective theater on Sunday • Service is only available for elective patients on weekends • There is also extended provision within 3 of the 5 theatres operating from 8am to 8pm Monday to Thursday • Planning and engagement workshops were held with staff to prioritize which of the services were most essential over seven days	*Grey literature:* • The number of people on the elective cardiac surgery waiting list was reduced from 556 patients in April 2014 to 288 by January 2015 • The hospital was able to perform an additional 90 cases in one year • The team has been able to treat approximately 86 Sunday cases and 300 Saturday cases since the start of the improvements • The delivery of a 7 day service for elective cardiac surgery has not compromised emergency care provision in any way

				• Key performance indicators show a reduction in patient harms including serious incidents, drug errors and pressure ulcers; these improvements have been consistently achieved
Scheduling- Weekend surgery				
Norway (132,133)	National (2007)	Various	• The Government added funds to hospitals providing the Faster Return to Work (FRW) scheme • The funds were used to increase capacity by offering treatments on weekends (among other initiatives) • The Government spent approximately NOK 500 million (around EUR 70 million) yearly between 2007 and 2009 on additional treatment capacity	*Peer-reviewed literature:* • Surgical patients receiving treatment on the FRW waiting list have waiting times that are 14 days shorter than surgical patients in the regular system (from GP referral to consultation/treatment) • The average length of the sickness absence is almost the same for FRW patients (238.7 days) and regular patients (234.8 days) • The scheme costs more than it contributes in reduced productivity loss
Scheduling- Reduce seasonal slow-downs				
Canada, British Columbia (114)	Provincial (2018)	Various	• Targeted funding of $75 million starting in 2018-19 and increasing to $100 million in 2019-20 supports a surgical strategy that includes reducing seasonal slowdowns	Not reported
Scheduling- Extended day procedure unit hours				
Australia, Tasmania (39)	State (2008)	Various	• The Commonwealth asked for an additional 895 elective procedures in return for its $8.1 million funding • The Tasmanian Government's Department of Health and Human Services is working with hospitals to further reduce waiting lists and waiting times - the Royal Hobart Hospital has extended the hours of its day procedure unit to 10 pm, which provides an additional 20 hours a week to improve throughput of elective procedures	*Grey literature:* • In 2008, Tasmanian hospitals increased the total number of elective surgery admissions by 14% to almost 14,000 • Tasmania's hospitals achieved 1637 extra admissions for elective procedures
Scheduling- Compensation for overtime				
Sweden (147)	National (1987 – 1989)	Various	• The state and the Federation of County Councils agreed to compensate hospitals if they worked overtime to provide additional CABG, hip replacements and cataract surgeries	*Grey literature:* • Approach only affected waiting times marginally

Table 8 Centralization of elective surgeries

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Centre dedicated to elective surgery attached to a hospital					
Australia, Tasmania (148,149)	Regional (Not reported)	Various	To reduce wait lists, high cancellation rates, and poor outcomes	• Mersey Community Hospital established an elective day surgery centre dedicated to day surgeries	Not reported
Australia, Tasmania (111)	Regional (Not reported)	Various	To reduce the incidences of cancellations	• Royal Hobart Hospital established a separated area dedicated to elective surgery	Not reported
Australia, South Australia (150)	Regional (2016)	Various	Not reported	• Local authority decided to centralize elective surgeries at Modbury Hospital while emergency and complex surgery were concentrated at another hospital	Not reported
Canada, Alberta (113)	Provincial (2010)	Orthopedic (hip and knee replacement)	To increase efficiency and quality of care	• Royal Alexandra Hospital established an Orthopedic Surgery Centre (OSC) dedicated to elective low-complexity hip and knee replacement • Services were consolidated into a single location • Centre was provided with new equipment and services that are specific to orthopedic needs • It was estimated that the centre, at full capacity, can support 3,500 to 4,000 cases per year	Not reported
Canada, Alberta (113)	Regional (2010)	Orthopedic (hip and knee replacement, and spine surgeries)	Not reported (Not reported)	• Foothills Medical Centre established the McCaig Tower surgical centre dedicated to elective orthopedic surgeries	Not reported
Canada, British Columbia (103)	Regional (2006)	Orthopedic (hip and knee replacement)	To improve patient throughput and reduce incidences of cancellations	• University of British Columbia Hospital (UBCH) established the Centre for Surgical Innovation (CSI) dedicated to elective low-complexity hip and knee replacement (initially only accepting patients with ASA grade 1 and 2, but later expanded to ASA 3) • Clinical pathway and overall management of patients was designed specifically for orthopedic cases and to improve patient throughput	*Peer-reviewed literature:* • In an observational study, the number of patients waiting over 26 weeks in BC decreased by 15% in 2005/06 and a further 14% in 2007/08 • Total number of patients on the waiting list decreased by 16% over the first year, but increased by 3% in the following year • The mean satisfaction score after discharge from patients (n=599) was 4.7 out of 5 on a Likert scale • Average OR time was 1h45min and average length of stay was 3.4 days
Canada, British Columbia (151)	Regional (in progress)	Various	To reduce wait times, cancellations and optimize quality of care	• UBCH will become a hospital specialized in elective surgeries, consolidating services into a single location • Another hospital (Vancouver General Hospital) will focus on providing emergency and highly complex services	Not reported
Canada, Ontario (152)	Provincial (2010)	Ophthalmology (cataract surgery)	To create greater efficiencies and better quality	• Central LHIN established two high-volume eye care centres dedicated to low-risk cataract surgery • One located at the north site (Southlake Regional Health Centre) and one at the south site (North York General Hospital) • Hospitals have decided whether or not to transfer their services to these centres	*Grey Literature:* • Wait times for ophthalmic surgery have decreased in the LHIN • In 2014/15, the wait time at both centres was 92 days (69 days less than the provincial wait time)
Area (OR) dedicated to elective surgery within a hospital					
Canada, Ontario (153)	Regional (2013)	Prophylactic mastectomy and reconstruction	To increase timely access to bilateral prophylactic mastectomy	• Rapid Access Prophylactic Mastectomy and Immediate Reconstruction (RAPMIR) program was established in Ontario for patients requiring prophylactic mastectomy • Patients were placed on an independent wait list • Ambulatory centre with 5 ORs dedicated one day a month to RAPMIR surgeries • Process was designed to efficiently run operations (2 ORs are run concurrently: surgical oncology and plastic surgery teams in alternative rooms)	*Peer-reviewed literature:** • Mean wait time from referral to surgery was significantly shorter for RAPMIR patients (n=13) than for traditional patients (n=16) (165.4±144.8 vs. 309.2±178.4 days, p=0.027) • Mean wait time from referral to first consultation was not different between RAPMIR and traditional patients (38.2±105.8 vs 25.1±36.4 days, p=0.65) • Mean wait time from consultation to surgery was significantly shorter for RAPMIR patients than for traditional patients (127±82.1 days vs 284.1±177.7 days, p=0.005)

Table 8 Centralization of elective surgeries

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
				• In the traditional model, prophylactic patients had to wait for surgery and be prioritized along with cancer patients	• Daily patient throughput (4.3 vs. 2.8, p=0.003), plastic surgery case volume (3.7 vs. 1.6, p<0.001), and surgical oncology case volume (3.0 vs. 2.2, p=0.015) were significantly greater in the RAPMIR model vs. the traditional model *Note: impact based on implementation alongside other approaches
Hospital or centre dedicated to elective surgery (not attached to a hospital)					
Canada, Ontario (154)	Regional (2001)	Various (day surgeries including minimally invasive arthroscopic procedures, and plastic surgeries)	To improve access to surgery for low-risk patients and leave more complex cases for hospital care	• The Pan-Am Clinic (originally a for-profit company) was acquired by the provincial Government and now operates as a not-for-profit clinic • The clinic functions as a short-stay clinic for low-risk elective patients • The clinic is specifically designed to manage and improve the flow of this homogenous group of people • Short-stay units can run at over 95% capacity • The clinic also provides education and resources to community planning activities.	*Grey literature:* • No impact on wait times reported • In 2005, clinic performed 5,250 orthopedic surgeries and had the capacity for another 700 • In 2005, clinic performed 500 cataract surgery and had the capacity for another 300 (2005) • In 2001, when Government took over the clinic's operation, cost of cataract surgery fell from $1,000 to $700
Canada, Ontario (154,155)	Regional (1998)	Various	To improve access to surgery for low-risk patients and leave more complex cases for hospital care	• Queensway Surgicentre (a division of Trillum Health Centre) was established as a short-stay clinic for low-risk elective patients • Clinic was specifically designed around patients and their needs, to manage and improve the flow of this homogenous group of people • Short-stay units were created to run at over 95% capacity	*Grey literature:* • No impact on wait times reported • Evidence suggest that clinic is a hub for innovation and specialization usually associated with the private sector • Clinic performs 20,000 procedures per year including 3,500 cataract surgeries • Clinic has the capacity to perform 30,000 procedures per year
Finland (1)	Regional (2002)	Orthopedic (hip and knee replacement)	To increase efficiency and quality of care	• Coxa hospital-specialist centre in Finland specializes in elective joint (hip and knee) replacement • Elective surgeries were withdrawn from five hospitals and are now concentrated at one centre • All services within the clinic are designed to efficiently manage this homogenous group of patients	*Grey literature:* • No impact on wait times reported • Hospital performs over 4,000 surgeries annually • According to data for 2014, length of hospital stay varied between 3.2 and 4.5 days at the clinic, readmission rates (1.0% to 1.1%) and infection rates were low (0.6% to 0.8%)
New Zealand (2)	Provincial (2001)	Various	To create efficiencies, provide a better patient experience and enhance patient outcomes.	• The Manukau Surgical Centre expanded in 2001 to consolidate elective services geographically separated from emergency • In 2005, the clinic was expanded, once more, to allocate a greater range of surgeries • Clinic functions as a hub for elective day and short-stay surgeries	*Grey literature:* • No results of wait times • Following the expansion in 2005, the proportion of elective discharges out of total surgical discharges increased from 32% to 42% • There was initial resistance from surgical staff, who had to travel to both sites on the same day • A clear vision and clinical leadership were vital to make the change work
United Kingdom, England (65)	National (2000-2004)	Various	To reduce wait times	• Centres for elective surgery were established managerially and clinically separate to the provision of emergency and other treatment	*Grey literature:** • During this time, the maximum wait for inpatient and day-case treatment was reduced from 18 to 6 months • The maximum wait for an outpatient appointment reduced from 6 to 3 months *Note: impact based on implementation alongside other approaches

Table 9 Centralized surgical scheduling

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Approach	Impact
Australia, South Australia (98)	Regional (2014)	Various	Not reported	• Elective Surgery Unit Coordinators were co-located into a single area to adopt a centralized waiting list model and to provide a dedicated area for the hospital-wide coordination of Elective Surgery at the Royal Adelaide Hospital	Not reported
Australia, Tasmania (72)	State (2008)	Various	Not reported	• During 2009-2010, funding has led to improvements in the management of elective surgery, and enabled hospitals to establish an elective surgery coordination unit to strengthen the management and coordination of elective surgery within hospitals across the State	*Grey literature:** • In 2009-2010, the funding has supported improvement in the performance of Tasmania's public hospitals with the Median Waiting Time for patients admitted for surgery falling from 54 days in June 2009 to 34 days in June 2010 *Note: impact based on implementation alongside other approaches
Canada, Alberta (interview)	Regional (Not reported or Not reported)	General surgery	Not reported	• Centralized booking of surgical services has been implemented in some pockets around the province (e.g. FAST program)	Not reported
Canada, British Columbia (156)	Provincial (Not reported)	Various	To improve timely access to appropriate scheduled surgical procedures, optimally manage surgical waitlists, and improve the patient experience	• The Ministry of Health, in collaboration with the Provincial Surgical Executive Committee and the health authorities, has developed plans which include developing Surgical Services Programs, new health authority programs responsible for coordinating and/or providing all of the services a surgical patient requires, from diagnosis to post-operative care	NA
Canada, British Columbia (7)	Regional (Not reported)	Cardiothoracic	Not reported	• A regional consolidated device implant program, called ICED (Implantable Cardiac Electrical Devices) was developed that revolves around the centralized intake model with a standardized reporting system to monitor, track and adjust cases	*Grey literature:** • Within six months of implementation, the ICED program consolidated and standardized cardiac services across the health authority from four sites to two • Cardiac implants increased from 22/week to 30/week, the waitlist was reduced from 120 to 40 patients and there were no cancelled procedure days due to a lack of staffing • Staff and patient feedback on the new care model and service has been positive. *Note: impact based on implementation alongside other approaches
Canada, British Columbia (114)	Provincial (2018)	Various	Not reported	• Five hip and knee replacement programs are being implemented across the province • The strategy is supported with ongoing targeted funding of $75 million starting in 2018-19 and increasing to $100 million in 2019-20 • Components include dedicated OR time, pre- and post-surgical support, centralized intake (establishing centralized booking and a single point of contact for patients), standardized assessment, first available surgeon and ongoing evaluation.	Not reported
Canada, British Columbia (interview)	Applied	Orthopedic	Not reported	• The Ministry of Health has proposed that all surgeries be scheduled by the regional health authorities • Fraser Health Authority has implemented this approach in pockets already, primarily around hip and knee replacements	Not reported
Canada, British Columbia (157)	Regional (Not reported)	Various	Not reported	• Centralized referral and booking process has been implemented for 10 new ORs in the new North Island Hospital (NIH)	Not reported

Canada, British Columbia (interview)	Hospital (2019)	Pediatric elective surgery	Not reported	• BC Children's Hospital has implemented centralized surgical booking through the health authority • Ass soon as a decision for surgery has been made and the patient is "ready-to-treat", an OR booking package is sent directly to the health authority booking office • The booking office takes over all communication with patients/families, books cases, and is able to see completed OR slates weeks in advance	
Canada, Ontario (158,159)	Regional (2011)	Various	Not reported	• Novari's Surgical Access with Smart Wait ™ (a web-based software system for managing wait lists and submitting electronic bookings to ORs and other hospital care sites) has been implemented in the Central LHIN • Surgeons in the Central East LHIN can only book a surgical slot in a LHIN hospital OR through the System • Bookings are automated and completed online • The System is integrated with the region's existing OR scheduling applications and Hospital Information Systems • The System provides standardized, current, real-time patient list and wait times data, which can be aggregated from across the region	Not reported
Canada, Quebec (interview)	Not reported	Various	Not reported	• Health care institutions have been encouraged to use a single drop-off point for handing over the operative request and use their centralized operating room booking service for the planning of the surgical program	Not reported
Canada, Saskatchewan (interview)	Provincial (Not reported)	Various	Not reported	• Each region has implemented a central booking office • The provincial electronic medical record collects booking information, date of surgery, patient information, etc. and feed this information directly into the provincial surgical registry • They are still working with Saskatoon to have their surgeon's offices give up their wait list management to the health authority	*Interview:* • Taking the wait lists out of the surgeon's offices was the biggest task of the Saskatchewan Surgical Initiative • Surgeon had a hard time giving up being able to see and juggle their own wait list; however, no there is not a single surgeon's office that would go back to managing their own wait list after seeing the positive impact
Norway (81)	Hospital (2008)	Various	To unify handling of referrals, allowing for better coordination and planning, and potentially more operations and reduced cancellations	• In a hospital in Norway, one electronic reception for all referrals of elective surgery and one common electronic surgery planning system for all departments have been implemented • Referral system was implemented alongside other changes at the hospital, including development of a day-surgery centre and a redesign of the elective surgery care pathway	*Peer-reviewed evidence** • Based on data collected at the hospital between 2010 and 2012, mean cancellation rate was reduced from 8.5% to 4.9% ($p<0.001$) • After interventions, the cancellation rates were more stable • The median number of operations per month increased by 17% • The median number of scheduled operations per month increased from 373 to 400 after the interventions ($p=0.04$)" *Note: impact based on implementation alongside other approaches
United Kingdom, Scotland (83)	Regional (Not reported)	Orthopedic	Not reported	• NHS Grampian implemented a centralized surgical booking office	Not reported

Table 10 Efficient use of ORs

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Parallel processing					
Australia, Queensland (160)	State (2014)	Not reported	To improve OR throughput	• In New South Wales, anesthetic rooms have been developed to allow for parallel processing of the patient (i.e. using separate rooms for preparation and induction of anesthesia before entering the OR)	*Grey literature:* • Preparing for the following case in the anesthetic room during turnover time improved efficiency and allowed for extra cases • Using anesthetic rooms in this way may also require additional staff • Maximizing the productivity of operating theatres in hospitals reduces cancellations, minimizes overruns with consequent overtime staff costs and improves the flow of patients through the hospital
United States (161)	Single surgeon (2003)	General (hernia)	To increase caseloads in ambulatory surgery operating rooms while maintaining patient satisfaction and safety	• As part of a study, a surgeon performing hernia repairs on patients under local anesthesia divided patients into two groups: a control group receiving local anesthesia in the OR at the start of surgery and an experiment group receiving local anesthesia in an induction room by the surgeon while the OR was being cleaned and set-up • Surgical teams remained the same for the entire day • During the turnover time period, one nurse and the surgical scrub remained in the operating room to prepare for the upcoming case, while the second nurse and the surgeon went to the preoperative holding area to start the sedation and block • In the preoperative holding area, a specific slot was designated for hernia patients that contained the supplies necessary to begin the sedation, block, and prep time • When the operating room was ready, the surgeon and nurse transported the sedated and blocked patient into the operating room where the prep took place • The next step was the operation, at which all members of the team were present • At the end of the operation, one nurse and the surgical resident transported the patient to the recovery room, while the surgeon went to the pre-op area to begin with the next patient • This methodology essentially outlines a strategy where a significant portion of the sedation, block, and prep time overlaps with the turnover time.	*Peer reviewed literature:* • While operative time for the control group and the experimental group were nearly identical, the turnover time and the induction time were significantly shorter for the experimental group • The cumulative reduction in time during the operative day was sufficient to allow the addition of new operative cases • Reduction in block time usage was consistent across the entire study period of 12 weeks • This decrease in usage allowed the surgeon to stop using his Thursday afternoon block time altogether and shift his total caseload to Wednesday (without reducing the total number of cases performed) • The surgeon's caseload was very consistent during the study averaging 8 to 10 hernias per week • This freed up additional operating room capacity for other surgeons' cases and led to fewer cases in the concurrent control arm
Concurrently run ORs					
Canada, Alberta (interview)	Provincial (2016-17)	Oncology	Not reported	• Concurrent ORs (or "flip-flop" rooms) have been implemented in 'pockets' around the province (e.g. within the breast cancer day surgery pathway, where surgical oncology team performs surgery on the patient in one room and then moves onto the next patient in a separate room while the plastic surgery team comes in to complete the procedure)	Not reported
Canada, British Columbia (103)	Provincial (2018)	Orthopedic	Not reported	• With suitable surgical assistance in place (i.e. a GP, retired orthopedic surgeon, fellow or resident surgical trainee), hospitals have established a double "swing room" following a 30- to 40 minute start time stagger • Consensus among participating surgeons is achieved ahead of time for a standard set of instrumentation to facilitate an efficient turnover of patients • The senior surgeon is mandated to participate in the time-out portion of the Surgical Safety Checklist	Not reported

				• All surgeons perform a minimum of 4 operations per day in 1 operating room or a minimum of 8 per day if a double room is used	
Canada, British Columbia (162)	Hospital (2004)	Orthopedic	To increase surgical efficiency	• The Richmond Hospital established swing operating rooms as part of a new high-quality, high-volume, low-cost model of "best practice" for hip and knee surgery • Surgeons "swing" between ORs as their patients are ready • The new model also included standardization of equipment, prostheses and supplies; and coordination with surgical units post-op	*Grey literature:* • OR teams were able to complete eight joint replacements or reconstructions per day instead of three • Together, these measures were able to increase operating room efficiency by 25% and enabled a 136% increase in completed cases • This contributed to bringing wait times for surgery down by 75%, from 20 months to five months • The two Richmond operating rooms are able to capitalize on the efficiencies that come with specialization similar to private surgical centres
Canada, Manitoba (interview)	Regional (2005)	Orthopedic	To increase volumes within existing OR days	• Some surgeons ran 2 OR rooms simultaneously with a physician assistant and anesthetist in each room	*Interview:* • Improved the efficient use of the surgeon, but not the overall efficiency of the system • Physicians assistants were found to be more cost-efficient than having primary care providers participate in the OR
Canada, Ontario (153)	Hospital (2013)	Oncology	To optimize surgical scheduling	• The Rapid access prophylactic mastectomy and immediate reconstruction (RAPMIR) program established a process for running 2 ORs concurrently, with surgical oncology and plastic surgery teams alternating rooms • In room 1, the surgical oncology team begins with the mastectomy portion of the first combined case • Once they complete the first BPM, they begin the second BPM in room 2 as the plastic surgery team begins reconstruction in room 1 • Continuation of this pattern makes 3 BPMs with immediate reconstruction possible in 1 operative day • The surgical oncology and plastic surgery teams each complete 1–2 independent cases in the remaining time, for a daily total of 5–6 patients	*Peer reviewed literature:** • Mean wait time was significantly shorter for RAPMIR patients (n=13) than for traditional patients (n=16) (165.4 vs. 309.2 days, p=0.027) • Daily patient throughput (4.3 vs. 2.8, p=0.003), plastic surgery case volume (3.7 vs. 1.6, p<0.001), and surgical oncology case volume (3.0 vs. 2.2, p=0.015) were significantly greater in the RAPMIR model vs. the traditional model *Note: impact based on implementation alongside other approaches
United States (163)	National (Not reported)	ENT	Not reported	• Multiple-room surgeries have been performed across the US, including: - Concurrent or simultaneous operations: surgical procedures when the critical or key components of the procedures for which the primary attending surgeon is responsible are occurring all or in part at the same time - "Overlapping or sequenced" operations for surgeons: the practice of the primary surgeon initiating and participating in another operation when he or she has completed the critical portions of the first procedure and is no longer an essential participant in the final phase of the first operation • In December 2016, the US Senate Finance Committee issued a report on concurrent and overlapping surgery after reviewing data and policies from 20 teaching hospitals and recommended banning concurrent surgery	*Peer reviewed literature:* • 907 members (9.5%) of the American Academy of Otolaryngology—Head and Neck Surgery (AAO-HNS) completed a survey on the use of multiple-room surgeries • Proponents of certain forms of multiple-room surgery observed that multiple-room surgery can improve efficiency and access to care while enhancing trainee education • Detractors cited potential safety concerns, lack of consensus on critical portions of operations, and a need for greater transparency • The surgeons' expectation is that wait time between each of their "to-follow" cases is minimized • Respondents predicted that disallowing multiple-room surgery would lead to an increase in late starts, defined as rooms starting after 5 pm (73.5%), and an increase in the time to schedule surgery (84.5%) • Since 40% of the roughly 12,000 members of the AAO-HNS perform multiple-room surgery and two-thirds of these individuals do so at least monthly, restriction of multiple-room surgeries would result in backlogs for thousands of otolaryngologists • Limited access to surgical specialists could also lead to inappropriate surgery in less skilled hands or pursuit of nonsurgical treatment for cancers where surgery is the preferred approach • An increase in the number cases starting late (after 5 PM) may also occur if multiple-room surgery were disallowed

United States (164)	Hospital (2011)	Orthopedic	To maximize efficiency and increase access to care	• A study compared two models for managing surgeries at a hospital: 1 surgeon managing 1 room vs. 1 surgeon managing 2 rooms without any portions of the surgical time overlapping • Interscalene blocks were not performed in the operating room but were performed in the preoperative holding area Therefore, the APT does not include the time to perform the block	*Peer reviewed literature:* • 1062 shoulder arthroplasties in one study • A 1-room surgical model with each case following the next would allow 3 arthroplasties to be performed in an approximately 10.4-hour surgical day (624.2 minutes) • Conversely, a 2-room model with a 24-minute stagger would allow 4 cases to be performed in an approximately 9.2-hour (549.5-minute) surgical day or 5 cases in an approximately 11.2-hour (672.2-minute) day • In this 2-room model, there would be no time in which the surgeon is absent for any surgical portion of the case • A 2-room model with no delay between cases would have the surgeon present for 90.2% of the ST • In this model, 4 arthroplasties would be able to be performed in an 8.6-hour day (513.5 minutes), whereas 5 cases would be able to be performed in a 10.4-hour day (624.2 minutes) • This model was designed so that as soon as the room was ready at the conclusion of turnover from the previous case, the next patient would enter • The findings indicates that there is a clear ceiling at which a 2-room model cannot further increase efficiency

Table 11 Family doctors-led surgeries

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description of role	Description of additional training	Impact
Ireland (165)	National pilot (in progress)	ENT	To provide a greater volume of care in communities, reduce the number of referrals and waitlist	• A pilot project is in progress in which GPs with a special interest in ENT will provide a defined range of procedures without referral to otorhinolaryngologists • GPs and ENT services will be formally linked, and appropriate learning and research opportunities will be explored and developed to enable GPs obtain accreditation in ENT procedures agreed and accepted as suitable for primary care surgery	• A Training Process and Accreditation for GPs in ENT Primary Care Surgery is under development	• Data is being collected and no results have been reported • The predicted outcomes are a reduction in outpatient referrals, a reduction in existing outpatient waitlist and reduction in the return to new patient ratio
New Zealand (2)	Regional (Not reported)	General surgery	Not reported	• Seven GPwSIs within the Otago region were trained to provide general surgery through contracts with Southern DHB	• GPs with Special Interests (GPwSI) • No other information provided	*Grey literature:* • In a document published by the health authority, it was reported that referrals and treatment by GPwSIs were appropriate, access for patients was improved, and waiting times had reduced • 99% of referrals to the minor surgery service are managed by GPwSIs • Average waiting time from referral to treatment for minor surgery was 12.3 days in 2010/11
United Kingdom, Northern Ireland (166)	National (2018)	Urology	To improve access to treatment	• GPs have performed vasectomies	Not reported	Not reported

Table 12 Fast track programs

Jurisdiction	Healthcare Setting (year implemented)	Specialty area	Purpose	Description	Impact
Denmark (167)	Hospital (2007) National	Oncology	To decrease waiting times between diagnosis and treatment for patients with head and neck cancer	• A "pack solution" fast track program was implemented for patients with suspected head and neck cancer, which included pre-booked slots for outpatient evaluation (clinical examination), imaging, and diagnostic surgical procedures for each cancer type • Once a GP suspected a patient with potential symptoms, the GP contacted a specialist directly • The specialist had to provide the patient with an appointment date (same or the next day) • If the specialist determined that there is head and neck cancer, then a hospital referral was made immediately • If the specialist determined that treatment is not needed immediately, the patient was followed according to guidelines	*Peer reviewed literature:* • It was reported that the time from referral to first consultation was reduced by 8 days to 1 day from 2006 to 2012 • The time from referral to diagnosis was decreased from 24 to 10 day • The success of this program depended on flexible hours: all patients who were referred the same or the next day were able to be seen and specialists also saw patients during the evening hours • The program was seen as feasible and thus was implemented widely across Denmark
Spain (168)	Regional (2005)	Oncology	To reduce the time interval between the time of diagnosis to the time of treatment	• The Fast Track Diagnosis and Treatment Program (FTDTP) for breast, lung and colorectal cancers establishes preferential pathway between primary care and hospitals • This program is aimed to reduce the wait times no longer than 30 days between first specialist consultation and the start of treatment	*Peer reviewed literature:* • Results from a tertiary hospital which included 156 patients in the fast track program and 156 patients in the habitual care track • Waiting time from first consultation to first treatment was reduced to 39.2 days • Waiting time from first consultation to first treatment was reduced to 23.1 days • Wait time from date of first consultation to diagnosis confirmation reduced to 9.6 days with the fast track program • Wait time from diagnosis confirmation to first treatment reduced to 7.7 days with the fast track • 28% of patients in the fast track program waited no longer than 30 days • Although it was determined that the fast track program reduced patients' anxiety levels, the program did not achieve the targets of less than 30 days for most patients • The fast track program was effective in terms of healthcare quality but no "in the clinical prognosis of the patient"
Spain (169)	Hospital (2005)	Oncology	To reduce the time between diagnosis and treatment for lung cancers. Early treatment was needed to decrease hospitalization and mortality rates	• The Lung Cancer Rapid Diagnosis Unite (LC-RDU) was implemented in a hospital to act as referral centers and diagnose patients with neoplastic diseases • Referred patients were examined in the rapid diagnostic clinic • A pathway for the diagnostic testing was established	*Peer reviewed literature:* • Results from a total of 678 patients who attended the rapid clinic • It was reported that in half of the LC-RDU referred patients who were suspected of lung cancer, the diagnosis was confirmed in 75% of cases using endoscopic techniques • This led to reduced waiting times between the time of diagnosis to the time of treatment

					• One-third of patient referred to the LC-RDU were diagnosed in the early stages of lung cancer
United Kingdom, England (170)	National (2010)	Oncology	To address the long wait times and improve cancer survival rates	• The NHS implemented rapid diagnostic and treatment pathways with the following targets: - Maximum 14-day wait between urgent GP referral and outpatient appointment (called Two-Week Wait (TWW)) - Maximum 31-day wait between decision to treat and initiation of treatment - Maximum 62-day wait from urgent GP referral to treatment initiation • NICE provided TWW triage pathway • Penalties were enforced if the targets were not followed.	*Peer reviewed literature:* • As of 2015, it was reported that there was 93% achievement for the 14-day wait, 96% for the 31-day wait, and 85% for the 62-day wait • Although there were penalties for not achieving targets, it continued to happen and caused for criticism of the program especially for colorectal cancer where there was a very low number of referrals • Although, clinicians viewed the TWW program as needed, they expressed criticisms about the established targets was directed toward the strict targets and that one-size-fits-all targets were not considered appropriate for all cancers It was highlighted the problems applying the TWW referral criteria for colorectal cancer to individual patients because there were not always signs about the cancer. TWW was seen as a good program needed to fast track patients from a diagnosis to treatment. However, there were challenges related with the implementation of the program and meeting the outlined targets. Key challenge was limited capacity in secondary care Coordination of care is needed to make this fast track program more plausible.

Table 13 Patient choice

Jurisdiction	Healthcare setting (year implemented)	Purpose	Specialty area	Choice type	Description	Impact
Australia (110)	National (2008)	To decrease wait times for elective surgery	Various	Hospital	• Australian Government's Elective Surgery Waiting List Reduction Plan implemented the option for patients to elect to be referred to hospitals where waiting times are shorter	Not reported
Australia, Queensland (171)	Region (Not reported)	Not reported	Various	Hospital	• Patients from Townsville are given the opportunity to have their surgery performed at a hospital in rural towns that Townsville Hospital surgeons are scheduled to operate in • Patients who do elect to have their procedures performed at rural hospitals are offered travel assistance through Queensland Health's Patient Travel Subsidy Scheme (PTSS)	*Grey literature:* • Choosing to have surgery in a rural hospital has allowed some patients to have their operations earlier than originally planned
Australia, New South Wales (172)	State (2006)	To provide patients with an independent information service regarding booked admissions to NSW public hospitals and enquire on their behalf and investigate surgery options that are available	Various	Hospital or surgeon	• In New South Wales, the Surgery Access Line was created to provide patients with access information regarding their current waiting time • The Surgery Access Line staff investigate options for earlier treatment either at their local hospital or another hospital with another surgeon	Not reported
Australia, Tasmania (173)	State (2014)	To facilitate the flow of patients between regions and allow long waiting patients to choose to be treated quickly at hospitals with capacity	Various	Hospital	• Tasmanian Government established a Statewide Elective Surgery Waiting List to give patients the choice of being treated at other hospitals more quickly	Not reported
Canada, Alberta (88,89,174,175)	Provincial (Not reported or Not reported)	To reduce lengthy waiting times for consultation and surgery and to improve care for patients	Orthopedic	Surgeon	• A provincial hip & knee care pathway was implemented which provides patients receiving hip & knee replacements in Alberta have the choice of first available surgeon or a specific surgeon • Alberta's eReferral system shows the current wait time for the surgeon selected as well as the wait time for the next available surgeon(144) • This information gives referring physicians and their patients the ability to make an informed choice based on accurate wait times(144)	*Grey literature:* • Patient choice of next available surgeon has resulted in reduced waiting times for patients • "The Hip and Knee Replacement Program has reduced the time between the decision to have surgery and the surgery date to 19.2 weeks, down 12 per cent or almost three weeks from when the program launched in 2010." (89)
Canada, Alberta (176)	Provincial (Not reported)	To improve service integration and patient access to primary care and specialist medical services	Various (Gastroenterology, rheumatology, general internal medicine, endocrinology, hematology and hematologic malignancies, cardiothoracic, geriatrics, nephrology)	Surgeon	• Central Access and Triage programs have implemented the choice of first available surgeon or a specific surgeon	Grey literature: • Preliminary evaluations have reported decreased wait times and timely access for patients requiring urgent care • Pooled referrals have eliminated duplicate referrals and wait times for physicians have equalized • Health care providers reported increase ease and efficiency of referrals • In the rheumatology CAT pilot (2006), there was a 15 to 37% reduction in wait times, depending on urgency

						• Between 2005 and 2008, mean wait time to consultation for urgent-level referrals decreased from 29 ± 46 days to 17 ± 14 days ($p<0.05$) • Mean wait time to consultation for moderate-level referrals decreased from 110 ± 57 days to 63 ± 42 days ($p<0.00005$) • Mean wait time to consultation for routine-level referrals decreased from 155 ± 88 days to 108 ± 37 days • Wait list shopping by referring GPs was documented to have ended • In the gastroenterology pilot, there was an 8% reduction in wait times, despite 153% increase in referrals *Note: impact based on implementation alongside other approaches
Canada, Alberta (177)	Regional (Not reported)	To address the delay in access to multidisciplinary assessment and management of patients with spinal diseases and injuries	Orthopedic/ neurosurgery (spine)	Surgeon	• Caleo Health Spine Partnership implemented patient choice of first available surgeon or a specific surgeon	Not reported
Canada, Alberta (interview)	Regional (Not reported)	To improve access and reduce wait times for elective surgeries	General surgery	Surgeon	• Facilitated Access to Treatment (FAST) program implemented patient choice of first available surgeon or a specific surgeon	Not reported
Canada, British Columbia (178)	Regional (Not reported)	To allow patients to identify surgeons with the shortest wait times	Various	Surgeon	• The Soonest Surgery Tool was implemented to provide a list of up to 5 surgeons most likely able to perform surgery sooner than others in Fraser Health • The tool uses statistics from the Ministry of Health's wait times website and results are changed regularly based on the number of patients referred to each surgeon and the amount of time available in ORs • Family doctors access the Fraser Health physicians website to refer a patient to a surgeon most likely able to perform the surgery sooner • If a patient already has a referral and would like a second opinion or be referred to a surgeon who can perform the surgery sooner, s/he can go back to their family doctor and ask to be referred to a second surgeon or one that is on the list	Not reported
Canada, British Columbia (46)	Regional (2016)	To allow patients to see surgeons faster	Various	Surgeon	• Island Health implemented the First Available Surgeon Triage (FAST) system to allow patients the choice of seeing the first available surgeon	*Grey literature:* • In 1 year, FAST has reduced the wait time for consultation with a surgeon from 24 to 8 weeks
Canada, British Columbia (157)	Regional (2013)	To provide better access and reduce wait times for joint replacement surgery	Orthopedic	Surgeon	• Hip & knee centres throughout the province (i.e. centres with centralized referral and assessment) have implemented the choice of first available surgeon or a specific surgeon (e.g. Burnaby Hospital Central Intake and Optimization Clinic, Rebalance MD, etc.)	Not reported
Canada, Manitoba (179) (interview)	Regional (2012)	To improve access to total joint replacement surgery	Orthopedic	Surgeon	• Winnipeg Central Intake Service for total joint replacement implemented the choice	Not reported

					of first available surgeon or a specific surgeon • Patients classified as "delay by choice" if they do not choose the first available surgeon	
Canada, Newfoundland (91,180)	Provincial (2011)	To reduce wait times for hip and knee replacement surgeries	Orthopedic	Surgeon	• Interdisciplinary Central Intake and Assessment Clinics implemented patient choice of first available surgeon or a specific surgeon	Grey literature • In 2-year pilot in the Eastern Health Region wait times for referral from a GP to initial orthopedic consult was reduced from a median of 325 days to 91 days for high-priority referrals and 179 days for routine referrals • Having the clinic arrange for additional services reduces delays and duplicate referrals *Note: impact based on implementation alongside other approaches
Canada, Nova Scotia (76, 181)	Provincial (2017)	To improve access to hip and knee care	Orthopedic	Surgeon	• Orthopedic Surgery Central Referral Clinics implemented patient choice of first available surgeon or a specific surgeon	Grey literature: • In one health region, referrals to surgeons that were awaiting assessment decreased from 1200-1250 (2010) to 235 (2014). • LOS for knee arthroplasty patients decreased from 4.7 days (2010) to 3.8 days (2012) • LOS for hip arthroplasty decreased from 4.9 days (2010) to 4.1 days (2012) *Note: impact based on implementation alongside other approaches
Canada, Nova Scotia (182)	Regional (2006)	To increase effective use of resources to reduce waiting times	General surgery (hernia)	Surgeon	• The joint hernia clinic implemented patient choice of first available surgeon or a specific surgeon for both consultation and surgery	*Peer reviewed literature:* • There was no difference in post-operative complication rates between patients who saw the same surgeon for consultation and surgery (group 1) and those who saw different surgeons (group 2) • Waiting time from GP referral to initial clinic consult decreased from 208 days in 2007 to 59 days in 2009 • 98.4% of group 1 respondents considered it important to have the same surgeon for assessment and surgery vs. 48.3% of group 2 respondents ($p<0.0001$) • 98.4% of group 1 respondents had confidence in their assessing surgeon vs. 86.2% of group 2 respondents ($p=0.034$) • 100% of group 1 respondents had confidence in their operating surgeon vs. 86.2% of group 2 respondents ($p=0.009$) • 2/3 of respondents had confidence in the competence of any surgeon and believed the service was better and faster in specialized centre • Majority of respondents believed the group model uses resources more effectively • 52.5% of respondents understood that they could request the assessing surgeon to perform their surgery (49.2% group 1 vs. 55.2% group 2, $p=0.66$) • On average, 2/3 respondents were comfortable having their surgery performed by a surgeon they meet the day of surgery (59.7% group 1 vs. 75.9% group 2, $p=0.16$)
Canada, Ontario (183) (interview)	Provincial (Not reported)	To help assess and manage Ontarians with low back and low back related leg symptoms	Orthopedic/ neurosurgery (spine)	Surgeon	• Inter-professional Spine Assessment and Education Clinics implemented patient choice of first available surgeon or a specific surgeon	Interview: • Pilot programs in Hamilton, Thunder Bay, and Ontario showed significant success in patient outcomes and financial benefits to the system

						• The Ministry is making this program a priority for all LHINs • Champlain LHIN is the first to have implemented the program LHIN-wide • GPs have benefited from this program as many have difficulty managing patients with lower back pain *Note: impact based on implementation alongside other approaches
Canada, Ontario (184-186) (interview)	Provincial (Not reported)	To streamline the intake process (providing patients with more timely assessments and consult); improve surgeon wait list management and referral practices; provide patients with choice of hospital, surgeon, or shortest wait time; provide non-surgical patients with conservative management strategies; and improve communication to referral sources	Orthopedic	Surgeon	• Central Intake and Assessment Centres implemented patient choice of first available surgeon or a specific surgeon	Interview: • Hip and knee central intake was a success story for the Champlain LHIN, despite some pushback • Funding was obtained for a 3-year pilot project to expand the central intake and triage components to foot/ankle, shoulder, knee conditions requiring arthroscopy, cervical, thoracic, and spine • The assessment phase is seen as one of the most valuable components Interview: • Central referral and triage saves surgeons time and standardizes criteria for surgery • Most patients choose first available surgeon • Central intake had a greater impact on wait times once it became mandatory (patients now need a central tracking number to have their case booked) *Note: impact based on implementation alongside other approaches
Canada, Ontario (187)	Regional (2007)	To actively manage patients requiring hip and knee replacement surgery across the entire continuum of care	Orthopedic	Surgeon	• Joint Health and Disease Management Program implemented patient choice of first available surgeon or a specific surgeon	Grey literature: • In a report published by the LHIN*, it was stated that 90% of patients in the LHIN are waiting <115 days for hip or knee replacement surgery vs. the provincial target of 182 days •Wait from date of referral to first consultation with a surgeon is <100 days *Note: impact based on implementation alongside other approaches
Canada, Saskatchewan (188)	Provincial (Not reported)	To provide patients with quicker access to specialists by maximizing the use of all specialists evenly	Various	Surgeon	• Pooled referrals have implemented patient choice of first available surgeon or a specific surgeon	*Grey literature:* • Pooled referrals are a popular choice amongst patients. • A Regina gynecologist was quoted as saying that her colleagues were not hard to convince of the benefits of pooled referrals. They receive a steady stream of appropriate referrals and the system matches the flow of referrals to the capacity of the specialists.
Canada, Saskatchewan (189-191)	Provincial (2010)	To improve quality for lower back pain care by encouraging guidelines-concordant evidence-based primary care while reducing wait times for appropriate MRI and surgical referral	Orthopedic/ neurosurgery (spine)	Surgeon	• Spine Pathway Clinics have implemented patient choice of first available surgeon or a specific surgeon	Peer reviewed literature • In a retrospective analysis of 215 consecutive new patient referrals between June 1, 2011 and May 30, 2012, it was reported that SSP clinic referrals were significantly more likely to be candidates for surgery than referrals from outside an SSP clinic (59.1 vs. 37.6%, p=0.003) *Note: impact based on implementation alongside other approaches

Hong Kong (192)	Territory (Not reported)	Not reported	Various	Hospital	• Hong Kong established a policy allowing patients to choose where they receive their procedures • Patient can choose with their attending surgeon to see if they are suitable for referral to another hospital with shorter waiting time (if suitable, referral letters are issued • Patients are required to book a specialist out-patient service and attend the consultation before they are put on the waiting list for elective surgery in the short-wait cluster • Patients may choose to join a Special Public Private Partnership Programme, if invited, to receive treatment	Not reported
Norway (59)	National (Not reported)	To allow the government to quickly access additional surgical capacity	Various	Hospital	• Patients in Norway can opt out of public hospitals and receive elective treatment at private clinics with costs covered by a public purchaser • Payments to private for profit hospitals are based on DRG-based payment implemented in 2000	*Peer reviewed literature:* • In one study based on pricing data collected from the formal contracts awarded to private for profit hospitals, private for profit hospitals performed day surgeries at markedly lower prices than public hospital • Authors (Hagen 2018) speculated that the private hospitals' lack of acute services, less severe patient population and ability to streamline productions explained the lower prices
Norway (80)	Hospital (2013)	Not reported	Various	Surgery date	• Lillehammer Hospital established a process where patients are given the operation date on their examination day so they have an opportunity to choose the date that is most suitable for them	Not reported
United Kingdom, England (64,193,194)	National (pilot 2005, full 2006)	To increase patient choice and receive treatment faster	Various	Hospital	• Patients requiring planned hospital care were able to book appointments from their choice of four to five providers (chosen by their primary care trusts) at the point of referral from their GP, paid for by the NHS • GPs were required to ensure that patients were made aware of, and offered, choice	*Peer reviewed literature:* • One study was based on administrative discharge data from the UK Department of Health (data from every hospital in the England NHS from 2003 to 2008; analysis included 13,500 elective CABG discharges). Mean waiting times from referral to treatment decreased when choice was available, but other policies such was enforcement of waiting time targets were also in place. The average probability of being informed about choice was about 50%, showing that not all physicians did offer choice as mandated by the reform. The study also reported that patients were more responsive to clinical quality than wait times when choosing a hospital.(193) • In a literature review of studies from the discipline of economics**(194)** • Patients who are older, female, have lower educational qualifications, or who look after children are less likely to indicate that they wish to take up choice. Patients are willing to trade-off waiting time against reputation of the hospital, with some indication that this trade-off is affected by the income of the patient • It also appears that lower waiting times for those in the scheme were not at the expense of patients who were not in the scheme. Waiting times for all patients fell as sending hospitals responded to loss of patients (and funding) by improved performance on waiting times and

						receiving hospitals did not increase waiting times for other patients at the hospital

Table 14 Mobile surgical clinics

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
New Zealand (195) (interview)	National (2002)	Elective surgery (Dental; endoscopy; general surgery; orthopedics; gynecology; ear, nose and throat; urology; ophthalmology; and plastic surgery)	To reduce high wait times and increase services in rural areas by providing supplementary capacity in the district health boards	• Mobile Surgical Services (MSS) implemented to provide various day surgical procedures in rural communities and thus improve services in rural communities in order to meet wait times for elective surgeries • Nurses played a major role in the MSS set up • Focused on high need populations that are based in rural areas	*Grey literature:* • No significant differences in wait time • The feedback provided on the MSS services by patients has been highly positive • Patients reported that the travel times to MSS tend to be short • The complaints have been around the need for faster children surgeries and the wait on the day of the surgery in the MSS • The MSS improves access for rural patients especially those patients who have high health needs, suffer from health inequalities and/or face barriers to accessing care • It was reported that the MSS buses are a small but useful supplementary capacity to help district health boards manage reduced targets for patient waiting times for elective surgery *Interview:* • Mobile service is restrictive and many patients are not considered clinically appropriate • Service also provides work force training for rural areas and telehealth service support
United Kingdom, England and Wales (66)	National (2004)	Ophthalmology	To reduce wait times and increase cost savings in delivering cataract surgeries	• NHS issued a tender for a private company, Netcare, to perform cataract surgeries in mobile clinics at 10% less than surgery cost within an NHS facility • Aspects of the contract include a guaranteed number of referrals (or a payout must be made) and no capital investment by the NHS • The mobile units established are one-stop shops, run by 1 ophthalmologist and 2 support staff, serving patients from referral to diagnosis, to decision to treat, to treatment and discharge plan (eliminating the need for outpatient pre-operative assessment • On the first visit, the patient were provided a surgery date and treatment plan • Patients were contacted 24 hours prior to the surgery for assessment • Routine follow up was performed after 3-4 weeks	*Peer reviewed literature:* • The Netcare mobile clinics decreased the number of surgeries needed in NHS facilities within 9 months and allowed wait time targets to be met; however, the quality of the services provided has yet to be determined • In the beginning, Netcare procedures resulted in many complications • The decrease of surgeries at NHS facilities has made some staff obsolete • What would be the impact of the elimination of cataract surgeries within NHS facilities is yet to be determined • Some questions that have been considered are: - Who will handle emergencies that Netcare clinics could not? - Mobile clinics do not offer continuity of care so how this will be done? - How to ensure quality of care? - How to ensure proper training of staff? - How to minimize impact on the NHS workforce?
United Kingdom,North Wales (196)	Regional (2016)	Cardiothoracic	To reduce the time between referral to a specialist and diagnoses	• A one-stop mobile heart scanning clinic was established to provide scans, assessment, diagnosis and treatment patients for cardiac problems in rural areas • A specialist nurse carried out all services including echo scanning for diagnosis and pre-operative assessment to check on the heart function of patients who are due to undergo surgery • Nursing staff underwent additional training so they can assess and monitor patients better • Nursing staff added additional knowledge and training in other areas of heart failure	*Grey literature:* • Patients were able to receive scans and assessments within their community • Patients reported that they liked that they did not have to travel to the hospital • Patients prefer the locations and like the ease of access to services • The nurse at the clinic is the first nurse with an expanding role in cardiac care where the nurse is supported by the physiologist rather than the other way around

Table 15 Organization incentives

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Activity-based funding (financial)					
Australia (197,198)	National (2011)	Various	Not reported	• In 2011, an independent organization, entitled the Independent Hospital and Pricing Authority (IHPA) was established to determine a national activity-based funding model for public hospitals in Australia	Not reported
Australia, Victoria (197,198)	State (1992)	Various	Not reported	• Activity-based funding was introduced in Victoria in 1992, when it represented only 25% of hospital revenue • In 2001, it represented 70% of hospital revenue	Not reported
Canada, British Columbia (13,199)	Provincial (2010)	Various	Not reported	• In 2010, a patient-focused funding model was launched with an additional funding of $250 million • The model payment was based on Case Mix Groups and resource intensity weights • The program was piloted and expected to be implemented in 12 hospital	Not reported
Canada, Ontario (199)	Provincial (2004)	Various	To increase hospital activities in key areas	• Activity-based funding was first introduced in 2004 followed by a plan to implement in larger hospitals in 2011	Not reported
Canada, Quebec (200)	Province (2004)	Various	To increase the volume of surgeries with the longest waits to reduce wait times	• Activity-based funding was introduced within the Access to Surgery Program (ASP) • Initially only included hip, knee replacement and cataract surgeries, but was expanded to other types of surgery • Program funded additional surgeries performed during the year in question compared with 2002-2003 • Hospitals that performed additional surgeries at below-average cost were rewarded for their efficiency, while those performing at higher costs were encouraged reducing their costs	• Surgeries under ABF increased by 22% between 2002/03 and 2012/13 (annual growth rate of 2.0%) • Average wait times decreased between 2008/09 and 2011/12 • Wait times for orthopedic, ophthalmology, neurosurgery, thoracic and cardiovascular, plastic surgery decreased by 31%, 26%, 28%, 86% and 16%, respectively • Mean length of stay also decreased in particular for orthopedic (11%), general (14%) and oral surgery (16%) • However, the program is no longer able to meet the increase in demand, which has prompted to an Expert Panel's recommendation to expand the program to its permanent implementation in 2014-2015 • The panel recommends the following improvements to the current program: expansion to other surgeries that were not covered by the program; funding for the patient's entire care pathway; a minimum production threshold of 1,000 weighted cases per year to be eligible for funding; to take quality and access into account • The Panel also recommends improvements in determining costs and that implementation is carried out gradually
Denmark (198)	National (Not reported)	Various	Not reported	• Introduced in 2000s (alongside other funding systems, e.g., global funding and performance targets) • When introduced, ABF only accounted for 10% of the hospital finance • Only procedures above a negotiated target volume were reimbursed, and at 10-20% of the NordDRG-rate	• In Denmark, the volume for 18 common surgeries increased by 13% and mean waiting times reduced by 17% • However, up-coding was present and there were complaints of the process leading to budgetary uncertainties

				• DKK 1.5 billion fund was available to counties that showed increases in activity above an agreed baseline • In 2004, a new change was introduced where a minimum of 20% of the funds from the counties to the hospitals should be activity-based	
France (201)	National (2004)	Various	Not reported	• Progressive implementation with ABF accounting for 10% of public hospital's reimbursement in 2004 to 100% in 2008	Not reported
Israel (202-204) (interview)	National (2002)	Various	To reimburse hospitals more fairly, reduce gap between costs and actual reimbursement hospitals, and reduce unnecessary hospitalization	• Implemented slowly since 2002. In 2010, a new Ministry of Health was appointed and the number of hospital procedures reimbursed by activity-based funding increased significantly • Target was to have 500 of them by 2015 • Introduction of the activity-based funding was part of a broader policy of strengthening the hospital sector (Extra money has been paid to specialists to see patients after hours in the community) • Until 2010, there was no costing and pricing method in place • Ministry of Health felt that a consistent costing in pricing mechanism was important • Israel uses a procedure-related group system. In other words, it uses procedures rather than diagnosis (diagnosis-related groups or DRGs) • As of 2017, the payment is not adjusted by patient's age and complexity • A Pricing Division within the Ministry of Health assesses costs and sets prices for procedures • Micro-costing is performed by obtaining inputs and resources used during surgery from experienced surgeons • The list is reviewed by other surgeons and other hospital personnel • The cost of the procedure assessed undergoes a long process of revision and a "pricing sub-committee" approves the final cost • A price is set based on the approved cost and quantity performed per year	*Interview:* • Program is effective at reducing wait lists
Netherlands (205)	National (Not reported)	Various	Not reported	• Abolished the budget cap, and allowed hospitals to be compensated based on activity • Activity-based payment for medical specialists • Lump sums (fixed budget) were fully abolished to create incentive for increased production of services • Other policies in place: Managed and competition and deregulation of hospital prices • Government introduced managed competition to allow hospitals and insurers to negotiate prices, quality and volume for a number of routine hospital services	Not reported
Norway (198,206-208)	National	Various	To reduce waiting lists, especially long waiting times for elective treatment	• Activity-based funding based on the DRG system • Used the NordDRG system based on ICD-10 and NCSP (the NOMESCO Classification of Surgical Procedures)	• In Norway, studies comparing years before and after the introduction of ABF found that ABF lead to increase in hospital activity • The yearly growth before ABF was around 2%, while after the reform the growth was 3.2% from 1997 to 2000 and 18.3% from 2001 to 2005

				• Reimbursement scheme changed from a system of risk-adjusted global budgets to a combination of ABF and global budgets • Share of ABF vs the corresponding block grants has changed frequently and has varied from 30% in 1997 to 60% in 2003 and 2005 • As of 2016, the share of ABF is 50% • ABF share is decided by parliament and operates as an arrangement between the National Government and the Health Authorities	• However, the system also led to increase of up-codes (i.e. report more severe diseases in order to increase income) • The percentage of cases with complicated conditions increased from 17% in 1997 to 30% in 2000
Sweden (198)	National (1990s)	Various	Not reported	• Introduced in the 1990s as part of a broader strategy that included wait time guarantees to reduce waiting times • Each county has a different mechanism of ABF and many counties still use global budgets to fund hospitals • Most counties use the NordDRG system	Not reported
United Kingdom, England (65,209)	National (2003)	Various	To support England's police of Patient choice since money will follow the patient reward efficiency and quality since providers can retain the difference if they can provide care at lower costs	• Introduced in a limited way in 2003 and by 2006, the system had expanded to cover most acute activity • Implementation was gradual so that organizations could manage their finances • English version of DRGs is called Healthcare Resource Group (HRG) • System covers the majority of inpatient care and some outpatient procedures • Payments are directly linked to levels of activity performed, paid at a price that reflects current average hospital costs • In 2010/11, NHS changed its practices and tariffs are determined by best clinical practices rather than the average cost • System uses ICD-10 for diagnosis and OPCS-4 for interventions. All information about the patient is sent to a national database (Secondary Uses Services) • Reports from the Secondary Uses Services allow payment to reflect the actual activity undertaken • Tariffs can be adjusted by geographical location and length of hospitalization, and can also have adjustments to support a policy goal	Not reported
United States (199)	Not reported	Various	Not reported	• DRG system has been in use since 1983	Not reported
Pay-for-performance (financial)					
Australia (210)	National (2011-2016)	Various	To reduce number of patients waiting for surgery longer than the recommended time and improve number of patients treated within the recommended time	• The agreement sets operational standards in which: States must show a progressive reduction in the number of patients who are overdue for surgery; and States must show an improvement in the number of patients treated within the wait time targets. • A financial reward was given to States that met those targets • Up to AUD 200 million in rewards were set over the life of this agreement	Not reported
Norway (199,207)	National pilot (2014)	Various	Not reported	• Introduced in 2014 as a pilot project and represented only 0.5% of the budget (NOK 500 million)	Not reported

				• The system used a point system of up to 100,000 and each Health Authority was rewarded with points based on a set of quality indicators and performance criteria • Indicators and performance criteria included: five-year survival for specific types of cancer; 30-day survival after hospital admission; waiting time violations; treatment of cancer performed within the wait time targets (from referral to surgery); and patient satisfaction • Payment was redistributed between Health Authorities depending on their performance levels and improvement relative to the other Health Authorities	
Sweden (211)	National (2008-2011)	Various	To reduce wait time for elective surgery	• An economic incentive was introduced in 2008 • Money was given to counties that reached the wait time targets: wait times 1 and 2	*Grey literature:* • The number of patients waiting more than 90 days to see a specialist declined during this period • The number of patients waiting more than 90 days to receive treatment also declined during this period
Non-financial					
United Kingdom, England (212)	National (2000)	Various	To reduce wait times for elective surgery	• As part of National-level wait time guarantees, the Government introduced incentives and sanctions • Waiting times from referral to inpatient admission, with a limited set of other key targets and a 'balanced score card' of a wider set of indicators, were used to calculate an annual star rating (which ranged from zero to three) for each NHS hospital • These were published and used as a basis for direct sanctions and rewards • The sanctions were the dismissal of key managers of hospitals for poor performance against these targets and the rewards were the granting of greater autonomy (the freedom to keep certain surpluses and less central control) for hospital managers who performed well	*Peer reviewed literature:* • One retrospective study based on census and hospital data compared wait time reductions after 2001 between England and Scotland • The study reported that the proportion of patients waiting longer than 6 months for treatment fell by 6 to 9% points more in England than Scotland. The study also reported that the percentage of patients waiting more than 6 months for care was 14% in those with the ASC code and 28% for those patients in Scotland without the Availability Status Code • An ASC is assigned to patients who were not available or suitable for treatment
Negative financial incentives					
United Kingdom, England (170,211)	National (2011)	Various	To reduce wait times for elective surgery	• A wait time guarantee was given to all patients • The guarantee covers the whole patient journey from referral to initial treatment. • By law, patients are given options of other providers (public or private) if guarantee cannot be fulfilled. • NHS also sets operational standards in which at least 90-95% of patients have to start treatment within 18 weeks of referral. • Providers are monitored on a monthly basis and breach of the operational standard will result in up to 5% reduction in revenue	*Peer reviewed literature:* Interviews with GPs, oncologists and surgeons about the wait time targets were conducted. Overall, they were positive about the targets. However, the following concerns were raised: wait time targets take a 'one-size fits all' approach; providers are under considerable pressure; waiting time targets over-rode patients and providers choice.

Table 16 Appointment reminders

Jurisdiction	Healthcare Setting (year implemented)	Specialty area	Purpose	Description of Service	Impact
Australia, New South Wales (97)	Hospital (2016)	Various	To reduce surgery cancellations due patients forgetting or being too ill to come in	• Text messaging reminders have been implemented to inform all elective surgical patients about their upcoming appointments	*Grey literature:* • Cancellations due to patients were reduced by 65% with median cancellation rate of 1% (target was 1.5%) • Leading cause of day of surgery cancellations were patient related (32%) with patients not adequately prepared for surgery - failed to arrive or their surgery cancelled due to being unwell. • Text reminders are effective in getting patients to show up for surgeries, but they are not enough.
Norway (81)	Hospital (2008)	Various	To reduce no-show appointments, which impact wait times and waste resources	• **Patients were** allowed to select their appointment dates and received an appointment reminder call 2 days prior, leaving time to fill the slot if the patient could no longer make it	*Peer reviewed literature:* • Mean cancellation rate was reduced from 8.5% to 4.9% ($p<0.001$) • After intervention, the cancellation rates were more stable • Patients being allowed to select surgery times in order to fit their schedules led to less cancelations • Cancelations decreased once patients started getting reminders about their appointments • Decrease in cancelations led to increase in surgeries performed

Table 17 Cancellation lists

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Description	Impact
Australia, New South Wales (213)	State (2012)	Various	• Hospitals have implemented "short notice" lists for willing patients who may be able to have their performed sooner (e.g. if there is a cancellation)	Not reported
Australia, South Australia (33)	State (Not reported)	Various	• Hospitals in Southern Australia have established lists of patients who are available for admission on short notice	Not reported
Australia, Tasmania (214)	State (2009)	Various	• Where there is uncertainty about either the capacity of theatre resources or the time it will take to complete particular cases, hospitals have made arrangements to have patients put on standby for admission • Patients who are willing and understand the standby booking need to live reasonably near the hospital, wait at home and remain fasting until called in for surgery • The Admission Nurse will normally contact those standby patients who are not called for surgery before Midday on the day of the operation	Not reported
Canada, Alberta (interview)	Surgeon-specific (not reported)	Not reported	• Some surgeon's offices have implemented a cancellation list, where patients on the list can receive consultations or surgeries on short notice (after another patient cancels)	Not reported
Canada, British Columbia (75)	Hospital (Not reported)	Orthopedic	• Burnaby Hospital Central Intake & Optimization Clinic has implemented a cancellation list for patients (unless they do not wish to be contacted for last minute dates)	Not reported

Table 18 Innovative surgical approaches

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Canada, Alberta (215) (interview)	Provincial (Not applicable or NA)	Various	To guide decisions on the responsible introduction of health technologies in context and encourages the best use for both patients and clinician	• The Surgery Strategic Clinical Network established the Evidence Decision Support Program, an interdisciplinary team that helps make evidence-informed decision regarding the introduction of new health technologies into the health system • Innovative approaches recently introduced in Alberta include the SuperPATH approach for hip replacement, 24 hour vascular surgery, and 23 hour appendectomy	*Interview:* • These approaches still need to be evaluated
Canada, Alberta (216)	Hospital (2014)	Oncology	To destroy abnormal cells in the esophagus less invasively than through an esophagectomy	• The Barrx Flex System, a minimally invasive procedure that uses radiofrequency ablation to destroy abnormal cells, has been used at the Royal Alexandra Hospital • Typically, the entire procedure – from arrival to discharge – takes about two hours and patients can return home the same day fully functional and with only mild discomfort • An esophagectomy, requires the removal of all or part of the esophagus, followed by one or two days in the ICU and a 7- to 14-day hospital stay • After the abnormal tissue is initially removed, patients return every three to six months for follow-up treatment, often avoiding chemotherapy and radiation treatments • About 200 patients every year will receive ablation treatment rather than surgery – a 20% increase with the new Barrx Flex System • The more patients who can undergo ablation means more surgical capacity is freed up for Albertans who need it	Not reported
Canada, British Columbia (75)	Hospital (Not reported)	Orthopedic	To access the hip joint with a smaller incision, causing less damage to tendons, muscles or ligaments	• Hospitals in British Columbia have implemented the SUPERPATH® approach, which is a percutaneously assisted total hip replacement technique • Some patients will be able to leave on the same day as surgery after a SuperPath hip replacement	Not reported

Table 19 No-show policies

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
United Kingdom, Scotland (136)	National (2004)	Various	To calculate waiting times in a way that will be fairer, more open to scrutiny, more understandable, and which will help put patients at the centre of their care	• Process was implemented where periods of patient unavailability were reviewed regularly, so that no-one remained unavailable for treatment for more than 3 months without a check on their status • New arrangement also meant that patients had to take responsibility for accepting and keeping a reasonable offer of an outpatient consultation or hospital admission for treatment •Patients who failed to turn up for an appointment or admission without prior warning will return to the start of the waiting queue, unless there were clinical or other compelling reasons for treating them more quickly • Effectively they would have their waiting times "clock" returned to zero	Not reported

Table 20 Pre-habilitation clinics

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Australia, Queensland (217)	Region (2017)	Various(Orthopedic, gynecology, vascular)	To reduce patients' health risks and improve their overall health before surgery	• The Get Set for Surgery (GSfS) project offers patients the opportunity to reduce their health risks and improve their overall health preparation while waiting for elective surgery through participation in community health partner programs.	*Grey literature:* The program anticipates that: • The number of surgical procedures that have to be cancelled as a result of modifiable, patient factors will be reduced •The number of avoidable complications during and after elective surgical procedures will be reduced, as a result, the overall lengths of stay will also be reduced
Australia, South Australia (218)	Regional (2006)	Orthopedic	Not reported	•A pre-habilitation program implemented as part of an initiative to deliver arthroplasty services at a single site under a new management system • No other information provided on the pre-habilitation program • The new system also includes centralized referral, a standardized referral template, pooled waiting lists use of the Multi-attribute Prioritization Tool, dedicated orthopedic-surgeon led clinics, physiotherapist-led clinics, patient education, and the Orthopedic Patient Management Information Technology program.	*Peer reviewed literature:** • In the first 4 years of its implementation, the model reduced waiting times for initial outpatient assessment from 10 to 3 months and surgery from 18 to 8 months • Increased throughput of arthroplasty surgery from 396 procedures in 2005–6 to 548 procedures in 2009–10 • Increased attendance at patient preoperative education sessions from 31 to 81% • Decreased length of stay from 6.3 to 5.3 days for hips and 5.8 to 5.3 days for knees • Reduced the use of inpatient rehabilitation from 44 to 8% from June 2008 *Note: impact based on implementation alongside other approaches
Canada, Alberta (88)	Pilot (2007) Program (2010)	Orthopedic	To reduce lengthy waiting times for consultation and surgery and to improve care for patients.	• Patient optimization programs were incorporated into the Alberta Hip & Knee Replacement Pilot and Program • This program outlined a standard of care across the entire continuum, including central referral, a multidisciplinary team, and coordination by a case manager	*Peer reviewed literature:** • In a pilot randomized controlled study in which 1700 patients were allocated to the new care path and 1700 patients were allocated to the traditional care path, patients who followed the new care path had significantly greater improvement in general health, less pain after surgery, and greater ability to perform normal daily activities than those who received conventional care • Waiting times for consultation with a specialist and for surgery declined dramatically • New continuum: - Wait from referral to first consultation: 21 - Wait from first consultation to surgery: 7.5 weeks - LOS 4.7 days - 85% mobilized day of • Current approach: - Wait from referral to first consultation: 145 days - Wait from first consultation to surgery: 58 weeks - LOS 6 days - 31% mobilized day of • The degree of improvement among patients in the new continuum of care exceeded that of patients in the conventional approach as measured by the WOMAC and SF-36 • Patients in the new continuum of care had a 36% improvement in their average WOMAC score, compared with a 31% improvement for patients in the conventional approach • The lower total cost to public health care together with improved patient outcomes indicate the new continuum is more cost-effective than the conventional approach to hip and knee replacement

Table 20 Pre-habilitation clinics

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
					*Note: impact based on implementation alongside other approaches
Canada, British Columbia (75,90)	Regional (Not reported)	Orthopedic	Not reported	• At the Burnaby Hospital's Central Intake and Optimization Clinic, patients who are a surgical candidate are provided with pre-operative education and support to ensure they are in optimal health and to reduce the risk of complications •The hospital has also introduced a centralized referral, assessment, and standardized referral process for hip and knee patients • Some patients also access the SuperPath approach	*Grey literature* • In a document published by the health authority, it was reported that wait time at Burnaby Hospital is approximately 6-8 months after a surgical consultation • The average length of stay in the hospital after a hip or knee replacement is between 1 to 3 days • Similar programs have since been implemented at Vancouver General Hospital, South Vancouver Island and Prince George •The model will expand to other centres later in 2018
Canada, British Columbia (157)	Regional (Not reported)	Orthopedic	To meet the government's target of no more than 5% of patients waiting longer than 26 weeks.	• Pre-surgery preparation and readiness programs are being incorporated into the Hip & Knee centres being established across the Island Health region • These centres also include centralized referral, pooled waiting lists, first-available surgeon, and post-operative support and rehabilitation	Not reported
Canada, British Columbia (103)	Hospital (2016)	Orthopedic	To help reduce provincial waiting times to <26 weeks for 90% of patients	• As part of the University of British Columbia Hospital's Centre for Surgical Innovation (CI), patients receive a "prehab" class via one of the centre's centralized joint clinics (the physiotherapy-based Osteoarthritis Service Integration System) • The CSI has a number of other components including a designated hospital ward bed and OR capacity, telephone preoperative anaesthetic consultation, etc.	*Grey literature:** • The results of the CSI program are assessed annually by the management team in terms of the following patient access, service quality and efficiency, and finance • In the 2006/07 and 2007/08 fiscal years, the CSI program achieved its headline target by performing 1609 and 1600 joint replacements, respectively, or about 16% of the total number of provincial cases • The total number of patients waiting > 26 weeks in BC decreased by 15% from 3878 at the end of 2005/06 to 3203 in 2006/07 and by a further 14% to 2768 in 2007/08 • The total number of patients on the waiting list decreased by 16% over the first year of the program • The result is a median waiting time of 3 months for hip replacements and 4 months for knee replacements • The 2 health authorities that are local to the program achieved their patient participation targets, whereas the 3 distant health authorities did not. • Patient satisfaction with the service provided at the CSI remains high, with a mean satisfaction score recorded at 4.7 out of 5 on a Likert scale for 599 patients randomly surveyed after discharge • Any reported concerns were mainly related to waiting time and travel rather than service quality • Targets were well met for an average OR time of 1 hour and 45 minutes, an average length of stay in post-anesthesia recovery of 2 hours and 4 minutes and an average postsurgical length of stay in hospital of 3.4 days • Changes have already taken place in Vancouver to accommodate ASA grade 3 patients within the program to more directly and effectively deal with the backlog of patients waiting > 26 weeks • The increased staffing levels and medical coverage on the surgical observation unit have been instrumental in facilitating this change

Table 20 Pre-habilitation clinics

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
					• The change has been successful and, at present, very few patients are ineligible for the CSI program, thus alleviating concerns of so-called "cherry-picking" *Note: impact based on implementation alongside other approaches
Canada, Manitoba (interview)	Regional (Not reported)	Orthopedic	Not reported	• In the Winnipeg Regional Health Authority, a lot of time was spent with patients on pre-habilitation • Process was re-vamped to include an education session and online videos • Group sessions are held at consult visits to help patients get ready for surgery • They have the ability to refer to sub-specialities in pre-hab	*Interview:* • Resulted in delays in surgery and had the patients just received surgery, their hip pain would have been addressed quicker • Need to expedite the most appropriate care • Cost a lot of money • All of this is important to consider within the context of value-based health care (if it really makes sense to spend the money on pre-hab instead of more surgeries) • The data was reviewed a few years ago and found they couldn't prove that there was a benefit for patients going through pre-hab
Canada, Newfoundland (interview)	Provincial (Not reported)	Orthopedic	Not reported	• Patients requiring hip and knee replacement attend pre-optimization clinics for one-on-one assessment with various members of the health care team, who address patient-specific needs prior to surgery	Not reported
Canada, Ontario (219)	Hospital (Not reported)	Cardiothoracic	To help get patients as fit and ready for surgery as possible	• Cardiac Pre-Hab program at the University of Ottawa Heart Institute • No other details found	Not reported
Canada, Ontario (219)	Hospital (Not reported)	Cardiothoracic	To help patients avoid further de-conditioning and learn what to expect from surgery	• Patients attend the program 1 hour/week for 8 weeks to learn exercises to avoid further de-conditioning and about what to expect from their surgery • The program costs $100 (parking not included)	*Grey literature:* The St. John's Pre-Hab program suggests Pre-hab: • Prevents physical de-conditioning and/or joint deterioration from prolonged inactivity • Improves recovery time • Teaches patients how to set and achieve rehab goals • Teaches patients how to become familiar with swelling, wound care, and pain management techniques • Decreases chances of infection and/or future injury
New Zealand (2)	Regional (2008)	Orthopedic	To improve patient flow	• Joint Camp, 2.5 hour program for patients undergoing joint replacement surgery, has been implemented in New Zealand	*Grey literature:* • In a document published by the government, it was reported that Joint Camp lead to a reduced average length of stay and there were fewer cancellations on the day of surgery; there has been a marginal improvement of waiting times for surgery and bed-day savings of approximately 300 days/year

Table 21 Provider incentives

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Type of incentive	Description	Impact
Canada, Alberta (220,221)	Provincial (2010) Hospital (2009)	Orthopedics	To improve patient outcomes and health system efficiency	Non-financial	• The Joint Optimization Incentive Team (JOINT) created a performance score card with key performance indicators in the 6 dimensions of quality: average LOS in hospital; time out for a final checklist in the OR before incision; percentage of patients mobilized on the day of surgery; time to surgery (referral date to date of surgery); patient satisfaction; date of discharge from hospital vs predicted date of discharge • Performance levels were set from 1-10 with the upper end identified as "ideal" • The Alberta Hip & Knee standardized, integrated care pathway was implemented in the hospital at the same time • Across the province, data have been collected from hip/knee replacement surgeons and analyzed by the ABJHI • Each surgeon gets a report twice yearly on results in 17 key indicators	*Peer-reviewed literature:** • In the first six months of the implementation of the scorecard, LOS declined to 4.4 days from 5.5 days, an improvement of 20%; compliance • Time-out to complete a pre-incision checklist increased to 96.1% from 60% • Patients mobilized on day of surgery increased to 76% from 47%; waiting time for surgery was 450 days, a reduction of 446 days or 50% *Note: impact based on implementation alongside other approaches
Spain (60,61,222)	National (1996-2000)	Elective surgery	To encourage specialists to reduce waiting time	Financial	• Spain has used bonuses for providers who have achieved waiting time reductions • Additional money was given to providers achieving reduction on number of patients on the waiting list • Bonuses were proportional to provider's salary to a maximum of 3%, 2% and 1% to specialists, nurses, and other staff.	*Grey literature*:* •Number of patients on the waiting list reduced during the period the approach was in place • Mean waiting time reduced from 210 days in June 1996 to 67 days in 2000. *Note: impact based on implementation alongside other approaches

Table 22 Privately funded, privately delivered services

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Australia (223)	National (2001)	Various (Cataract extraction, cholecystectomy, coronary artery bypass graft, hip/knee replacements, etc.)(15 indicator procedures in total)	To "take the burden off the public hospital system"	• 30% health insurance rebate was introduced to encourage people to take out health insurance thus facilitating access to private hospital care • Study designed to examine the interaction between levels of private activity and waiting times for public patient care, testing the hypothesis that an increased proportion of care in the private sector is associated with reduced public sector waiting times using secondary analysis of hospital activity data for 2001-2002	*Peer-reviewed literature:* • Increased private sector activity is associated with increased public sector waiting times • Contracted activity appears to act more like private activity suggesting that private contracting for public patients may not be an efficient strategy for improving public sector waiting times • More public activity would reduce public waiting times; the models used in the study indicated that waiting times decline with increasing proportion of public activity (e.g., a 1% increase in the public patient proportion is associated with a 46-day reduction in median waiting time)
Australia (60)	National (1997)	Various	To reduce demand in the publicly funded health care system	• The Australian government implemented a program to provide subsidies to encourage more citizens to purchase private insurance and seek care in the private healthcare system • Several policies have been included in the "1997 and 1998 private Health Insurers incentive schemes" and in 2000 "the lifetime health cover", which introduced tax rebates	*Grey literature:* • The percentage of population covered by private health increased sharply from 30.5% in 1999 to 44.1% in 2002 • The effects of these incentives still are unknown.
Australia (42)	National (Not reported)	Various	To reduce wait times	• Parallel private healthcare system	*Grey literature:* • A 2005 study in Australia found that when more care was provided in the private sector, waiting times for public hospital patients were longer.
Australia, Queensland (224)	State (Not reported)	Various	Not reported	• Private health insurance implemented in Australia allows patients to be treated as a private patient in a public or private hospital • Hospital cover pays for some or all of the costs of hospital treatment as a private patient, including doctors' fees and hospital accommodation • This applies when patient is a private patient in a public or private hospital (or a day hospital facility) • If patients would like to see a particular specialist or go to a hospital of their choice, they will need to do this as a private patient • If patients ask their GP to refer them to a private specialist, they are responsible for paying all costs incurred (out-of-pocket or through private health insurance) • If the private specialist recommends surgery, but a patient is unable to do this as a private patient, they are referred to the public outpatient wait list to see a medical specialist for an opinion • Patients will not be added to the elective surgery wait list until they are assessed by a public medical specialist and it is decided they will benefit from surgery	Not reported
Canada, Québec (225-228)	Province (2006)	Various	To reduce wait times for cataract surgery and hip/knee replacements	• Legislative change in 2006 expanded private healthcare delivery and allows Quebeckers to purchase duplicate private insurance for a limited number of medical and surgical treatments, such as hip or knee replacement, and cataract extractions	*Grey literature:* • In practice, however, no real market for this type of insurance has developed, as the number of eligible surgeries remains too small for new insurance products of interest to individuals and employers to emerge • Maintaining the ban on mixed medical practice has also hindered the emergence of such an insurance market • Province-wide data shows the new regulations have had no impact on wait times for those surgeries**(228)**
Israel (interview)	National (Not reported)	Various	Not reported	• Parallel private healthcare system	Not reported

Netherlands (42)	National (Not reported)	Various	To reduce wait times	• Parallel private healthcare system • Patients using separate private hospital systems are not allowed to access the public system	*Grey literature:* • Their wait times are shorter compared to England and New Zealand in the 2004 study

Table 23 Prioritization of patients

Jurisdiction	Healthcare setting (year implemented)	Example	Description	Development	Validation of criteria or process	Impact
Australia (33,106, 111,214,229-232) (interview)	National (Not reported) **(230)**	Urgency categories	• In Australia, patients receiving elective surgery are classified into one of three clinical urgency categories, taking into account the likelihood of deterioration **(230)** • The categories are aligned with recommended waiting times for surgery and are as follows: - Category 1 (urgent): appointments clinically indicated within 30 days - Category 2 (semi-urgent): appointments clinically indicated within 90 days - Category (non-urgent): appointments clinically indicated in > 90 days • Within their urgency categories, patients are treated in-turn (i.e. routine patients are treated fairly in waiting time order within their urgency category) • There are a number of specific circumstances where a patient will be exempt from treatment in turn: the patient's condition has deteriorated; the health service has previously postponed the patient's surgery (the health service should reschedule the patient's surgery as soon as possible); issues with resource availability; sound clinical reasons; teaching and training needs • In 2012, it was proposed that the potential for a patient's condition to deteriorate should be removed, and an addition of a timeframe of 365 days should be added to category	Not reported	Not reported	*Peer-reviewed literature:* • Previous definitions of urgency categories were criticized as being an informal and insensitive; they didn't assure transparency, equity of access, and didn't consider factors that could contribute to a patient's urgency for surgery **(230)** • "Likelihood of deterioration" was not well defined **(230)** • Data and performance measures based on clinical urgency categories are not comparable or consistent between jurisdictions due to considerable variation in urgency categorization *Interview:* • The treat-in-turn approach puts the spotlight on a waiting list, smooths out bumps, and is more efficient
	State (Victoria, 2009) **(229,230)**					*Peer-reviewed literature:* • The classification of patients into broad urgency categories for elective surgery wait-lists was largely subjective and clinicians varied in the assessment of clinical and non-clinical symptoms in assigning the category • The recommended waiting times were not evidence-based; however, they are broadly used as a measure of access and demand *Grey literature:* • Treating the majority of patients in Victoria in turn from a pooled list improved patient flow, led to decreased variation and an overall reduction in the average wait time
	State (Tasmania, 2009) **(111,214)**					• There were a high number of over boundary patients due to inappropriate urgency categorization of patients for elective surgery; 43% of patients on the list waited beyond the clinically recommended timeframe • Compared with other states and territories, there was a significant, long-standing trend in Tasmania towards higher categorizations of patients, meaning that a larger (and unsustainable) proportion of capacity was spent on treating highly categorized patients within short timeframes • This trend was a distortion of the actual clinical urgency of some patients, who

Table 23 Prioritization of patients

Jurisdiction	Healthcare setting (year implemented)	Example	Description	Development	Validation of criteria or process	Impact
						could safely have waited longer and should have been categorized as less urgent • There was substantial variation in the timeframes within a given patient category; for example, 36% of Category 3 patients are being admitted within 90 days, which is the recommended timeframe for Category 2 patients • Meanwhile, only 53% of Category 2 patients were being admitted within 90 days; a full 16% of Category 3 patients are admitted within 30 days, while 27% of Category 3 patients wait more than a year
	State (Queensland, Not reported)					Not reported
	State (Western Australia, Not reported) **(232)**					Not reported
	State (South Australia, Not reported) **(33,106,231)**					Not reported
Australia, Victoria (218)	Regional (2006 stage; 2008 fully operational)	Multi-attribute Prioritization Tool (MAPT)	• Triage based on potential need for surgery facilitated by the Multi-attribute Prioritization Tool (MAPT) that generates a score ranging from 100 (maximum need for surgery) to 0 (no need for surgery) • Specifically designed to facilitate triage and prioritization and consists of eleven patient or clinician-completed items covering five areas; pain, limitations to daily activities, psychosocial health effects, economic effects and recent deterioration • Highly standardized patient and clinician-friendly prioritization tool widely applied in Australia	• Developed at the Centre for Rheumatic Diseases, Royal Melbourne Hospital and The University of Melbourne	Not reported	*Peer-reviewed literature:** • Reduced waiting times for surgery from 18 to 8 months, increased throughput of arthroplasty surgery from 396 procedures in 2005–6 to 548 procedures in 2009–10 *Note: impact based on implementation alongside other approaches
Australia, Victoria (218,230)	State (2006)	Multi-attribute Prioritization Tool (MAPT)	• In Victoria, selection is based on clinical priority, but other factors should also be taken into account such as length of time already waited, previous postponements to surgery and resource availability • Research focused on prioritization tools for joint replacement and prostatectomy • The MAPT contained 11 clinical and psychosocial domains and has been built into the Victorian OA Hip and Knee Service	• The Orthopedic Waiting List Project developed MAPT through a process involving concept mapping, review and validation with orthopedic surgeons and patients	Not reported	Not reported
Canada (137,233-235) (interview)	National (2008)	Pediatric Canadian Access Targets for Surgery (P-CATS)	• A priority classification scheme based on the Saskatchewan Surgical Care Network's system • Composed of a 7-level priority classification scheme (Priority I, within 24 hours to Priority VI, within 12 months) • Standardization across surgical subspecialties and hospitals allows for national and hospital-	• Developed in 2008 by over 100 pediatric surgeons from across Canada representing all surgical specialties • Part of the Canadian Pediatric Surgical Wait Time Project	Not reported (Not reported)	*Grey literature:** • By June 2012, 32% decrease in number of children waiting; 24% increase in number of children completed. By July 2012, 47% decrease in number of days waiting for surgery

Table 23 Prioritization of patients

Jurisdiction	Healthcare setting (year implemented)	Example	Description	Development	Validation of criteria or process	Impact
			specific analyses, comparisons and benchmarking since each patient with a given diagnosis has the same priority level • Allows for information sharing and alignment of surgical wait times with capacity • Patients appear on waitlist report in "near real-time" –P-CATS diagnosis & code –Ready-to-Treat date (RTT, T7) –Decision-to-Treat date (DTT, T6) • Allows for queue-based scheduling – 'right patient at the right time' • Resource limitations are more easily identified, confirmed and quantified; can identify, implement and evaluate solutions • Updated in 2016 (enhancements implemented at sites across Canada and in the CIHI database in support of better pediatric data)	(CPSWTP, 2007-2011), funded by Health Canada		• Better benchmarking and operative best practices locally, provincially and across Canada • Hospitals were using the data to determine, every quarter, how to redistribute OR time to minimize wait times for their patients • Data collected using P-CATS was recognized as the nationally accepted, standardized methodology for measuring and comparing wait times across the country *Note: impact based on implementation alongside other approaches
Canada, Alberta (21,127,236,237) (interview)	Provincial (2012)	Alberta Coding Access Targets for Surgery (ACATS)	• A system to manage, measure, monitor and report wait times for adult surgical patients • Part of the Path to Care continuum • Measures service wait time (Decision to Treat (T6), Ready to Treat (socially, functionally, medically (T7)), date surgery is booked (T8) and date surgery is initiated/performed (T9)) • Provides a consistent approach to prioritize patients based on diagnosis and level of urgency • Ready to Treat serves as the foundation for the entire aCATS data system; produces the most accurate and appropriate surgical wait lists • Lists suggested wait times by service, category (subcategory), code and diagnosis description • The defined ideal times to surgery are based on clinical indicators according to disease process and physiological state; they are founded by evidence and validated with consensus across the province • Since 2017, codes updated every 2 years (was annually previously) • Wait times for specific procedures can also be modified (e.g. in June 2011 wait times were changed to the date the patient is ready for urgent CABG surgery (T7); standardization ensures accurate reporting and consistency of data. Only scheduled CABG surgeries are included in this measure)	Not reported	Not reported	*Grey literature:** • As a result of the ACATS pilot project, the wait time for cataract surgery was 29 weeks in 2012/13, down from 37.3 weeks at the same time in 2011/12, a 22% improvement • An evaluation from 2015/16 reported that respondents see the value in standardizing waitlists in their own surgical services and standardizing waitlist information across Alberta; improves waitlist management, helps monitor patient wait times and prioritize OR bookings • ACATS assisted patients to understand surgical wait time; surgeons deliver the right treatment to the right patient at the right time; and the health system supports the highest quality, patient-centered care *Note: impact based on implementation alongside other approaches
Canada, British Columbia (43,139,238,239)	Provincial (2010; updated in 2015)	Patient Prioritization Codes	• Standardized approach to prioritizing adult patients waiting for elective surgery • Standard provincial procedure list and standard diagnosis-based prioritization list; implemented in 2010, updated codes/wait time targets were implemented in 2015	Not reported	Not reported	*Grey literature:* • Patients were assessed with a higher degree of consistency and standardization (similar conditions got treated similarly, irrespective of geographic location) • In 2018, Island Health was testing a new method for assigning OR time based

Table 23 Prioritization of patients

Jurisdiction	Healthcare setting (year implemented)	Example	Description	Development	Validation of criteria or process	Impact
			• Surgeons use their assessment of the patient to select a diagnosis/clinical condition from a standard list of descriptions • Each diagnosis/clinical condition has a code assigned to it along with a priority level and associated wait time benchmark/target (Priority Level 1, within 2 weeks, up to Priority Level 5, within 26 weeks) • Patients are treated on a first-come, first-served basis within their categories			on national and provincial benchmarks, and standardized urgency criteria (with this model, a surgeon in high demand may have more OR time) • Also, people with urgent surgical needs received priority • This approach increased consistency and fairness for all and ensured OR time is used with maximum effectiveness
	Hospital (Not reported)		• Orthopedic codes are structured differently, but still include a priority level and wait time benchmark/target • Patient prioritization codes are used by surgeons to help manage their waitlists and to book patients in turn within their respective priority categories • Province-wide standard definitions for patient procedures allow health authorities to compare surgical access and resource utilization • Comparing current patient waiting times to benchmarks helps to understand capacity needs across the province. Accurate, audited surgical information, including priority levels, is intended to help ensure that waitlists are being managed fairly and in a transparent way • Better waitlist management and more accurate information on patient urgency and priority will improve the timeliness and equity of patients' access to surgery			*Grey literature:** • Surgical waiting times at two major Vancouver hospitals were cut by 21% over a year (2012-13) • The number of patients waiting for surgery for >1 year dropped by 69% • More than 300 patients were waiting for surgery for more than a year, but that's down from almost 1,300 on March 31, 2012 • As of Dec. 2018: scheduled surgeries waiting > 26 weeks was 31.4% vs the target of ≤ 10% and scheduled surgeries completed within 26 weeks was 86.4% vs the target of ≥ 95% (Report Card) *Note: impact based on implementation alongside other approaches
Canada, Manitoba (240)	Provincial, except cases in Brandon (1998)	Manitoba Cataract Waiting List Program (MCWLP)	• Program uses a centralized database to track and prioritize all patients waiting for cataract surgery • The 14-item Visual Functioning Index (VF-14), a questionnaire based on common patient symptoms and their severity, was selected to measure the severity of functional impairment • After the decision for surgery is made, surgeons send their booking request form to the hospital where it is entered into the computer program. The program tracks all patients who have been booked to undergo surgery and also records all completed cataract procedures and cancelled bookings. In return, the surgeons receive a monthly report listing their patients in order of priority (based on the scoring system) • Surgeons then use this information to indicate which patients they will operate on and in what order	• Created by the Misericordia Health Centre and Manitoba Health after all adult ophthalmologic surgical services were consolidated at the centre in 1993 • All members of the ophthalmology department were involved in planning the scoring system • All agreed that scores should be heavily weighted by the degree of functional impairment related to the cataract • There was also agreement to include social factors (i.e. ability to work, loss of one's driver's license)	Not reported	*Peer-reviewed literature:** • Provided an objective and reliable measure of the length of the wait, and patients on the waiting list are treated in a more equitable fashion through application of a uniform method of prioritization • Brought to light previously undocumented issues, such as the simultaneous booking of both eyes for cataract surgery and variations in waiting time between surgeons • Mean length of time waiting for surgery fell from 34.7 weeks (January 1999, after the backlog had been cleared) to 28.9 weeks (November 1999) • The scoring system has been criticized for overemphasizing driving, not giving extra credit for people who have dependants for whom they are the sole caregiver, and giving too many points for time waiting *Note: impact based on implementation alongside other approaches

Table 23 Prioritization of patients

Jurisdiction	Healthcare setting (year implemented)	Example	Description	Development	Validation of criteria or process	Impact
Canada, New Brunswick (interview)	Provincial (Not reported)	Prioritization of patients in the provincial Surgical Access Registry	• Prioritization tools are standardized, aiming to ensure that surgery goes to the highest priority patients who have waited the longest	Not reported	Not reported	Not reported
Canada, Quebec (241) (interview)	Provincial (1999)	Computerized Service Access Management System (SGAS)	• In response to the issue of waiting list management, policymakers in Quebec decided to implement a computerized service access management system (SGAS) • The system has two principal functions: based on clinical data provided, it weighs cases and risk factors and, using this evaluation, ranks patients on a prioritized list • First implemented in the discipline of tertiary cardiology; also implemented in radio-oncology • The codes of best clinical practices are approved for the entire province of Quebec, facilitating uniform treatment throughout the province regardless of where treatment takes place • The SGAS system allows for greater transparency and equity in the management of priority of access to treatment • It also puts hospitals in better position to manage the flow of patients because system makes it possible to compile relevant statistics and asses their capacity to the demand for services	• Proposed in August 1998 by the Support Group for Access to Specialized Surgical and Medical Care	• The ranking of the weight and urgency of cases was based on criteria developed by a consensus of experts who had determined the clinically acceptable wait time for treatment of each pathology.	*Grey literature:** • The SGAS project suffered from a lack of leadership, of continuity, and of funding • The work was largely performed behind closed doors and it became apparent that there was strong resistance to change • Despite original ambitions to have it act as a province-wide managing system for all waiting lists, its sphere of operation was restricted to individual hospital institutions *Note: impact based on implementation alongside other approaches
Canada, Saskatchewan (interview)	Provincial (2010)	Saskatchewan Surgical Initiative priority setting tools	• At the beginning of the Saskatchewan Surgical Initiative, every specialty had a different scoring tool for the surgeons to prioritize their patients	Not reported	Not reported	*Interview:* • Once surgeons cleared their backlogs and didn't have demand that would require they go over the 3 month wait, the priority scoring tools became an "exercise in futility" • The tools for each specialty have been retired but the wait time targets are still in use
Western Canada (230,242,243)	Western Canada (Alberta, BC, Saskatchewan, Manitoba)	Western Canada Waiting List Project (WCWLP) General Surgery Priority Form	• WCWLP was established in 1998 to address problems in waiting list management by developing, testing, and refining clinical measures for assessing and comparing relative urgency of patients on waiting lists • It was federally funded partnership of 19 organizations, including medical associations, health authorities, ministries of health and research organizations • The original General Surgery Priority Form was developed in 1999 and refined in 2000 • Criteria on the form include: usual frequency of painful episodes/suffering, how bad pain is at its worst, usual intensity of other forms of suffering, degree of impairment in usual activities due to surgical condition, and recent	• Clinical panels consisting of specialists, family physicians and other relevant health care providers were constituted to address each of 5 areas: cataract surgery; general surgery; hip and knee replacement; magnetic resonance imaging; and children's mental health services	• General surgeons from the western provinces accepted and endorsed the ability of clinical priority criteria to reflect global expert judgments of urgency • Interrater and test-retest reliability of criteria items appeared good, based on clinicians' ratings of 6 videotaped, standardized patient interviews • The panel considered the criteria easy to use and reasonably reflective of expert surgical judgement regarding clinical urgency	Not reported

Table 23 Prioritization of patients

Jurisdiction	Healthcare setting (year implemented)	Example	Description	Development	Validation of criteria or process	Impact
			history of major complications or additional significant physical examination or test results			
Western Canada (230,242)	Western Canada (Alberta, BC, Saskatchewan, Manitoba)	WCWLP Hip & Knee Referral Tool	• As part of the WCWLP, a Primary Care Project was established to develop a valid, reliable, standardized prioritization tool for use by primary care providers in making referrals to specialists for hip & knee pain, based on a standardized assessment of urgency •An 8-item priority-setting tool was developed to assist in queuing patients for referral in order of urgency for hip & knee pain • Priority criteria includes: pain on motion; pain at rest; ability to walk without significant pain; other functional limitations; abnormal findings on physical exam related to most severely affected joint; highest level of walking supports that patient currently uses to carry out usual activities; highest level of medication to manage affected joint; threat to patient role and independence in society	• The tool was created by a panel comprised of 9 family doctors and one nurse practitioner from the four western Canadian provinces, representing both rural and urban practice settings, and academic and non-academic partners • Development of the referral tool relied on scoring of simulated paper cases; the tool was not applied to real patients and the pool of patient cases used to develop the weights and conduct the reliability testing was small and cannot be considered as generalizable • Input and feedback was also obtained from orthopedic surgeons	• The Hip & Knee Referral Tool had excellent inter-and intra-rater reliability; a panel of primary care providers believed it had face validity	*Peer-reviewed literature:** • The WCWLP hip and knee replacement prioritization tool was implemented as part of a care pathway for arthroplasty patients in Alberta following a successful year-long pilot program in 2005-2006 comprising 1200 patients in which waiting times were reduced by 85% *Note: impact based on implementation alongside other approaches
Ireland (244)	Pilot (Not reported)	Need-based waiting list	• Approach aimed at reorganizing the waiting lists so that clinical need, rather than time waited would determine priority in order to provide a fairer, more efficient and more transparent waiting list system • Traditionally 'first come, first served' • Patients designated as urgent by their consultant may have their surgery performed sooner, but no objective criteria are defined for this designation • The Harris Hip Score and the American Knee Society Score are used as the scoring instruments for hip and knee joints, respectively • Each allocates points based on symptoms, disability and physical findings to yield a score ranging from 0 (severe disability) to 100 (normal) • Patients are invited to attend a dedicated assessment clinic; are assessed and ranked in the waiting lists in order of joint score • Patients with the lowest scores are moved to the top of the waiting lists • Patients on the waiting list are reassessed every six months (validation)	Not reported	Not reported	*Peer-reviewed literature:* • Results based on 240 patients on the hip arthroplasty waiting list and 98 patients on the knee arthroplasty waiting list: • 48 (20%) of patients on the hip arthroplasty waiting list were removed • 12 (12%) of patients on the knee arthroplasty waiting list were removed • Within 6 weeks all patients had been assessed • Some patients had died, some had their surgery elsewhere and others no longer needed surgery • The need-based waiting lists for total hip and total knee arthroplasty achieved the desired results of increasing efficiency, transparency and demonstrable service quality
New Zealand (60,230,245-249)	National (1998)	Clinical Priority Assessment Criteria (CPAC) Integrated Scoring Systems (ISS)	• The Core Services Committee commissioned a report in 1993 recommending that waiting lists be replaced by booking systems and that criteria for accessing elective care be developed based on need and ability to benefit**(247)**	• The Committee commissioned a number of national working groups to develop tools for assessing need, ability to benefit and likely outcomes from care, to support a more explicit	Not reported	*Peer-reviewed literature:* • After the introduction of this policy, the number of patients waiting longer than 6 and 24 months decreased, respectively, from 35,500 and 14,200 in the first

Table 23 Prioritization of patients

Jurisdiction	Healthcare setting (year implemented)	Example	Description	Development	Validation of criteria or process	Impact
			• The 'booking system' would prioritize and ration access to surgery from time of referral by GPs to provision (or denial) of surgery **(246)** • System aimed to provide certainty about timing of treatment, ensure those with the greatest need and potential to benefit were treated first and provide nationally consistent access to surgery • Additional funding was provided to clear the backlog of patients waiting for care and to facilitate introduction of the system where CPAC and booking systems were in place, where audits for waiting lists were completed and where financially sustainable thresholds were established to determine access**(247)** • CPAC tools used a range of clinical and other social factors in a numerical assessment of patient urgency • 0 (lowest priority) to 100 points (greatest priority) **(246)** • If patients' level of need, determined by their CPAC score, meets the threshold for publicly funded treatment, they are booked for surgery within 6 months • CPAC score thresholds permit rationing of access; hospitals negotiated a CPAC threshold (financial threshold) according to historical and anticipated surgical throughput, case-complexity and the money available for purchasing surgical procedures**(246)** • If the score falls below the threshold, patients are referred back to their GP or are placed under active review that requires monitoring and reassessment of priority every 6 months • In 1998, patients above the clinical threshold but beneath the financial threshold were placed on residual waiting lists (RWLs) **(246)** • In 2001, a new system was introduced for patients prioritized for surgery: given a booked date to receive surgery within 6 months of their outpatient appointment; given certainty that they will be treated within 6 months; placed on an active care and review (AC&R) list (for 6-monthly review by the hospital) if they have priority scores beneath the financial threshold or have to meet some other requirement; provided with planned or staged treatment; returned to the care of their GP or removed from the hospital records**(246)** • Integrated Scoring Systems introduced for orthopedics, ENT, plastics and some ophthalmology; 1-5 point linear scale of clinically judged priority of need in conjunction with score ranges for different surgical	approach; conditions were initially cataract surgery, coronary bypass surgery and angioplasty, hip and knee joint replacements and prostate surgery **(247)** • Work continued over the next few years on the development of priority assessment criteria **(247)**		quarter of 1999/2000 to 16,900 and 3400 in the first quarter of 2001/2002**(60)** • People could see where the system was unfair (where thresholds were higher in some localities than others) **(247)** • People were denied access to surgery despite having an identified need because financial thresholds were situated well above clinical thresholds; patients with scores beneath the clinical threshold became invisible to the 'booking system.' **(246)** • The ISS and the earlier 'booking system' were implemented without prior evaluation of their effect on patients**(246)** • There was a lack of scoring tool validation before implementation, there was inconsistency between scoring tools and a lack of CPAC score correlation with measures of patient need • Clinicians believed the tools didn't effectively and consistently prioritize patients; the need to work toward achieving this aim was acknowledged • The surgical prioritization tools have not provided a transparent or equitable method of prioritizing patients; much of the rationing was still implicit as there was still a reliance on the discretion of clinicians to weight subjective criteria and gaming of scores still occurred**(247)** • It was imperative that priority criteria and access thresholds were developed in a nationally consistent manner; it needed to be made clear what the intention of any 'booking system' was; rigorous piloting of priority criteria and systems for booking patients was fundamental. The performance of 'booking systems' and waiting lists was likely to be comparable.**(248)** • When the CPAC scoring system was introduced in 1996, the Ministry set the threshold for access at 35/100 points based on the average cost of an operation and the available funding; >50% of patients waiting for CABG surgery in 1996 were removed from the waiting list. Cardiologists advised that a clinically acceptable threshold was 25 points. **(249)** • Some patients with low CPAC scores were assigned an 'emergency' category while others with much higher CPAC

Table 23 Prioritization of patients

Jurisdiction	Healthcare setting (year implemented)	Example	Description	Development	Validation of criteria or process	Impact
			procedures. New system intended to remove RWLs **(246)** • In Auckland, the CPAC scoring system is used to regulate access onto the CABG surgery waiting list; it is not used to prioritize the urgency of surgery for patients on the list; prioritization is the domain of cardiologists and surgeons **(249)** • Clinical priority categories are E (emergency patients requiring in hospital surgery), H (urgent waiting at home), O (semi-urgent out of hospital) and A (active review) • The cardiac team at another District Health Board uses a national tool designed to determine a patient's urgency. This ensures that priority patients can access surgery sooner. The clinical nurse specialist and the surgeon look at a patient's needs and work together to determine the optimum time for surgery. (Targeting waiting times, NZMoH)			scores were sent home to wait; the majority of patients in the Auckland region were assigned an 'emergency' priority and were not subject to long waiting times**(249)**
Norway (133,250,251)	National (2001)	Norway Priority Regulations	• Patient prioritization is regulated through the Act on Patient Rights and administrative regulation of prioritization **(251)** • The Act was implemented in 2001 and covered a broad range of rights including: free choice of hospital, the right to evaluation within 30 days and the right to receive necessary care within individually set time limits • Patients referred to the specialist health care sector are categorized as follows: 1) Acute care; 2) Elective treatment, with individual maximum waiting time (elective with); 3) Elective treatment, without individual maximum waiting time (elective without); 4) other health care services that may be demanded • For elective patients, priority regulations establish that upon referral the assessment of a patient's condition must consider: 1) How serious the condition is; 2) Whether a suitable treatment exists that may improve the patient's condition; 3) The cost-effectiveness of this treatment • Starting in Sept. 2004**(251)**, within 30 days of referral, the hospital has to consider whether the patient belongs to group 2 (elective with) or 3 (elective without) or whether s/he should not receive treatment at all • Each patient is to be considered according to the Priority Regulations	Not reported	Not reported	• Comparing the pre-reform period 1999-2001 and the post-reform period 2002-2005 for the 5 health regions both average waiting times and the proportion of excessive waiting were reduced; however, there were relatively large differences across health regions in the reported measures indicating that the hospital reform did not lead to more equal prioritization practice • The results indicated that low prioritized patients had better access than high priority patients; low priority patients obtained improved access in the post-reform period • For example, for high priority patients with a maximum acceptable wait of 28 days, average waiting times pre-reform were 74.53 (±126.22) and post-reform were 74.21 (±124.76); for patients with a maximum acceptable wait of 182 days, average waiting times pre-reform were 182.93 (±155.34) and post-reform were 156.61 (±138.32) • Other factors were likely to affect waiting times between prioritization groups *Note: impact based on implementation alongside other approaches
Norway (132)	National (2007)	Faster Return to Work (FRW) Scheme	• The FRW scheme follows the logic that long waiting times for hospital treatment lead to unnecessarily long periods of absence from work	Not reported	Not reported	• Surgical patients receiving treatment on the FRW waiting list had waiting times that were 14 days shorter than surgical patients in the regular system (time from GP referral to consultation/treatment)

Table 23 Prioritization of patients

Jurisdiction	Healthcare setting (year implemented)	Example	Description	Development	Validation of criteria or process	Impact
			• The scheme is intended to reduce the length of the sick leave period (i.e. to promote faster return to work via shorter waiting periods for treatment) • The allocation of FRW funds and new treatment capacity is exclusively aimed at people on sick leave • Patients on sick leave are given priority over patients on the regular waiting list			• Average length of the sickness absence was almost the same for FRW patients (238.7 days) and regular patients (234.8 days) • The scheme costed more than it contributed in reduced productivity loss
Spain (252)	Clinic (Not reported)	Gastrointestinal quality of life index (GIQLI)	• Use of the GIQLI as a system to prioritize patients on the waiting list for laparoscopic cholecystectomy (LC) and its correlation with a linear prioritization system that included clinical and ultrasound data • The ideal prioritization system should include clinical or objective factors as well as social factors, such as: (1) need, expected benefit or utility expressed by the patient; (2) effectiveness; (3) maximum possible benefit; (4) clinical utility from the physician's standpoint; (5) social, family and work situation of the patient; and (6) order of inclusion • This entails a multidimensional system that requires considering the health related quality of life and expected utility	Not reported	Not reported	*Peer-reviewed literature:* • A prioritization system based on GIQLI scores allowed patients to be selected according to the expected utility (worsening of HRQoL) and obtained utility (improvement in HRQoL) of LC • There was a lack of correlation between the GIQLI and an objective linear scoring system which indicated that a system of prioritization should include both measurements
Spain(61)	National (1997)	Clinical prioritization	• In 1997, initiatives to control demand are implemented as part of the Surgical Wait List Reduction Programme • In order to control the demand for surgical services, central authorities in collaboration with medical experts and scientific societies formulate recommendations for surgical indications and clinical prioritization of cases	Not reported	Not reported	*Grey literature** • By December 1997, patients over 9 months on the list were reduced from 19 052 to 876 • The mean waiting time decreased from 135 days to 98 days • The number of patients registered on the list decreased from 165 735 in December 1996 to 148 247 by December 1997 *Note: impact based on implementation alongside other approaches
Sweden (253)	Regional (2005)	Nationell Indikationsmodell Kataractextraktion (NIKE)	• Tool for prioritizing patients for cataract surgery using patient-reported disabilities in addition to visual acuity • The components of NIKE are: visual acuity in each eye, patient perceived difficulty in performing activities of daily living, cataract symptoms, ability to live independently and medical⁄ ophthalmic reasons for surgery • Scores are allocated depending on responses for each component and from this total score an indication group is derived • Patients are categorized into four groups depending on the tool score: from NIKE 1 (greatest need for surgery) to NIKE 4 (least need for surgery)	• Development of NIKE consisted of teams from various eye clinics in Sweden, including surgeons, nurses, opticians and managerial and support staff, reaching consensus for items to include in NIKE • After testing, the tool was further refined before final validation	Not reported	*Peer-reviewed literature:** • 69.9% of patients in the NIKE 1 group waited <3 months for surgery in 2009; 79.4% of patients in the NIKE 1 group waited <3 months for surgery in 2011 • Patients in 2010 were 1.3 times more likely, and patients in 2011 twice as likely to have their cataract surgery within the 3-month maximum guarantee period compared to 2009 • There were substantial reductions in the proportion of patients waiting more than 3 to 6 months and more than 6 months for surgery (e.g. 10.0% of patients in the NIKE 1 group waited >6 months for

Table 23 Prioritization of patients

Jurisdiction	Healthcare setting (year implemented)	Example	Description	Development	Validation of criteria or process	Impact
						surgery in 2009; 2.7% of patients in the NIKE 1 group waited >6 months for surgery in 2011) • The decrease in waiting time reported could also be due to other approaches in place such as the maximum wait time guarantee and overall increase in surgical capacity *Note: impact based on implementation alongside other approaches
United Kingdom, England (254)	Pilot (Not reported)	Salisbury Priority Scoring System (SPSS)	• A clinician-driven tool for use in any clinical specialty • Surgeons assign relative priority to patients at the time they are placed on a waiting list for surgery • Patients are assigned points according to clinical and social criteria in order to reflect their 'need' for treatment • Patients placed on the waiting list if their condition is potentially remediable through treatment • The five agreed clinical and social criteria of need are: rate of progress of disease; pain or distress; disability or dependence on others; loss of usual occupation; and time already waited • For four of the five criteria (excluding time waited), the hospital specialist assigns a score of 0-4 points for each patient • The score for time already waited depends on the number of days waited by the patient and the maximum number of days waited by any patient on that list • Greater weight is given to progress of disease, equal weight to pain and distress, disability and dependence on others, and less weight to loss of usual occupation and time already waited on the list • Priority scoring systems make the management of waiting lists transparent, priority criteria are explicit and should lead to patients being treated in order of clinical priority, rather than according to arbitrary maximum waiting time guarantees • They also make it possible to set minimum thresholds of clinical need for referral onto waiting list • A potential limitation of the acceptability of priority scoring systems to NHS patients would be that admission dates could no longer be given far in advance • Waiting lists would need to be updated weekly and would be constantly re-ordered, with high scores moving to the front of the queue	• SPSS is based on a Delphi consultation exercise between specialists and GPs in the Salisbury area		*Peer-reviewed literature:* • In a pilot in Salisbury Health Care NHS Trust, 20 patients on a 'first come, first served' orthopedic waiting list were compared to 20 patients on the SSPS (in the UK patients are largely admitted on a 'first come, first served' basis according to 'urgent' 'soon', and 'routine' categories); only 7 patients appeared in the first 20 patients to be treated under both schemes

Table 23 Prioritization of patients

Jurisdiction	Healthcare setting (year implemented)	Example	Description	Development	Validation of criteria or process	Impact
			• This would mean that only short notice of admission dates might be practical, causing difficulties for patients in gaining time off work for treatment or for those who had booked holidays in advance • One of the most serious issues limiting the potential benefits of priority scoring systems is the potential for 'gaming' by GPs or hospital specialists, patients and their families. Priority scoring systems would cease to discriminate constructively between high and low priority cases if sympathetic or harassed GPs or hospital specialists, or patients wise to the system exaggerated the case for priority.			
Multiple (60)	OECD Countries (Not reported)	Prioritization policies (General)	• The purpose of prioritization guidelines is to identify equitable criteria according to which patients should wait • There are different criteria, most of them clinical, which may be used to prioritize patients: severity of condition, expected benefit, need, urgency, decay rate of disease, the time already spent on the list • Tools developed may be more or less formalized • Less formalized systems use 2- to 3-level classification systems e.g. Spain (high-priority and low-priority), Sweden (very urgent, urgent and non-urgent), in Australia and Italy (admission within 30 days, 90 days and 12 months) • More formalized approaches include priority scoring systems, which assign a score to the need of each patient (e.g. New Zealand) and in Canada through the Cardiac Care Network of Ontario, the Manitoba Cataract Waiting List Project and the Western Canada Waiting List Project (WCWLP)	Not reported	Not reported	*Peer-reviewed literature:* The WCWL Project found that prioritization tools could be reliably introduced for general surgery, hip and knee procedures

Table 24 Regular validation of wait lists

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Wait list validated	Description	Impact
Australia, New South Wales (255,256)	State (2004)	Various	To ensure patients are properly categorized and non-appropriate surgery is removed	Surgical	• Wait list was implemented as a component of the Predictable Surgery Plan in New South Wales • No other information was provided	*Grey literature:** • Number of patients waiting more than 12 months from when added to the waiting list to surgery reduced from 9,540 in 2004 to 49 in 2006 • Number of urgent patients waiting more than 30 days from when added to the waiting list to surgery decreased from 3,916 in 2004 to 824 in 2006 *Note: impact based on implementation alongside other approaches
Australia, Victoria (73)	Regional (2008)	Urology	To update data and to identify those patients who were truly ready for care	Surgical	• The validation was undertaken on the urology waiting list in Victoria by telephone or written questionnaire • Patients who remained in the waiting list underwent a formal outpatient clinical review • Process was implemented and managed by a clinical liaison nurse • Other approaches were also implemented with validation including: direct lines of communication between clinical and administrative staff; urgent caseload management; utilisation of the Elective Surgery Access Scheme; financial and resource analysis justifying the appointment of a full-time urologist, and the establishment of a urology service from a satellite campus; implementation of a recall database; development of an outpatient service; and commencement of a day surgery initiative	*Peer-reviewed literature:** • One observational study (n=579) described the outcomes after introduction of the approach • Within 4 months, 74 out of 579 (12.8%) patients were removed from the waiting list • Reasons were: condition had resolved, treatment performed elsewhere, or death • The number of patients 'ready for care' reduced by 67%, from 579 to 190 (a 67% reduction) • The number of patients over the recommended timeframe reduced by 78%, from 390 to 85 • Mean time from admission to waiting list to surgery for semi-urgent and non-urgent patients reduced from 248 days to 180 days in the 10 months period • However, the mean time still exceeded the recommended timeframe *Note: impact based on implementation alongside other approaches
Australia, Tasmania (257)	State (Not reported)	Various	Not reported	Surgical	• Validation was implemented along with active management and co-ordination of waiting list across Tasmania • No other information is provided	*Grey literature:** • A progress report found that validation, along with other wait list management approaches managed to reduce waiting lists for elective surgery • From March 2010 to March 2012, all patients received surgery within 48 days from admission to waiting list to surgery • However, the report also stated that this trend is likely to be difficult to maintain due to increase in service demand and lack of resources *Note: impact based on implementation alongside other approaches
Canada, Alberta (interview)	Provincial (Not reported or Not reported)	Various	Not reported	Surgical	• AHS Policy 1151was established to provide guidance around ongoing wait list maintenance, management and scheduling, with advice on when to remove patients from the wait list (e.g. after refusing 3 surgery dates for non-medical reasons) • In the past, surgeons were reluctant to remove patients from their wait lists for liability reasons but it has been noted that there needs to be some patient accountability, as this does have a significant impact on surgical wait times (i.e. patient	Not reported

Table 24 Regular validation of wait lists

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Wait list validated	Description	Impact
					unavailability or voluntary waits) and OR utilization rates (i.e. patient no-shows)	
Canada, Alberta (interview)	Hospital (2007)	Various	Not reported	Surgical	• Prior to the implementation of the Canadian Pediatric Surgical Wait Times project, wait list maintenance was sporadic • Since implementation of the project, The Stollery has performed regular wait list maintenance for all specialty areas	*Interview:* • Wait list maintenance and proper scheduling contributed to meeting wait time targets
Canada, Alberta (127)	Provincial (Not reported)	Orthopedic	To ensure that the existing waitlists are accurate	Surgical	• No other information was found	Not reported
Ireland (244)	Regional (Not reported)	Orthopedic		Surgical	• The validation process was part of a study conducted on the implementation of a prioritization tool for joint replacement. • The team behind the project included: one staff nurse, one nurse specialist and one junior doctor • Patients on the waiting list were reassessed every six months • Patients were removed from the waiting list if surgery is no longer required • Patients moved up or down the list when their priority status changed	*Peer-reviewed literature:* • One study reported the findings of the validation process (the primary goal of this study was to use a joint score as a prioritization tool) • The study was on 338 patients on the waiting list for total hip replacement (n=240) and total knee replacement (n=98) • No results on waiting time were provided • Within 6 weeks, all patients on the waiting list had been reassessed: 60 (18%) of patients were removed from the waiting list, 48 (20%) of patients on the total hip replacement list were removed, and 12 (12%) of patients on the total knee replacement waiting list were removed • Reasons for removal of patients from the waiting list: death, no longer in need of surgery, and surgery performed elsewhere

Table 25 Subsidies for private health insurance or privately funded health insurance

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Australia (60)	National (1997)	Various	To encourage patients to choose private surgery over public	• After the percentage of population covered by Private Health Insurance fell from 50% to 30.5% between 1984 and 1998, the Australian Government began providing tax incentives for patients to buy private health insurance	*Peer reviewed literature:* • There was increase in the private health insurance coverage from 30.5% to 44.1% • There was an increase in the privately-funded share of activity • The private share of activity rose between 1999–2000 and 2000–2001 having fallen or remained stable in the period 1993–1994 to 1998–1999
Hong Kong (57)	Regional (2008)	Ophthalmology	To provide additional cataract surgeries to meet the growing service demand	• Government of Hong-Kong Special Administrative Region implemented a private-public partnership pilot program in which participating patients who choose to receive cataract surgeries performed by private ophthalmologists can receive a fixed amount of $5,000 subsidy • Patients may also need to co-pay an amount of not more than $8000 for the service package, which consists of one pre-operative assessment, the cataract surgery including intraocular lens, and two post-operative checks • Patients who have been on routine cataract surgery waiting lists for a specified period and are suitable for local anesthesia surgeries are invited to join the program, with priority to those who had waited longest on the waiting lists	*Grey literature:* • The program commenced in February 2008 and achieved the target of delivering 10,000 cataract surgeries in 2010/1 • In view of the positive response, additional funding has been approved since 2011/12 for the continuity of the program • Program has been largely supported by patients and private ophthalmologists (view were expressed in a survey by an independent market research agency)

Table 26 Ongoing monitoring, analysis, and reporting of wait time and other outcomes data

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Regular review of wait time data					
Australia, South Australia (106)	State (2010)	Various	To ensure that all patients receive elective surgical procedures within national clinical urgency timeframes	• As part of the National Elective Surgery Strategy, South Australia implemented an improved information management system in order to provide 'real time' waiting lists • The strategy also lead to extended OR hours, transferring patients between hospitals, prioritizing OR access for specialties with longer wait lists, and targeted funding	*Grey literature:** • The Elective Surgery Strategy proved successful in reducing waiting times for elective surgery, ensuring patients receive their treatment in the clinically recommended time, and reducing the number of long wait patients • 64,130 procedures undertaken in metropolitan hospitals in 2012-13, an increase of 5230 procedures (8.9%) compared with 2007-08 • 94.2% of patients admitted within clinically recommended times, compared with 80.2% in 2007-08 • No patients reported overdue for surgery at 30 June 2013, compared to 1441 patients at June 2007. • No patients waited > 12 months for their surgery as at 30 June 2013, compared with 841 patients at 30 June 2007 • 90% of patients admitted for elective surgery within 182 days, 4.7% better than the result from the previous year. South Australia has consistently performed better than the national average against this measure of performance • In 2011-12, 90% of patients admitted within 191 days, 24.2% lower than the national average of 251 days • Median waiting time for elective surgery in South Australia was 34 days in 2012-13, which is consistent with the previous year • National median waiting times have trended upwards since 2007-08 • In contrast, the South Australian median value has fallen from a high of 42 days in 2007-08, to a low of 34 days in 2012-13 (NB: There is no national data for 2012-13 at time of publication) *Note: impact based on implementation alongside other approaches
Australia, Victoria (229)	State (2009)	Various	To allow health services to compare performances at a statewide level on their treat-in-turn rates	• After implementing a treat-in-turn policy to prevent queue jumping, the health authority indicated it would be releasing a quarterly treat in turn 'heat map' to health services with regular performance reporting information	Not reported
Canada (interview)	National (Not reported or Not reported)	Various: Oncology (surgery and radiation) Cardiothoracic (CABG) Ophthalmology (cataract) Orthopedic (hip and knee replacement) Diagnostic imaging (CR and MRI)	Not reported	• The Canadian Institute for Health Information has worked with the provinces to report on wait times for priority procedures • CIHI worked with the provinces to agree on standard definitions for reporting on waiting time and the provinces send data to CIHI that is as close to the agreed upon definition as possible	Not reported

Table 26 Ongoing monitoring, analysis, and reporting of wait time and other outcomes data

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Canada, Alberta (258)	Provincial (2013)	Various	To identify where delays occur and support quality improvement, equity and transparency	• Hospitals (urban and rural) and diagnostic clinics collect data from physicians and other health-care providers and submit it to the Ministry of Health • Alberta Health Services (AHS) has established standardized processes for the collection and use of consistent and accurate wait time data to identify where delays occur • The health authority uses wait time data is used to support quality improvement, equity and transparency • AHS ensures that wait time information across the continuum of care is measured using standardized classifications, definitions and timestamp rules; is managed using established performance benchmarks based on diagnosis and/or clinical urgency and leading practice for process improvement; is reportable in a manner that is accessible to the public and health professionals and is in compliance with the HIA and other relevant privacy legislation and meets compliance, monitoring and auditing requirements	Not reported
Canada, Alberta (221)	Provincial (2010)	Orthopedic	To measure hospital performance in relation to benchmarks	• In the orthopedic wards of hospitals, teams have been using report cards to measure how they are doing in relation to benchmarks • They set targets for wait time, length of stay in hospital, pain reduction, getting patients on their feet after surgery, and many other indicators • Across the province, data are being collected from hip/knee replacement surgeons and analyzed by the ABJHI • Each surgeon gets a report twice yearly on results in 17 key indicators • Wait time data has become sophisticated enough that Alberta can distinguish the additional wait caused by patient postponement of surgery • At the same time, other approaches were implemented including central referral, patient choice of first available surgeon, etc.	*Grey literature:** • Ensuring patients make the necessary support arrangements has seen hospital LOS drop below the 4-day benchmark • Since 2004, Alberta has increased the number of hip and knee surgeries by 73% with only a 5% increase in the use of hospital beds • The program to reduce hospital stay saved 33,000 bed-days from 2010-2013 – a value of $33 million *Note: impact based on implementation alongside other approaches
Canada, Alberta (259)	Regional (2015)	Oncology	To improve system navigation and patient access to scheduled services	• Path to Care works with programs and services to improve system navigation and patient access to scheduled services • The "Manual Tracker" is one of many tools Path to Care has developed to standardize wait time measurement so programs and services who do not have IT to support their referral and scheduling activities can measure wait times, generate wait lists, identify delays and find opportunities for improvement	*Grey literature:* • With the tool in place, the program could determine if access targets for each referral type were being met • The referring physician receives confirmation of the receipt of referral the same day the referral is received by the program. • The program is able to track the time from first appointment to surgery, the number of referrals per surgeon, and if a patient's appointment is rescheduled, can track why (i.e. patient cancelled, patient rescheduled, no show, system rescheduled) • It was a major milestone to have accurate wait time data for the different steps in the process, be able to make improvements and have better communication with physicians and patients
Canada, Alberta (113)	Hospital (2010)	Cardiothoracic	Not reported	• A computerized "flagging" system was implemented to identify cardiac patients who are close to exceeding the allowable wait time in their applicable urgency category • A clinical assessment is then made to ensure patient safety	*Grey literature:** • Improvements have been made in CABG wait times: Urgent from 2.4 weeks in 2009/10 to 2.1 weeks in 2010/11; Semi-urgent from 7 weeks in

Table 26 Ongoing monitoring, analysis, and reporting of wait time and other outcomes data

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
				• At the same time, a process was implemented for daily triage of urgent and semi-urgent cases based on patient needs and OR availability	2009/10 to 6.4 weeks in 2010/11; Scheduled from 31 weeks in 2009/10 to 24 weeks in 2010/11 *Note: impact based on implementation alongside other approaches
Canada, Alberta (interview)	Regional (Not reported)	Oncology	Not reported	• The Comprehensive Breast Cancer Program reviews their numbers quarterly to ensure they are reaching the wait times that they have established as appropriate • If they are not meeting these wait times, they will try to determine the reason	*Interview:* • The program has been in place for a long time now so they are reaching a point where they required adjustments are minor, but not easy to fix
Canada, Alberta (interview)	Provincial (Not reported)	Oncology	Not reported	• Tableau collects cancer data for the province • Surgeons are able to view waiting times on a dashboard through Alberta Health Services-supported computers • Physicians use the dashboard to help them check how patients are moving into the system or to provide information to patients and their referring physicians about wait times • The dashboard can show how long patients will wait for diagnosis and treatments	Not reported
Canada, British Columbia (260,261)	Provincial (Not reported)	Various	Not reported	• The Provincial Surgical Patient Registry (SPR) tracks patients waiting for surgery in BC, and monitors and evaluates surgical wait times • It captures adult and pediatric surgical procedures that are typically completed in an OR or another room that requires similar equipment and human resources. The surgeries are captured in hospitals' OR booking system • The SPR allows health authorities to collect the dates that patients have identified as periods of time during which they are unavailable for surgery (these time periods are deducted from the patient's total wait for surgery) • The registry utilizes a standard provincial procedure list and standard diagnosis-based prioritization list making it possible to accurately report wait times for the same procedure across all BC hospitals and health authorities • Health authorities submit patient-specific booking and post-operative information from their OR booking systems directly to the web-based registry on a daily basis • The SPR also collects provincial data on hip and knee replacements and manages a separate provincial prosthesis library in partnership with BC Clinical and Support Services (BCCSS) • Patients can choose to not have their information entered into the registry	*Grey literature:* • On the SPR website, the following benefits are reported: • Patients: - Have better information through their surgeons' offices and family physicians regarding the relative waiting time for their surgical procedure - Can be assessed with a higher degree of consistency and standardization, and in the same way as other patients with similar conditions • Surgeons: - Prioritize surgical patients using a standard list that is utilized by their peers - Have the ability to query current and accurate waitlist data from the BC SPR for any of their patients - Have access to real-time waitlists - Can see comparative (patient non-identifiable data) reports for patients waiting or for surgeries completed across their health authority and the province • Health authorities: - Have more accurate and timely data to manage surgical access and resources - Have province-wide standard definitions for patient procedures which allow health authorities to compare surgical access and resource utilization - Have access to aggregated, accurate, comprehensive and timely data to assist in monitoring performance, forecasting need, and reporting on wait time data • Ministry of Health

Table 26 Ongoing monitoring, analysis, and reporting of wait time and other outcomes data

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
					- Has access to provincial, standardized, aggregated, accurate, comprehensive and timely data to assist in monitoring performance, forecasting need, and reporting on wait time data
Canada, British Columbia(139)	Hospital (2018)	Various	To exceed the Ministry of Health' target that no patients are waiting > 26 weeks for surgery by continuing to shorten the time for their longest waiting patients	• The hospital will be providing surgeon offices with regular reports that show which patients are waiting the longest • This makes it easier for them to book patients, according to the wait time target	Not reported
Canada, Manitoba(117) (interview)	Provincial (2003-04)	Orthopedic	Not reported	• Provincial registry for hip and knee replacement patients built "on the back" of the Canadian Joint Replacement Registry • Regional health authorities are required to report wait time data for publicly funded services from physicians and operating room or scheduling systems • Data collected may be entered into the registry by office/clinic staff or information may be forwarded to a central office for entry • All pre-operative functional and disease severity scores are monitored for each surgeon by the provincial Standards and Quality Committee • They have other mechanisms for tracking cataract and CABG surgeries	*Interview:* • Services differ in how they measure wait 1 and 2 and various start times are used for the start of wait 2 (e.g. date consent is signed, date decision is made to proceed with surgery, date booking form is received at the hospital) • This inconsistency has some effect on calculated wait times • There was good buy-in as people wanted to improve outcomes and quality •There has been no change in preoperative disease severity scores since they started the registry (they are not operating on patients with more or less severe disease)
Canada, New Brunswick(262) (interview)	Provincial (2007-08)	Various	To measure, monitor and manage surgical access	• The Provincial Surgical Access Registry (SAR) provides the RHAs with the data required to measure, monitor and manage surgical access. • The wait time data collected is utilized by surgeons and surgical programs to improve wait times (including scheduling patients for surgery, allocating OR time to surgeons, and answering patient's question about their wait time) • Each zone has access managers who are employed by the health authority and work with the SAR to ensure patients who are on the wait list are actually ready for surgery • Where wait times are the longest, access managers will call individuals patients on the registry to ensure they are ready and available • Access managers will also follow-up with patients waiting > 9 months and use the registry to ensure there are no duplicate referrals	Not reported
Canada, New Brunswick (interview)	Hospital (Not reported)	Cardiothoracic	To improve wait times by increasing surgical capacity	• All patients accepted for surgery at the New Brunswick Heart Centre are tracked using a standard approach that is managed by provincial mandate and employees • Surgical outcomes are tracked on a weekly and monthly dashboard that was implemented as part of an improvement process implemented ~2.5 years ago • Other approaches were implemented at the same time including better waitlist management and sharing wait lists between surgeons • New Brunswick Heart Facility staff use a dashboard to view weekly and monthly surgical outcomes	*Interview:** • In the last 2.5 years, the Center has increased their OR capacity by 10% and reduced median wait times from 90 to 50 days *Note: impact based on implementation alongside other approaches

Table 26 Ongoing monitoring, analysis, and reporting of wait time and other outcomes data

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Canada, Newfoundland (interview)	Provincial (Not reported)	Various	Not reported	• Regional health authorities must report wait times for hip and knee replacements, cataract surgery, CABG, and hip fracture • They also collect the time to triage or referral and time to respond to GP	*Not reported*
Canada, Newfoundland(263)	Hospital (2008-09)	Various Endoscopy	Not reported	• An electronic surgical waitlist database was developed for elective surgery and endoscopy referrals and has been implemented at one site (Charles S. Curtis Memorial Hospital) • The system allows monitoring of wait times and service demand compared to actual service delivery • No other details were reported	Not reported
Canada, Nova Scotia(264-266)	Provincial (2009)	Various	Not reported	• The Patient Access Registry (PAR) provides a central database with standard methods of measuring and interpreting province-wide wait time information**(265)** • It shows where more surgeries can be performed and where additional resources may be needed. It also shows patients where they are in the queue and when they are likely to receive surgery**(266)** • In 2012-13, the Department of Health and Wellness stated that it would use this data in order to work with the health authorities (prior to amalgamation) to validate the provincial surgical wait list and establish ongoing wait list validation practices • It also indicated that they would use this data to identify and implement strategies for optimizing surgical queue management practices in order to reduce wait lists**(264)**	Not reported
Canada, Ontario(267,268) (interview)	Provincial (2004)	Various	To measure, report and manage wait times	• The Wait Time Information System is built on point-of-care data entry. It captures data electronically in one system, while also integrating with current OR booking system • The WTIS was established to assist with the management of wait times at the LHIN, hospital, and surgeon level • It provides near real-time wait times data for surgery (waits1 and 2), diagnostic imaging, and alternate level of care (ALC) • Hospitals have wait time coordinators who are responsible for collecting data and training clerks in physicians' offices on data entry and look for issues that need to be addressed at the hospital level(105) • DARTS are used to report periods of unavailability due to patient reasons and remove them from the measured wait time (DART refers to periods of time between decision to treatment and the procedure date when the patient is unavailable for procedure(105) • The WTIS is managed by Cancer Care Ontario, who reviews the wait time information, analyzes patterns/trends, and provides recommendations to the Ministry, LHINs, and hospitals	*Interview:* • Recommendations tend to be well received because the program works with the experts, administrations, LHINs, etc. • The process is very collaborative so recommendations make sense to everyone
Canada, Prince Edward Island (269)	Provincial (Not reported)	Various	Not reported	• Health PEI monitors surgical wait times • They also make wait time data publicly available online	Not reported
Canada, Quebec(225,226) (interview)	Provincial (2007)	Various	To track wait times	• A new computer system to track wait times in elective surgery has been created and came into effect in June 2007 • Data in the provincial waiting list is obtained from health institutions' operating room planning systems • The government has also set a maximum of six months for the treatment of surgical surgeries (e.g. hip, knee and cataract)	*Grey literature:* • This database now shows that wait times for elective surgeries have remained, on average, relatively constant in Québec since 2008. In the case of hip and knee surgeries, wait times between consultation with the specialist and intervention have increased to more than 15 weeks in recent years

Table 26 Ongoing monitoring, analysis, and reporting of wait time and other outcomes data

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Canada, Saskatchewan(270,271) (interview)	Provincial (2002)	Various	To provide better access to elective surgery	• As part of the Provincial Wait Time Strategy, an electronic province-wide Saskatchewan Surgery Registry was implemented to track all patients needing and waiting for surgery, including their clinical priority score (based on the Patient Assessment Process) • The Registry is used to monitor access to ensure that surgical needs are met within clinically appropriate time frames, to plan resource requirements, and facilitate evaluation of patient outcomes • Every region, facility, scheduling office, etc. had the ability to enter data into the registry • Now, centralized booking offices are in place and responsible for submitting data into the registry • At the start of the Saskatchewan Surgical Initiative, all facilities and centralized booking offices were mandated to enter data into the registry, including patient demographics, date of surgery, and date information entered into the registry	Not reported
Israel (interview)	National (Not reported)	Various	Not reported	• The government monitors elective surgeries • The "long waiting" list is about 2 months long and patients wait, at most, 3-6 months for surgery • There are usually no patients waiting > 6 months • Hospitals are able to compare their wait time data	Not reported
Netherlands (interview)	National (Not reported)	Various	Not reported	• Monitoring of wait times is ongoing and wait times are published • There is no list of patients who are waiting, but hospitals are required to report the length of time to diagnosis and treatment	Not reported
New Zealand (interview)	National (Not reported)	Various	Not reported	• Eight key performance indicators are measured and monitored in each district health board (DHB) • The indicators are: - DHB services that appropriately acknowledge and process patient referrals within required timeframe - Patients waiting longer than the required timeframe for their first specialist assessment - Patients waiting without a commitment to treatment whose priorities are higher than the actual treatment threshold - Patients given a commitment to treatment but not treated within the required timeframe - Patients in active review who have not received a clinical assessment within the last six months - The proportion of patients treated who were prioritised using nationally recognised processes or tools	Not reported
Spain(61)	National (1996 – 2000)	Various	To reduce wait times for elective surgery	• As part of the Surgical Waiting List Reduction Programme, indicators for monthly wait list monitoring were developed • The program also included maximum wait time targets, contracts with private hospitals to increase capacity, allocation of additional OR time, supplementary funding, recommendations for patient prioritization, standardized management criteria, and monetary incentives for hospital managers and doctors to meet wait list targets	*Grey literature:** • By December 1997, patients over 9 months on the list were reduced from 19,052 to 876 • Total cost of the program was 18,612,137 Euros for 13,461 procedures • From a clinical, social, and political point of view, the results were considered excellent • By 2000, were able to successfully meet their wait list targets • Mean waiting time was 67 days. • Total cost of the program in 1999 was 45,666,595 Euros for 41,535 surgical procedures

Table 26 Ongoing monitoring, analysis, and reporting of wait time and other outcomes data

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
					*Note: impact based on implementation alongside other approaches
Tracking of OR times, length of stay, mobilization after surgery, etc.					
Canada, Alberta (interview)	Provincial (Not reported)	Orthopedic	Not reported	• The Alberta Bone & Joint Health Institute has collaborated work related to efficiency measures in the OR • They have also looked at decreasing length of hospital stay • They track OR times and how long it takes to complete other pieces of the pathway • Through the SCN, they coordinate with the sites providing these surgeries to feedback information to discuss targets (e.g. mobilization, reducing length of stay, etc.) • If they can save resources on LOS and in the OR, these could be reinvested to improve wait times by performing more surgeries	Not reported
Tracking reasons for delay in a patient's care (e.g. consults, diagnostic tests, discharge process, out of hospital referral, or transfer/transport)					
Australia, New South Wales(272)	State (2011)	Various	To assist in patients meeting their estimated date of discharge target	• In New South Wales, delays in care are identified and managed through "Waiting for What?" (W4W) noted in the Patient Flow Portal Bed Board • W4W reasons are used track unreasonable waits for patient care at any step of the patient journey • They identify resources that are not available when the patient requires them within a timeframe that is acceptable and reasonable to patients, carers and clinicians	Not reported
Using the ready-to-treat date vs. decision-to-treat date					
Canada (interview)	National (2007)	Pediatric elective surgery	Not reported	• Children's hospitals across Canada have used Pediatric Canadian Access Targets for Surgery (P-CATS) to measure wait times for patients based on 'ready-to-treat' date instead of 'decision-to-treat' date	*Interview:* • Using 'ready-to-treat' provides more accurate wait time data
Canada, Alberta(273) (interview)	Provincial (2012)	Various	Not reported	• Alberta Coding Access Targets for Surgery (ACATS) have been used to track wait times using the 'ready-to-treat' date • Ready-to-treat date is when a patient is medically, functionally, and socially ready for surgery	*Interview:* • Using 'ready-to-treat' ensure
Canada, Ontario (interview)	Provincial (Not reported)	Various	Not reported	• The Ontario Wait Time Information System uses Date Affecting Readiness to Treat (or DARTS) to remove periods of time between decision to treat and the procedure date when a patient is unavailable for the procedure	Not reported
Use of operations research methods/OR planning tools to perform capacity analysis					
Australia, Queensland(160)	State (2017)	Various	To ensure treatment within clinically recommended timeframes	• In Queensland elective surgery coordinator have been hired to manage OR efficiency • They monitor and provide expert advice on best practice management of elective surgery waiting lists to ensure treatment within clinically recommended timeframes • They also monitor and improve waitlist management measures (e.g. treat in turn and alignment to the National Elective Surgery Urgency Categorization Guideline (NESUCG))	Not reported
Australia, South Australia(108)	State (2005)	Various	To ensure that all patients receive elective surgical procedures within national clinical urgency timeframes	• As part of the National Elective Surgery Strategy, funding was made available in South Australia for elective surgery coordinator positions to improve management of waiting lists and support the achievement of performance targets • The strategy includes a number of other initiatives, such as increased funding for surgeries	*Grey literature:* • In a government report, it was stated that targeted funding enabled an additional 2,631 elective surgery procedures to be undertaken (98 .8% of the targeted 2,691 procedures) • A deliberate strategy to focus on the very long-wait patients has seen a 52.9% reduction in the number of people waiting > 12 months for elective surgery from 2003–04 to 2005–06

Table 26 Ongoing monitoring, analysis, and reporting of wait time and other outcomes data

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
					• This strategy has resulted in a slight deterioration in the percentage of people seen within the thresholds for each of the three categories *Note: impact based on implementation alongside other approaches
Australia, Tasmania(214)	State (2009)	Various	To strengthen coordination and active management of waiting lists	• A key pillar of strengthening the coordination and active management of waiting lists was the appointment of Elective Surgery Access Coordination staff in each public hospital •The staff worked directly with senior and operational Hospital staff and DHHS to improve patient access to elective surgery through active and collaborative waiting list management	Not reported
Canada (interview)	National (Not reported)	Pediatric surgery	Not reported	• Eight pediatric sites across the country (part of the Canadian Pediatric Surgical Wait Time (CPSWT) program) share their data through the Canadian Association of Pediatric Health Centres (now called Children's Health Canada) • Data is available to the participating sites only and not available publically • Capacity Analysis is performed on the data in order to identify barriers and resources are needed to make improvements	Interview: • The CPSWT provides trustworthy data for decision-making by utilizing a standardized, national accepted measure • Wait list used to be reviewed sporadically with "little to no concern given to maintenance or scheduling protocols" • Before the CPSWT project, the Stollery had no good measure in place and there was no end date for some patients
Canada, Alberta (interview)	Hospital (2007)	Pediatric elective surgery	Not reported	• The Stollery Pediatric Surgical Wait Times program uses P-CATS to measure access for pediatric surgical patients • They submit data to the Canadian Association of Pediatric Health Centres, sharing data between other pediatric sites across the country • Capacity analysis is used to make all decisions in the Program • They measure various indicators including utilization rates, first-case start times, etc. • The	
Canada, Alberta (interview)	Regional (Not reported)	Various	Not reported	• The Edmonton Zone reviews pediatric and adult data provided by Analysis Works (using the LightHouse platform) • They measure if surgical patients are being completed within target time or past target time	*Interview:* • The data doesn't provide the full story in identifying the issues causing increased wait times • It's necessary to do additional Capacity Analysis to identify the root cause of the issue
Canada, British Columbia (interview)	Provincial (under development)	Various	Not reported	• The Ministry is in the process of evaluating vendors of systems to manage wait lists and schedule surgeries • The goal is to collect accurate information and have the systems synchronize between surgeons' offices, hospitals and BC surgical patient registry	NA
Canada, British Columbia (interview)	Hospital (Not reported)	Pediatric elective surgery	Not reported	• Analysis Works (LightHouse) was implemented at the British Columbia Children's Hospital to manage wait lists	Not reported
Canada, British Columbia (interview)	Region (2016)	Various	Not reported	• Fraser Health Authority completed a comprehensive review of OR efficiencies in 2016 to identify opportunities to better use ORs, with a focus on late starts, early finishes, departure delays, and turn-around times	

Table 26 Ongoing monitoring, analysis, and reporting of wait time and other outcomes data

Jurisdiction	Healthcare setting (year implemented)	Specialty area	Purpose	Description	Impact
Canada, Manitoba (interview)	Provincial (Not reported)	Various	Not reported	• Work has been done by the province to increase surgical efficiency by increasing the number of procedures performed during a day, consolidating surgical slates, and reducing length-of-stay through a number of mechanisms (e.g. increasing bed capacity)	Not reported
Canada, New Brunswick (interview)	Hospital (2016)	Cardiothoracic	To improve wait times by increasing surgical capacity	• The New Brunswick Heart Centre undertook significant efforts to improve wait times by reducing cancellations, increasing ICU efficiency, better managing wait lists and sharing wait lists between surgeons	*Interview:* • 10% increase in OR capacity • Reduction in median wait times from 90 to 50 days
Canada, Nova Scotia(274) (interview)	Provincial (2017)	Orthopedic	To identify and implement efficiencies, standardization, process improvement, and capacity building	• As part of its Hip and Knee Action Plan (2017 -), the Nova Scotia Health Authority worked with Stryker Performance Team to analyze wait time data for orthopedic procedures from the PAR • Operational data are updated and monitored daily	*Interview:* • Length of stay, readmissions, and discharges home have all improved
Canada, Ontario (interview)	Provincial (Not reported)	Various	Not reported	• Cancer Care Ontario developed a resource allocation tool that uses discrete event simulation to show the LHINs the best possible wait time outcomes they can achieve with existing resources	Not reported
Canada, Ontario (interview)	Regional (Not reported)	Orthopedic	Not reported	• The Champlain Regional Orthopedic Network measures “wait 1a” (wait from GP referral to central intake), “wait 1b” (wait from assessment to first consultation with surgeon), and “wait 2” (wait from decision to treat to surgery) • Using this information, the Network provides advice to the LHIN regarding distribution of services, where services should be offered, volume allocation, funding, etc.	Not reported
Canada, Ontario (interview)	Provincial (Not reported)	Various	Not reported	• Cancer Care Ontario has provided hospitals with efficiency data to help fine tune scheduling, etc.	Not reported
Canada, Saskatchewan (interview)	Provincial (Not reported)	Various	Not reported	• At the beginning of the Saskatchewan Surgical Initiative, the initiative leads acquired a demand analytics tool that is still in use today • This tool was used to set the Initiatives wait time targets of 3 months for all surgeries and 3 weeks for cancer surgeries	*Interview:* • The tool is still being used today

Table 27 Operations research/resource planning tools

Authors, year, country	Jurisdiction	Healthcare setting and types of elective surgeries addressed	Problem/issue addressed through simulation modeling	Purpose of modeling	Model type/ method	Main assumptions of the model	Information sources/inputs into the model	Findings	Implementation of findings/ impact
Abasolo et al. 2014 (275) Spain	Spanish National Health System	Healthcare regions • Cholecystectomy • Carpal tunnel release • Inguinal/femoral hernia repair	• Heterogeneous reporting of wait times across regions • Total wait times not reported – instead, waiting times reported for each stage in a patient pathway to surgery (GP referral to specialist consult to completion of diagnostic tests to second specialist consult to scheduling of surgery date)	1) To determine total wait times for three elective surgeries 2) Demonstrate impact of determining wait time for each subsequent stage based on time waited to complete previous stage (alternative wait time management system)	• Used Software Easyfit 5.3 Professional and MatLab • Simulated waiting time distribution for each stage • Added simulated wait time for each stage to calculate total wait time • Created a hypothetical patient cohort to run a simulation exercise in which wait time for subsequent stage depended on time waited in previous stage (i.e., those who waited longer for first visit received greater priority for second visit)	• Data from two regional health services were representative of all regional health services • All patients in hypothetical cohort had same clinical need • No increase in use of healthcare resources	• Published wait time data for each stage from two regional health services in 2009	• Estimated average total wait times: - Cholecystectomy: 331 days - Carpal tunnel release: 355 days - Inguinal/femoral hernia repair: 137 days • Estimated maximum reduction in wait times based on alternative wait time management system: - Cholecystectomy: 11% - Carpal tunnel release: 15% - Inguinal/femoral hernia repair: not reported • Through alternative system, overall variability and maximum wait times could be reduced with no additional costs	No information found
Akkerman R and Knip M 2004 (276) The Netherlands	Dutch hospital	Department of Cardiac Surgery within Hospital (contains 2 hospital wards and an intensive care unit (ICU)) • Cardiac surgery	• Bed capacity following surgery identified as main reason for increasing wait times for cardiac surgery	To determine whether it is possible to identify a more efficient distribution of beds between the ICU and the hospital wards	• Markov modeling to simulate different scenarios: 1) Current situation 2) All external patients are returned to their own hospital after 4 days 3) All patients are admitted to the same ward following surgery; after 4 days, patients requiring less attention are transferred to a different ward or to another hospital • Calculated the theoretical number of beds needed for each scenario	•Total number of ICU beds = 16 • Total number of ward beds: 50 • Assumes two groups of patients admitted to hospital: a) External patients – admitted from another hospital b) Hospital-based patients – not transferred from another hospital • Fixed number of patients admitted daily • Patients only admitted on weekdays	• Hospital records from October 2000 to January 2001	Scenario 1: number of beds needed varies between 30 and 40 Scenario 2: Average number of available beds increases by 3 Scenario 3: Average number of total available beds same as Scenario 1 but 19% of patients would be transferred to a different hospital Based on results, proposes clustering patients in groups who require similar levels of care: 16 ICU beds, 5 intermediate care beds and 40 general ward beds	No information found
Antelo et al. 2015 (277) Spain	Galician Healthcare Service	Academic teaching hospitals	Waiting times for elective surgery were identified as a leading source of	To examine the relationship between bed capacity, inpatient	•Monte Carlo simulations for daily inpatient activity and length of stay	• Changes in inpatient activity can be accurately estimated using the activity-beds	• Hospital data for all patients admitted in 2007	• Based on simulated daily occupancy rates: - 38 of 100 days per year have no wait list	No information found

Table 27 Operations research/resource planning tools

Authors, year, country	Jurisdiction	Healthcare setting and types of elective surgeries addressed	Problem/issue addressed through simulation modeling	Purpose of modeling	Model type/ method	Main assumptions of the model	Information sources/inputs into the model	Findings	Implementation of findings/ impact
		• All elective surgeries	public dissatisfaction with hospital services Bed capacity was viewed as one of the main problems	activity and size of surgery waiting list	• Programming performed with R software • Modelled effect of inpatient activity on beds using linear regression • Replicated simulation process for various increased percentages in the number of available beds in two alternative scenarios: 1) Increased number of beds leads to no change in inpatient activity patterns 2) Increased number of beds leads to changes in inpatient activity Inpatient activity = number of hospital patients who receive lodging and food daily divided by the number of beds • Simulation process followed three stage procedure: 1) Generated inpatient activity value taking into account new and waiting list patients 2) Detected number of free hospital beds and occupied them with patients to generate length of stays 3) If daily inpatient activity exceeded number of available beds, remaining patients put on the wait list	elasticity estimated in a comparative study of 10 European countries • Inpatient activity data were normally distributed		- 62 of 100 days per year have variable wait list - Hospital working below capacity 28 of 100 days - 10% increase in number of beds would significantly increase the number of days in which occupancy rate remains below 100% and period with no waiting list would extend up to 95% • When admission rate adjusts itself to number of available beds, every 5% increase in number of beds leads to 1% reduction in waiting list (not a statistically significant difference)	
Askildsen et al. 2010 **(250)** Norway	Norwegian Regional Health Authorities	Five newly created regional health authorities (RHAs) (previously had hospitals run by counties) • All surgical and non-surgical elective services	Norway introduced a set of reforms (centralization of ownership and management of hospitals through creation of regional health authorities) to reduce variations in waiting times across the country and lead to more equal prioritization practices, but their impact had yet to be evaluated	To determine the probability of patients waiting longer than medically acceptable pre and post-reform	• Multivariate regression analyses (linear random effect panel data model and random effect probit model) Steps: 1. Categorised ICD-10 codes into 5 prioritization groups based on recommended maximum waiting time 2. Through regression analyses, compared waiting times and the probability of excessive waiting times for patients in different priority groups and compared outcomes for patients in	None specified	• Norwegian Patient Register from 1999 to 2005 (reforms took place within that period) – administrative patient register that includes age, gender, first and secondary diagnoses, ICD10-codes, the actual waiting time, place of residence, and treating hospital	• Probability of excessive waiting increased for higher prioritized patients and decreased for lower prioritized patients • Waiting times across groups were less dispersed post-reform • Prioritization practices within an RHA appeared to be similar, suggesting more equal prioritization practices within regions • Based on waiting times for different priorities,	• Reforms did not achieve political objectives

Table 27 Operations research/resource planning tools

Authors, year, country	Jurisdiction	Healthcare setting and types of elective surgeries addressed	Problem/issue addressed through simulation modeling	Purpose of modeling	Model type/ method	Main assumptions of the model	Information sources/inputs into the model	Findings	Implementation of findings/ impact
					different regional health authorities (controlled for case-mix, hospital specific effects and included a time trend to allow for changes in prioritization practices common to all hospitals) 3. Introduced interaction variables between health regions and pre-post reform dummies to test whether waiting times were more homogeneous post-reform			prioritization practices did not appear to improve over time	
Comas et al. 2008 (278) Spain	Spanish Health System	Catalonia • Cataract surgery	• Department of Health introduced prioritization system for cataract surgery but has already implemented a 6 month wait time guarantee • Uncertain whether this system or "first-in-first-out" leads to shorter wait times • Prioritization system includes functional and clinical criteria	To develop a decision-making aid for assessing needs and prioritization of patients for cataract surgery	• Discrete event simulation • Time horizon: 5 years • Sensitivity analysis: two-way sensitivity analysis that included all input parameters and uncertainty around their estimations • Calculated "weighted waiting time" – weight = priority score of patient divided by the sum of the priority scores of all patients • Model outcome: mean weighted priority score of all patient on the wait list	• General population 50 years and older at risk of needing cataract surgery • Incident cases had bilateral cases • Patients did not improve unless they underwent surgery • No return from private sector to public sector waiting list • Demand depended on supply capacity • One eye was operated on at a time	• Mortality: Catalonia 2001 census data • Prevalence: Database of the North London Eye Study (estimate prevalence of cataracts in Catalonia) • Number of surgeries per month and probability of a second surgery: Catalan Department of health • Number of waitlist per month: Catalan waiting list registry • Prioritization score based on prioritization system ; data from pilot study	• Use of prioritization system shortened wait times by 1.55 months compared with first-in-first-out	• Prioritization system implemented in Spanish Health System • No information on impact was found
Janukeviciute et al. 2013 **(251)** Norway	Norway and Scotland	Regional health authorities (RHAs) in Norway Regional health boards • Inpatient surgical and non-surgical services	Both countries have introduced reforms, the effects of which had not been assessed • Scotland: introduced blanket maximum waiting time targets • Norway: passed act in which assessment of a patient for elective services must consider: 1) severity of the condition, 2) whether a suitable treatment exists, and 3) cost-	To assess consequences of two different waiting time strategies, one in Norway (vertical prioritization) and one in Scotland (blanket prioritization) •Are more severely ill patients prioritized better where vertical prioritization is implemented through differential	• Assigned ICD-10 codes to medical conditions of patients in both the Norwegian and Scottish registers • Patients assigned to maximum acceptable waiting time groups based on ICD-10 code • Used exact matching to construct pre and post-reform groups with similar observable characteristics • Undertook weighted regression of patient level waiting times on patient characteristics • Performed multivariate regression analyses to compare changes in	• Impact of policy change (reform) observable within a two year period (pre and post reform)	•National administrative data pre and post-reforms in each of the countries (2003-2006)	• Norway - Wait times for highest priority patients increased by 6 to 9% post-reform - Wait times for low and no priority groups decreased by 4 and 7 days, respectively post reform • Scotland - With the exception of the highest priority group, wait times were longer pre-reform - Waiting times for highest priority patients were unaffected by reforms	No information found

Table 27 Operations research/resource planning tools

Authors, year, country	Jurisdiction	Healthcare setting and types of elective surgeries addressed	Problem/issue addressed through simulation modeling	Purpose of modeling	Model type/ method	Main assumptions of the model	Information sources/inputs into the model	Findings	Implementation of findings/ impact
			effectiveness of treatment; assessment must take place within 30 days of referral	maximum waiting times?	conditional mean waiting times over time			• In both countries, patients with lowest priority benefited most from reforms	
Kougias et al. 2016 (279) United States	Houston, Texas	Department of Vascular Surgery within academic teaching hospital • Vascular surgery	• Surgical suites comprise one of the most costly functional areas of a hospital • Better estimates of case duration are needed to maximize OR utilization	To determine whether use of a statistically driven surgical scheduling system improves OR throughput and utilization in a single operating room	• Multivariate linear regression • Modelled surgical and anesthetic lengths of vascular procedures as a function of patient characteristics and operative characteristics using multivariate linear regression approach (Predictive Modelling System (PMS)) • Calculated mean historical operative and anesthetic time for each procedure (HMS) • Performed computerized simulation of OR scheduling using PMS and HMS • Performance of both were assessed against observed duration distribution of vascular surgeries	• 10 hour operative day • Allowable overtime and underutilization thresholds set to 60 minutes	• 3,245 queries of electronic scheduling and timekeeping system information for vascular surgeries • Hospital records (technical operative and patient characteristics) • Cancellation probabilities derived from historical data	• Compared to using mean historical operative time per surgeon, predictive modeling system: - Increased throughput by a minimum of 14% - was slightly more likely to lead to overtime - overtime was shorter - had lower OR under-utilization rates - had less lengthy OR underutilization rates • Concluded that using PMS for scheduling in a single OR increases throughput and improves other measures of surgical efficiency	No information found
Kumar et al. 2018 (280) Australia	Public hospitals in Australia	Public hospital in Melbourne • Type of elective surgery not specified	•Frequent cancellation of elective surgeries on the day of surgery because of capacity shortage in ICU	To develop a scheduling scheme to optimize patient flow process in the surgical suite (includes operating theatres, recovery rooms, the ICU and surgical wards)	• Stochastic mixed integer programming model • Applied classification and regression tree (CART) analysis to classify patients into short, medium and long stay groups (outcome variable was length of stay and independent variables were patient attributes) • Fitted Coxian discrete phase type distributions to the data for each group • Modelled and optimized patient flow process over several time blocks	• ICU comprises the bottleneck • Seven elective surgery ICU beds • Maximum of 20 patients with average length of stay of 2.4 days in the ICU can be scheduled per week • Patients scheduled in same order as in the queue • Earliest scheduled case each day could be the only cancelled case • Elective surgeries only performed on weekdays	• Hospital records (time period not provided)	• To minimize the number of cancellations while maximizing the number of surgeries scheduled, short stay surgeries should be scheduled early in a week and medium and long stay surgeries should be scheduled later in the week	No information found
Persson M and Persson JA 2009 (281) Sweden	Swedish health system	General Surgery Department in one hospital • All types of elective surgery	• Swedish government passed law stating that patients scheduled for elective surgery should have to wait no more than 90	To find a suitable mix of surgery alternatives (surgery performed in house or outsourced) given	• Discrete event simulation • Incorporates optimization model to determine recurrent scheduling of surgeries (using Cplex, an optimization software package)	• Patients are assigned to one of three priority groups: 1) High priority – patients need surgery within 1-2 weeks	• Urology data from the Department of Surgery at Blekinge Hospital (two operating rooms for urological surgeries	• After applying the law, waiting times for: - median priority group increased - 'no priority' group decreased	No information found

Table 27 Operations research/resource planning tools

Authors, year, country	Jurisdiction	Healthcare setting and types of elective surgeries addressed	Problem/issue addressed through simulation modeling	Purpose of modeling	Model type/ method	Main assumptions of the model	Information sources/inputs into the model	Findings	Implementation of findings/ impact
			days, and if that is not possible, the hospital must arrange and pay for surgery at another hospital • Hospitals under pressure to optimize OR scheduling and determine when to outsource surgeries in order to prevent waiting times from growing	different scenarios of patient queues	• Simulation model considers number of operating hours per day and number of beds available for post-operative care • Optimization model bases scheduling on medical priority, time spent in the queue, and available resources and sets a scheduling time horizon of 4 weeks • Ran scenarios of surgical planning before and after Law was applied	2) Medium priority – patients need surgery within 4-8 weeks 3) No priority – patients need surgery within "a reasonable time frame" • No patient can wait longer than 90 days • OR schedule completed one week at a time in a rolling time horizon of 4 to 6 weeks • If a simulated patient has not been scheduled for surgery after 90 days, the patient is deleted from the queue with a probability of 0.1 (the probability of patients applying the law and having surgery at another hospital)	that run Monday to Friday) • Costs of salaries and overtime based on Swedish collective agreement (2005) • Out-sourcing price list provided by county council of Blekinge	- high priority group stayed the same • Out-sourcing costs were 2 million SEK (43% of total costs) • Overtime pay and costs of surgery cancellations stayed the same	
Sperandio et al. 2014 (282) Portugal	Portugal	Portuguese public hospital • General surgery and vascular surgery (case study)	• Portuguese government introduced a set of waiting limits where hospitals are penalized if times exceed limits • Hospitals lacked tools for improving surgery scheduling processes and resource management • Hospital information systems had capabilities to create optimal surgery schedules	To develop an intelligent decision support tool for OR planning and scheduling	• Workshops were conducted to identify user needs; characterize current scheduling process and assess where it could be improved; and understand strengths and weaknesses of current information systems • Developed mathematical optimization model for optimal allocation of patients to available OR shifts • Integrated simulation, data mining and optimization techniques • Used traditional software engineering lifecycle model • Technique used to estimate surgery duration – conducted experiments using regression, tree-based and neural network algorithms and found that regression model performed best • Compared computational results for maximizing the number of surgeries in a	• Patient can only be assigned to an OR if a room is available for the relevant specialty • A surgeon cannot move to different operating rooms within a half day time period • No overtime is allowed • A given patient has a priority to undergo surgery proportional to the maximum number of days he/she can wait for surgery without the hospital being penalized	• Hospital records from 2006 to 2011	Model functions: 1) Provide users with a means of monitoring and measuring the performance of an OR 2) Aid users in developing better scheduling alternatives through data mining and optimization techniques -Helps to standardize planning processes and control quality and productivity Decision support system contains 3 modules: 1) resource management – defines and allocates existing resources 2) surgery scheduling – supports scheduling of surgeries and shows ORs available for specific specialties (includes optimization module that provides optimal scheduling solution given an objective	

Table 27 Operations research/resource planning tools

Authors, year, country	Jurisdiction	Healthcare setting and types of elective surgeries addressed	Problem/issue addressed through simulation modeling	Purpose of modeling	Model type/ method	Main assumptions of the model	Information sources/inputs into the model	Findings	Implementation of findings/ impact
					week with actual OR rates through two case studies of vascular and general surgery			function (maximize number of surgeries, maximize OR utilization, minimize wait time or first come first served) 3) performance management – enables identification of anomalies and opportunities to improve performance based on a set of key performance indicators	
Tako et al. 2013 (283) United Kingdom	National Health Service in England	Multidisciplinary obesity centre providing non-surgical and surgical services to same patient population within Academic Health Science Centre • Bariatric surgery	Number of referrals received was rapidly growing, increasing pressure on the Centre to meet demand and achieve the 18 week target from referral to treatment set by the UK government	To examine the effect of alternative resource configurations on patient wait times to inform prioritization of planned investments in new capacity	• Discrete event simulation (Simul8 software) • Constructed a series of models that explored increasing capacity to meet demand or managing demand through a reduction in referral rates • Incorporated care pathway that included all non-surgical and surgical treatment options • Simulations based on one year with time unit of one day • Obesity care team determined six feasible scenarios to be represented in models – involved varying number of physicians and number of surgeons, and reducing referrals to half of baseline figures • Models considered the following performance indicators: 1) Waiting list size for introductory group session 2) Waiting list size for pharmacotherapy clinic 3) Waiting list size for surgery 4) Waiting time to surgery 5) Proportion of patients waiting more than 18 weeks from referral to treatment	• Capacity modeled as available patient appointments/slots • No patient attends two clinics in one day • Capacity relevant to study related to the number of physicians and surgeons and infrastructure components • Repeat outpatient appointments for follow-up after treatment excluded • Surgery allocation based on first in first out rule	• Clinic records of patients seen at the Centre • Administrative data collected by the Centre • Expert opinion (waiting time between clinics)	• Increasing capacity of pharmacotherapy clinics by adding one physician reduced waiting times for pharmacotherapy treatment but increased waiting times for surgery • Increasing surgical capacity by adding two surgeons reduced the proportion of patients waiting longer than 18 weeks to 8% • Reducing referrals to only patients with sleep apnea, diabetes, high cardiovascular risk or infertility reduced the proportion of patients waiting more than 18 weeks to 0 by the last month of the first year	• Based on the findings, the Trust decided to: 1) Add more surgeons, rather than physicians, alone 2) Change the eligibility criteria for surgery 3) Build a new operating theatre
Tuft and Gallivan 2001 (284) United Kingdom	National Health Service	Cataract clinic • Cataract surgery	Mounting pressure to reduce waitlists for cataract surgery	To compared three different strategies for managing waitlist	• Priority Admission Strategy Analysis • Three strategies tested: 1) "First come first served"	• Fixed number of referrals accepted per week	• Clinic records of patients presenting to outpatient clinic between February	• Triage and priority-based waiting list strategies resulted in	No information found

Table 27 Operations research/resource planning tools

Authors, year, country	Jurisdiction	Healthcare setting and types of elective surgeries addressed	Problem/issue addressed through simulation modeling	Purpose of modeling	Model type/ method	Main assumptions of the model	Information sources/inputs into the model	Findings	Implementation of findings/ impact
					2) Triage – patients categorized into a small number of priority strata (patients assessed as being in the lowest stratum are booked into an operating slot as far into the future as is acceptable; patients in strata other than the lowest are booked into the first available free slot) 3) Priority-based waiting list – patients are placed on a waiting list and booking decisions are made as late as possible, assigning available slots to highest priority patients first	• All patients assessed are booked for surgery as day case • Maximum wait time after assessment: 14 months	1998 and August 1999 (date of referral, date of outpatient assessment and priority weighting) • 357 patients assessed using the VF14, a validated instrument for measuring loss of visual function	increased delays for low priority cases • Both strategies led to "substantial and consistent reductions in total priority weighted delay" • For "first come first served", total priority weighted delay was shown to increase in proportion to the number of weeks initially fully booked	

Table 28 Public reporting of wait times

Jurisdiction	Specialty area	Wait 1	Wait 2	Description	Wait time measures	Impact
Australia (285)	Cardiothoracic ENT General Gynecology Neurosurgery Oncology Ophthalmology Orthopedic Pediatric Plastic Urologic Vascular All other elective surgery	No	Yes	• The Australian Government's MyHospitals website provides information on each hospital in the country, including wait time data for some hospitals • Reported by procedure, specialty, or urgency category, for each hospital • Data from the preceding year	• Median wait time • Peer group median wait time • % surgeries completed within target	Not reported
Canada (155)	NA	NA	NA	• Wait times made publicly available online allow patients to see which surgeons or hospitals have the shortest wait times • Most of the Canadian provinces have wait times for certain elective surgeries available on websites • However, provinces vary in how they report this information (e.g. by surgeon vs. by hospital or region only) • It has been suggested that making wait times publicly available will reduce wait times by allowing patients and their physicians to make referral decisions based on waits		*Grey literature:* • A Canadian Centre for Policy Alternatives (CCPA) report suggests that, based on significant variations in wait times across surgeons, patients are not using this information to move from one provider to another (e.g. in 2005, Toronto waits for elective heart catheterization varied from 3 to 44 days depending on the hospital; in Vancouver, waits for elective heart surgery varied from <1 week to 16.6 weeks depending on the surgeon) **(155)**
Canada (Canadian Institute for Health Information) (286)	Priority procedures (hip and knee replacements, cataract, CABG, cancer surgery, radiation therapy, hip fracture repair, CT scan and MRI scan)	No	Yes (booking date to completion of procedure)	• Reported by procedure and province • Booking date is when the patient and the appropriate physician agree to a service, and the patient is ready to receive it	• 50th and 90th percentile wait times • % of patients receiving care within benchmark	Not reported (Not reported)
Canada, Alberta (287)	Cardiothoracic ENT Gastrointestinal General surgery Gynecology Oncology Ophthalmology Orthopedics Pediatric Respiratory Urology Vascular Diagnostic imaging	No	Yes (decision to treat to completion of procedure)	• Reported by procedure or urgency level, for province and by zone, hospital, or surgeon • Data from most recent quarter • Data source: administrative data is submitted to the Ministry of Health by province's urban and rural hospitals and diagnostic clinics, which collect information from physicians and other health-care providers performing the procedures listed online	• Average wait time • 90th, 75th, 50th, and 25th percentile wait times	Not reported
Canada, British Columbia (288)	Cardiothoracic Dental ENT General surgery Gynecology Neurology Oncology Ophthalmology Oral maxillofacial Orthopedics	No	Yes (date the health authority receives the booking form to completion of procedure)	• Reported by procedure, for province or by health authority, hospital, or surgeon • Data from most recent quarter; updated bimonthly • Data source: provincial Surgical Patient Registry as well as the BC Cancer Agency, Cardiac Services BC, and the Eye Bank of BC	• 50th and 90th percentile wait times	Not reported

Table 28 Public reporting of wait times

Jurisdiction	Specialty area	Wait 1	Wait 2	Description	Wait time measures	Impact
	Pediatric Respiratory Urology Vascular Diagnostic imaging					
Canada, Manitoba (117,289)	Cardiothoracic Diagnostic imaging Oncology Ophthalmology Orthopedics	No	Yes (to completion of surgery; starting point not mentioned)	• Reported by procedure, for province and by health authority • Data source: regional health authorities are required to report wait time data for publicly funded services from physicians and operating room or scheduling systems**(117)**	• Median wait time	Not reported
Canada, New Brunswick (262,290)	Cardiothoracic General surgery Gynecology Neurosurgery Ophthalmology Oral maxillofacial Orthopedic Plastic Thoracic Urology Vascular	No	Yes (decision to treat to completion of procedure)	• Reported by procedure, for province and by community and hospital • Data from most recent quarter • Data source: Provincial Surgical Access Registry**(262)**	• 50th and 90th percentile wait times	Not reported
Canada, Newfoundland (291)	Ophthalmology (cataract) Orthopedic (hip and knee replacement)	No	Yes (decision to treat to completion of procedure)	• Reported by procedure and region • Data reported by quarter	• 50th and 90th percentile wait times • % of patients who have had surgery within the national benchmark	Not reported
Canada, Nova Scotia (292)	Cardiac Dental ENT General Neurosurgery Obstetrics/ gynecology Oral maxillofacial Orthopedic Plastic Thoracic Urology Vascular	Yes (referral to first appointment with surgeon)	Yes (decision to treat to completion of procedure)	• Reported by procedure, for province and by hospital and surgeon	• 50th and 90th percentile wait times	Not reported
Canada, Ontario (293)	Cardiothoracic Ophthalmology Orthopedic Oncology Pediatric	Yes (from referral to first appointment with surgeon)	Yes (decision to treat to completion of procedure)	• Reported by procedure or urgency, for the province and by hospital, city, and postal code • Data source: Wait Time Information System, which is built on point-of-care data entry	• Average wait time • % of patients treated within target time	Not reported
Canada, Prince Edward Island (294)	Ophthalmology (cataract surgery) Orthopedic (hip and knee replacement)	No	Yes (decision to treat to completion of procedure)	• Reported by procedure	• 90th percentile wait times	Not reported
Canada, Saskatchewan (295)	Cardiothoracic ENT General Neurology Obstetrics/ gynecology Ophthalmology Oral Maxillofacial/ dental	No	Yes (wait to completion of procedure; starting point not mentioned)	• Reported by procedure, for province and by region • Data source: Saskatchewan Surgical Registry, which tracks all patients needing and waiting for surgery, including their clinical priority score (based on the Patient Assessment Process)	• Median wait time • 90th percentile wait time • # of surgeries performed in prior 6 months • % of patients treated within 3 weeks, 6 weeks, 3	Not reported

Table 28 Public reporting of wait times

Jurisdiction	Specialty area	Wait 1	Wait 2	Description	Wait time measures	Impact
	Orthopedic Plastic Urology Vascular				months, 6 months, <12 months, and > 12 months • Patients waiting and % of patients waiting > 3 months	
Denmark (60)	Cardiothoracic ENT Gastrointestinal General Obstetrics/ gynecology Oncology Oral maxillofacial Ophthalmology Neurology Plastic Respiratory Urology	Yes ("wait for examination")	Yes ("wait for treatment")	• Reported by procedure and hospital • Overall patient satisfaction also reported	Not reported	*Grey literature:** • In Denmark, only 5% of the patients exercised their right to choose their provider • Aggregate mean waiting time increased before it decreased *Note: impact based on implementation alongside other approaches (i.e. patient choice of surgeon)
Hong Kong (57)	Ophthalmology	Not reported	Yes	• In 2010, the Chinese government indicated that the health authorities will allow patients to compare waiting times for cataract operations at a dozen public hospitals and the patients will be able to choose at which hospital they would like to have their operation • This may include hospitals outside of their regional hospital	Not reported	*Grey literature:** • Publicly listing wait times has only 'limited benefits' for patients. Increasing transparency is good, but the elderly will choose to stay in their own districts for medical care *Note: impact based on implementation alongside other approaches (i.e. patient choice of surgeon)
Netherlands (61,205)	Not reported	Yes	Yes	• Since 2009, the Dutch Healthcare Authority requires hospitals and freestanding clinics to publish monthly consumer information about waiting times in weeks (rounded off upwards, implying a minimum waiting time of one week) for a specified list of medical specialties and treatments using the following definitions: • Waiting time out-patient clinic – The number of weeks between the moment the patient makes an appointment with an out-patient clinic and the third opportunity he/she can visit the out-patient clinic according to the clinic's appointment registry • Waiting time hospital treatment (day-case and inpatient admission) – The number of weeks between the moment the patient is indicated for treatment by a physician (in the out-patient clinic) and the third opportunity he/she can be admitted to, or treated in, the hospital according to the hospital's appointment registry. In case of multiple treatments, the waiting time for the most common treatment has to be provided	Not reported	*Peer reviewed literature:** • Despite the availability of public information about waiting times and health insurers' mediation services, for several procedures waiting times 2 substantially vary across hospitals *Grey literature:** • For 50% of the hospitals and specialists the interest for waiting times, urged them to take extra measures on organization, efficiency and consultation • 60% of patients chose to stay at their own hospital, even though wait time was longer; 40% chose to go to a different hospital if the wait time at the other hospital was shorter • During the experiments, the number of people on the waiting list dropped by 10% *Note: impact based on implementation alongside other approaches (i.e. patient choice of surgeon)
New Zealand (296)	Elective surgery	Yes	Yes	• Eight key performance indicators are measured and publically reported monthly • Reported by district health board (DHB)	• DHB services that appropriately acknowledge and process patient referrals within required timeframe • Patients waiting longer than the required timeframe for their first specialist assessment	Not reported

Table 28 Public reporting of wait times

Jurisdiction	Specialty area	Wait 1	Wait 2	Description	Wait time measures	Impact
					• Patients waiting without a commitment to treatment whose priorities are higher than the actual treatment threshold • Patients given a commitment to treatment but not treated within the required timeframe • Patients in active review who have not received a clinical assessment within the last six months • The proportion of patients treated who were prioritised using nationally recognised processes or tools	
Norway (297)	Elective surgery	Not reported	Yes	• Information on waiting times for treatments across different hospitals in the country is available online • Some hospitals also provide information on other quality indicators (e.g. infections and death rate) • The waiting times posted are the expected waiting times not necessarily the waiting time experienced by a particular patient	Not reported	*Peer reviewed literature:** • Mean waiting time from referral to hospital admission in 2002 (after approach implementation) was approximately 5 days longer compared to 1999 (before implementation) • Patients willing to move to seek treatment (=Migrating patients) waited on average two months less for treatment compared to patients who were treated at nearest hospital (=non-migrating patients) • Migrating patients had shorter length of hospital stay than non-migrant patients *Note: impact based on implementation alongside other approaches (i.e. patient choice of surgeon)
United Kingdom (298)	Elective surgery	Yes	Yes	• Patients book appointments through the NHS e-Referral services, which provides that average waiting times by hospital/clinic for the specialty or service the procedure sits under as a whole (e.g. orthopedic)	Not reported	Not reported

Table 29 Wait time targets

Case examples	Wait time targets	Wait time target policy	Other information	Impact of policies	Consequences/ implications
Policy: Legally binding wait time targets or guarantees enforced through positive and negative incentives					
United Kingdom, England (2000-2008) (194,211,212,299-309)	Cancer: 2000: 2 weeks from GP referral to specialist assessment Non-cancer: 2000: 18 months for inpatient treatment 2002: 26 months from referral to specialist 15 months for inpatient treatment 2003: 21 months from referral to specialist 12 months for inpatient treatment 2005: 3 months from referral to specialist 6 months for inpatient treatment 2008: 18 weeks from referral to start of treatment The "star rating" system was introduced as a measure of institutional performance, and includes wait time considerations.	Implementation level: National • A wait time guarantee was given to all patients • The guarantee covered procedures funded by the public system • Initially, two separate guarantees were given to patients: one from referral to first specialist consultation, and another that covered inpatient waiting time. • Penalties were applied to hospitals with poor performance. – Jobs of senior executives were under threat if performance was poor. • Rewards were also given to hospitals that performed well in the form of greater autonomy. • Wait time data were published at the hospital level.	• A major increase in funding was provided during this time • Department of Health funded London Patient Choice Project (LPCP), in which patients at risk of breaching inpatient waiting time targets were offered the choice of an alternative hospital with a shorter wait. • Department of Health also set up overseas commissioning, which allowed hospitals to send their patients abroad to receive surgery so that Trusts could reach targets and avoid breaches.	Trends based on census data showed that during sanctions, fewer people waited more than 6 months for treatment. The median waiting time after patients were added to the waiting list was also shorter. A comparison of wait times before and after 2001 between England (which adopted an aggressive wait time targets policy coupled with strong sanctions for poor performing hospitals) and Scotland (which did not adopt the same policy) concluded that the proportion of patients waiting longer than 6 months for treatment fell by 6 to 9% points more in England than in Scotland and admissions for elective care increased. The order in which patients were treated did not appear to change, nor did the proportion of urgent cases fall. Further, there was no change in the severity of patients admitted for treatment or the quality of care patients received (based on the outcome measures assessed). However, there was evidence of waiting list manipulation, since the number of 'suspensions' (patients deemed not medically ready for treatment or could not attend first appointment date) and 'removals' (patients who died or were treated elsewhere) from the waitlist increased. Wait times were compared for breast cancer treatment before (1997-1999) and after (1999-2000) implementation of targets. The mean wait time from GP to specialist fell from 13.6 days to 12.3 days ($p<0.001$). However, the mean wait times from specialist to treatment (not covered under the guarantee at this time) increased from 21.4 days to 24.1 days ($p<0.001$). The mean wait time from GP to treatment increased from 35 days to 36.4 days ($p=0.01$). A duration analysis of wait time data from 2001/2002 and 2002/2003 for general surgery, orthopedics and ophthalmology found that variations in probabilities of admission coincided with changes to targets. Wait times were compared in England, Wales and Northern Ireland between 2001 and 2003. While they improved in England, they deteriorated in Northern Ireland and Wales, where the wait time target policies were not implemented. A before-after comparison of waiting time distributions for elective orthopedic surgeries in	Overall findings are based on analysis of the outcome before and after implementation of wait time target policies. However, many other approaches were in place along with the wait time target policy. Thus, it is not possible to conclude that the observable impact was only attributable to the wait time target policy.

				English hospitals found that the introduction of the wait time target changed admission patterns and led to an overall reduction in long waits. Admissions increased for all wait time categories except the shortest one. The mean waiting time from decision to treat to joint replacement fell from 157 days to 88 days ($p<0.001$) between 2006 and 2009. There was no evidence of socioeconomic disparities as the mean waiting time was 121 for the 20% less deprived and 119 days for the other groups. However, the mean "work-up waiting time" increased from 429 days to 487 days ($p=0.07$). Work up waiting time was defined as time from first referral to orthopedics clinic in the 3 years prior to surgery to inclusion in the waiting list. The policy faced criticism among healthcare professionals, e.g., mis-prioritization, undermined professional autonomy and "professionalism" Based on the results of a study exploring the effect of the LPCP on ophthalmology waiting times using 'difference in difference methods', the Project reduced both waiting times and variation in waiting times across London hospitals. A study comparing patients who travelled abroad for total knee replacement surgery through the overseas commissioning policy with those who were treated locally found that while functional outcomes were comparable, the overseas group were more dissatisfied with their overall experience Low and high performing trusts based on the star rating system were compared to explore the impact of such a system. Through semi-structured interviews with senior executives and document analyses, it was found that while the system drove some beneficial change, it also led to "tunnel vision, a distortion of clinical priorities, bullying and intimidation, erosion of public trust, and reduced staff morale".	
Policy: Legally binding wait time targets or guarantees and mandatory offer of alternative provider enforced through negative or positive incentives					
Australia (2011-2016) (210,211)	Urgent cases: 30 days from being added to the wait list to surgery Semi-urgent cases: 90 days from being added to the wait list to surgery Non-urgent: 365 days from being added to the wait list to surgery	Implementation level: National • A wait time guarantee was given to all patients • An agreement was made between the Federal Government and the States • The agreement set operational standards in which: States must show a progressive reduction in the	Not applicable	No information was found	Not applicable

		number of patients overdue for surgery; and States must show an improvement in the number of patients treated within the wait time targets. • A financial reward was given to States that met those targets. • Up to AUD 200 million in rewards were set over the life of this agreement.			
Portugal (2004-current) (211,282)	2004: General elective surgery: Urgent: 3 days High priority: 2 weeks Priority: 8 weeks Normal: 48 weeks Cancer surgery: Urgent: 3 days High priority: 2 weeks Priority: 8 weeks Normal: 48 weeks 2008: General elective surgery: Urgent: 3 days High priority: 2 weeks Priority: 8 weeks Normal: 36 weeks Cancer surgery: Urgent: 3 days High priority: 2 weeks Priority: 6 weeks Normal: 8 weeks	Implementation level: National 2004: • A wait time guarantee was given to all patients • Allowed for explicit transfer of patients between hospitals in order to meet maximum waits 2008: • When a patient on the wait list reaches 75% of maximum waiting time for surgery guaranteed by law, a voucher is produced allowing the patient to demand treatment in another public or private hospital 2012: • Financial penalties introduced: for each patient transferred, original hospital receives 10% penalty of episode billing	Not applicable	Over a 5 year period, waiting lists decreased by 35% and waiting times decreased by 63%	Not applicable
Sweden (2010) (62,211,310,311)	Patients to have instant contact with the health care system (0 days) Patients to be seen by GP within 7 days and by a specialist within 90 days* Patients to wait no more than 90 days after being diagnosed to get treatment No rationale for the wait time targets were found. * The Stockholm County Council had established more aggressive targets where patients were guaranteed consultation with a specialist within 30 days	Implementation level: National • A wait time guarantee was given to all patients • The guarantee covers patients from first contact with the health care system to surgery • By law, patient can choose another provider (public or private) if the guarantee was not fulfilled. Expenses would be covered by their home province • An economic incentive was introduced in 2009 (Queue Billion programme). Money was given to	Not applicable	A comparison of wait times for bariatric surgery in Sweden and Norway showed that the median waiting time from referral letter received to bariatric surgery was 253 days in Sweden and 461 days in Norway (where guarantees were enforced for a targeted population and only if a patient files a complaint). However, the numbers of operations in private hospitals in 2016 were 2,240 in Sweden and 114 in Norway. 55% of operations in the private sector were paid by the Swedish Government, whereas 0% of operations in the private sector were paid by the Norwegian Government.	Not applicable

		counties that reached the wait time targets set out in agreements.			
United Kingdom, England (2011-current) (211,302,312,313)	2011: Cancer: 2 weeks from GP referral to specialist 31 days from diagnosis to surgery 62 days from GP referral to first treatment Non-cancer: 18 weeks from referral to start of treatment	Implementation level: National • A wait time guarantee was given to all patients • The guarantee covers the whole patient journey from referral to initial treatment. • By law, patients are given options of other providers (public or private) if guarantee cannot be fulfilled. • NHS also sets operational standards in which at least 90-95% of patients have to start treatment within 18 weeks of referral. • Providers are monitored on a monthly basis and breach of the operational standard will result in up to 5% reduction in revenue	Not applicable	Interviews with GPs, oncologists and surgeons about wait time targets for colorectal cancer were conducted. Overall, they were positive about the targets. However, the following concerns were raised: wait time targets took a 'one-size fits all' approach; providers faced considerable pressure; and waiting time targets over-rode patient and provider choice.	Overall findings are based on analysis of outcomes before and after implementation of wait time target policies. However, many other approaches were in place along with the wait time target policy. Thus, it is not possible to conclude that the observable impact was only attributable to the wait time target policy.
Policy: Legally binding wait time targets or guarantees and mandatory offer of alternative provider					
Australia, Queensland (2015) (314,315)	Guarantee depends on the specialist decision Urgent cases: 30 days from being added to the wait list to surgery Semi-urgent cases: 90 days from being added to the wait list to surgery Non-urgent: 365 days from being added to the wait list to surgery	Implementation level: Provincial • A wait time guarantee is given to all patients • The guarantee is in force from the moment patients are added to the wait list • Patients are offered the next available appointment at another place (public or private) at no cost, if the target is not fulfilled. • Travel and accommodation expenses are covered if treatment is located less than 50km from the original hospital	Not applicable	No information found	Not applicable
Norway (1990s) (60,316)	1990: 6 months for elective surgery for "patients who suffer from damage to health that requires intervention to avoid serious consequences in the long run" 1997: 6 months for elective surgery for patients with higher need 3 months for elective surgery for patients with lower need	Implementation level: National • A wait time guarantee was given to patients with "needs" • By law, the Province had to offer treatment to patients with another provider if the guarantee was not fulfilled.	Not applicable	The number of patients waiting more than 6 months increased from 3,000 to 19,500 between 1993 and 1996. The number of patients on the waiting list increased from 227,000 to 301,000.	The policy was abandoned.
Norway (2004) (59,133,211,250,251)	2004: Assessment by specialist within 30 days of referral	Implementation level: National	Not applicable	Study used data from the Norwegian Patient Register to compare actual versus recommended waiting times following allocation of ICD10 codes to medical descriptions pre and post reform. The	Not applicable

	If the patient fulfills requirements, (s)he is given an individual maximum waiting time until start of treatment Guidelines describe a selection of medical conditions, and based on a typical patient with these conditions, a recommendation is made on what the maximum waiting time should be.	• All patients had the right to be assessed by specialist within 30 days of referral • A wait time guarantee after specialist assessment was given to some patients • By law, patients could file a complaint if waiting time target was not met. • Once complaint was filed, the hospital is given 14 days to provide treatment. • If treatment was not given, patients could choose treatment at another provider. All expenses were covered by the hospital, including travel expenses.		results showed that the overall mean waiting time did not change. However, patients in the highest priority group were more likely to experience excessive waiting times compared to the group with the lowest priority National registry data from 2003-2006 showed that the mean waiting time from referral to start of treatment for the group with the highest priority (65.2 days) was lower than for the group with the lowest priority (114.7 days). Mean waiting times for those without the guarantee was 157.6 days. However, 54% of the patients with the highest priority experienced excessive waiting time and only 42% of the patients with the lowest priority experienced excessive waiting times. The study concluded that "patients suffering from the most severe conditions wait longer than they should, and thereby are under-prioritised in the Norwegian hospital sector relative to patients of lower priority." The proportion of violations of maximum waiting times decreased between 2006 and 2011. However, this reduction was accompanied by a reduction in the proportion of patients who were given a maximum waiting time and a small reduction in the actual waiting times	
United Kingdom, Scotland (2011-current) (71,136,211,317-319)	Cancer: 31 days from decision to treat to first treatment 62 days from referral to treatment Coronary heart disease: 16 weeks from referral to cardiac intervention. Other elective care: 12 weeks from specialist decision to treat to treatment 18 weeks from referral to treatment 6 weeks for eight diagnostic tests	Implementation level: National • A wait time guarantee was given to all patients • The guarantee covers the whole patient journey from referral to initial treatment. • By law, if the guarantee is not fulfilled, the Board must provide a written explanation to the patient. • Patients can be given the option of treatment elsewhere (private or public). • There are also operational standards in which, for example, 90% of patients have to start treatment within 18 weeks of referral. • Performance of regions is reported in the press, but currently it is unclear what sanctions are in place if operational standards are not met.	Not applicable	No information was found	Not applicable
Policy: Non-legally binding wait time targets or guarantees and offer of alternative provider					

Canada, Newfoundland (2010) (320)	CABG: 182 days (no further information)	Implementation level: Provincial • A wait time guarantee of 182 days was given to patients waiting for CABG • Patients will be provided with treatment in another jurisdiction	Not applicable	No information found	Not applicable
Canada, Quebec(2007) (321)	6 months (no further information)	Implementation level: Provincial • 90% of elective surgeries will be performed within a maximum of 6 months • Patients can be given the option of treatment by another provider if the target is not fulfilled	Not applicable	No information found	Not applicable
Denmark (1993) (123,211)	1993: 12 weeks from GP or specialist referral to beginning of treatment	Implementation level: National • Patients were given the option of treatment at any public hospital • Expenses would be covered by the public system. • Patients were not reimbursed for travel expenses**(123, 211)**	"Extra funds allocated"	There was no effect on waiting times	A new policy was in place in 2002
Denmark (2000-2011) (123,211)	2000: Maximum wait time for life-threatening conditions established 2002: 8 weeks from GP referral to beginning of treatment 2007: 4 weeks from GP referral to beginning of treatment 2011: Non-cancer: 4 weeks from GP referral to diagnosis Non-cancer and non-life threatening conditions: 4 to 8 weeks (depending on urgency) from diagnosis to beginning of treatment Cancer: 2 weeks from referral to specialist 2 weeks from diagnosis to surgery 4 weeks from referral to follow-up treatments Ischemic diseases: Unstable angina pectoris: 3 weeks from specialist to coronary arteriography and revascularisation Angina pectoris after MI: 5 weeks from specialist to revascularisation and coronary angiography	Implementation level: National 2002: • A wait time guarantee was given to all patients • The guarantee covered patients from referral to treatment • Patients were given the option of treatment from another provider (public or private) if the guarantee was not fulfilled. Expenses would be covered by the public system. • Patients were not reimbursed for travel expenses.	In 2002, an additional 1.5 billion DKK were pledged to surgical activity to increase it by 14-18%	One report concluded that waiting times declined after 2002, although other approaches were already in place during this time and the number of patients using private hospitals increased from 2.0% in 2006 to 4.2% in 2008. **(211)**	Not applicable
Sweden (1992-1996) (211,322-324)	1992: 90 days from physician's decision to surgery	Implementation level: National • A wait time guarantee was given to 12 procedures (hip replacement, knee replacement, cataract, prolapse operations, surgery for urinary	Extra financial support (SEK 500 million) was given for the first year of implementation.	Data relating to the 12 procedures covered by the guarantee showed that waiting times decreased in the first year of the guarantee. However, waiting times started to rise in 1993 and by 1996, the waiting lists had reached initial levels. Data from the National Cataract registry showed that median waiting time from decision to treat to	The guarantee was abandoned in 1996. The guarantee faced criticism for only including 12 procedures.

		incontinence, gallstone surgery, hernia surgery, PTCA, CABG, angiography, surgery for prostate enlargement and fitting of hearing aids) • For some procedures (cataract, joint replacement, knee replacement and fitting of hearing aids), wait time guarantees were not offered to patients with no priority rating • The guarantee covered from physician's decision to treat to surgery • Patient could choose another provider (public or private) if the guarantee was not fulfilled. Expenses would be covered by their home province**(211)**.(;460)		day of surgery was 89 days in 1992. The median waiting time from decision to treat to day of surgery was 147 days in 1998-1999 The average wait for CABG decreased from more than a year to 6 weeks by the end of 1992, and the proportion of patients receiving cataract surgery within 3 months rose from 25% in 1991 to 70% in 1992 and 60% in 1993. However, the number of patients with no guarantee increased from 23% to 36%. Reports indicate that very few patients were sent to other hospitals with shorter wait times.	
Sweden (1997) (211)	1997: Patients to have instant contact with primary care (0 days) Patients to be seen by GP within 7 days and consulting a specialist within 90 days	• A wait time guarantee was given to all patients • The guarantee covered from physician's decision to treat to surgery • Patient could choose another provider (public or private) if the guarantee was not fulfilled. Expenses would be covered by their home province.	Not applicable	No information found	Not applicable
Sweden (2005) (62,211,281,310,311,322)	2005: Patients to have instant contact with the health care system (0 days) Patients to be seen by GP within 7 days and consulting a specialist within 90 days* Patients to wait no more than 90 days after being diagnosed to get treatment No rationale for the wait time targets were found. *The Stockholm County Council had established more aggressive targets where patients were guaranteed consultation with a specialist within 30 days	Implementation level: National • A wait time guarantee was given to all patients (but it was not a legal right) • An agreement was signed between the Federal Government and the county councils (although no legislation was implemented) • The guarantee covered patients from first contact with the health care system to surgery • Patient could choose another provider (public or private) if the guarantee was not fulfilled. Expenses would be covered by their home province.	Additional funding was provided extra funding to support the wait time target policy. The amounts were SEK 700 million in 2005, an additional SEK 500 million in 2006, and SEK 750 million in 2007. This was equivalent to 0.3% of the health care budget in 2005.	Data from the National Cataract registry showed that mean waiting times for cataract surgery decreased from 2005 (5 months) to 2008 (2.3 months). The number of patients crossing borders to have operations in another province went from 5% (2005) to 3% (2008). The mean waiting time for people who moved was 2.0 months, whereas the time for those who did not move was 3.4 months ($p<0.001$). Overall, waiting times decreased from 2005 to 2007. However, in 2008, 30% of all patients on the waiting lists had been waiting more than 90 days for an appointment with specialist. Also, there was a wide variation in wait times among regions. The general conclusion was that "the guarantee had a limited impact on waiting times, suggesting that implementation of the reform had not been completely successful".	Changes in the policy were introduced in 2010. Reasons were that policy had limited effect on wait times and many authorities did not inform patients and providers about the guarantee.
United Kingdom, Scotland (2003-2007) (68,71,136,194,211,251,317,318,325,326)	2003: 9 months from referral to first specialist assessment 9 months from specialist decision to treat to treatment	Implementation level: National	Not applicable	Overall, there was a reduction of waiting times after the implementation of the policy. But the decrease in waits for some patients was at the	The ASC code was abolished in 2007.

	2005: 6 months from referral to first specialist assessment 6 months from specialist decision to treat to treatment 2007: 18 weeks from referral to first specialist assessment 18 weeks from specialist decision to treat to treatment	• A wait time guarantee was given to all patients without an Availability Status Code (ASC, assigned to patients who were not available or suitable for treatment). • Two separate guarantees were given to patients: one from referral to first specialist consultation, and another that covered inpatient waiting time. • NHS boards were monitored on a monthly basis. Individual "breaches" had to be reported to the Executive and were rigorously investigated. • Patients at risk of breaching the target could be diverted to a national waiting centre dedicated to elective surgeries.		expense of other patients who would have waited less if the policy was not in place. Further, data was potentially manipulated (gaming) as the number of the allocation of ASC code to patients increased during this period The mean waiting time from specialist to initial treatment decreased from 84.1 days to 74.9 days from 2003/04 to 2005/06. The median waiting time increased from 44 days to 49 days. However, at the 90th percentile, the waiting time decreased by 59 days. Further analysis showed that patients in the low priority group experienced an 11% (16 days) reduction in mean waiting time relative to the high priority group, whose waiting times did not change over time. Mean waiting time from specialist to treatment reduced from 79.4 days to 63.0 days from 2002 to 2007. Further analysis showed that waiting times decreased for patients with longer times at the expense of those who previously waited less. In the orthopedic surgery department of one Health Board, the 95 percentile wait decreased from 36 weeks in 2004 to 17 weeks in 2007. Wait time reductions after 2001 were compared between England and Scotland (where, at that time, waiting time targets were not strongly monitored). The proportion of patients waiting longer than 6 months for treatment fell by 6% to 9% more in England than Scotland. The study also reported that the percentage of patients waiting more than 6 months for care was 14% in those with the ASC code and 28% for those patients in Scotland without the ASC code	Overall findings are based on analysis of outcomes before and after implementation of wait time target policies. However, many other approaches were in place along with the wait time target policy. Thus, it is not possible to conclude that the observable impact was only attributable to the wait time target policy.
Policy: Non-legally binding wait time targets or guarantees					
Australia (2013) (211)	Urgent cases: 30 days from entry into wait list to surgery Semi-urgent cases: 90 days from entry into wait list to surgery Non-urgent: 365 days from entry into wait list to surgery	Implementation level: National and regional	Not applicable	No information was found	Not applicable
Australia, Queensland (current) (327)	Deliver surgery to non-urgent cases within half of the recommended 365 days	Implementation level: State	Not applicable	News item reporting a successful story. After approach, the median wait time for non-urgent cases in the area decreased to between 80 and139 days.	Not applicable
Australia, Western Australia (2016) (232)	Urgent cases: 30 days from being added to the wait list to surgery Semi-urgent cases: 90 days from being added to the wait list to surgery Non-urgent: 365 days from being added to the wait list to surgery	• Implementation level: State • A wait time target is given to all patients An operational standard also states that 100% of patients will not wait longer than the recommended wait time.	Not applicable	No information was found	Not applicable

Canada (328-330)	Wait time targets (developed by the Wait Time Alliance, WTA) vary according to urgency and type of procedure. Examples: Hip and knee replacement within 26 weeks Cataract within 16 weeks for high-risk patients CABG within 2 to 26 weeks depending on urgency. Developed by the Wait Time Alliance (WTA)	Implementation level: National Wait time targets based on clinical evidence (when available), health care providers, patient, public and government input	In 2007, the Federal Government offered provinces and territories extra funding to address wait times contingent on the jurisdictions publicly committing to establishing Patient Wait Times Guarantee for at least one treatment, procedure, or diagnosis identified in the 2004 Health Accord	In the first 5 years of the WTA benchmarks, progress was made in most provinces to reduce wait times. However, progress stalled and some provinces experienced setbacks in 2011-2013. In 2014, improvements were again shown in most provinces. It was recommended that enforceable wait time targets be instituted in Canada Since the introduction of grading of provincial wait time websites, the provinces have made substantive progress to improve the breadth and level of reporting.	Not applicable
Canada (2008-current) (33,331) (interview)	Pediatric Canadian Access Targets for Surgery (P-CATS) Wait time targets (part of the Canadian Pediatric Surgical Wait Time Project, CPSWTP) vary according to diagnosis and urgency	Implementation level: National Wait time targets based on clinical evidence (when available), health care providers input	Not applicable	According to documents from grey literature, by 2012, there was a decrease in number of children waiting for surgery. However, impact is based on implementation alongside other approaches	Many other approaches were in place along with the wait time target policy. Thus, it is not possible to conclude that the observable impact was only attributable to the wait time target policy.
Canada, Alberta (Five year action plan 2010-2015) (332)	30 days from referral to specialist Cancer: 4 weeks from referral to treatment CABG: 1 to 16 weeks from referral to treatment Other surgical procedures: 14 weeks from referral to treatment	Implementation level: Provincial A five year action plan set targets to specific surgical procedures	The targets were set under a 5-year Health Action Plan (2010-2015)	No information found	Not applicable
Canada, Alberta (2012–current) (interview)	Alberta Coding Access Targets for Surgery (ACATS) Wait time targets vary according to diagnosis and urgency	Implementation level: Provincial The defined ideal times to surgery are based on clinical indicators according to disease process and physiological state; they are founded by evidence and validated with consensus across the province	Not applicable	According to sources from grey literature, the pilot project managed to reduce wait times for cataract surgery.	Many other approaches were in place along with the wait time target policy. Thus, it is not possible to conclude that the observable impact was only attributable to the wait time target policy.
Canada, Saskatchewan (interview)	Initially, 12 week wait time for all surgeries and a maximum 3-week wait for cancer surgeries	Implementation level: Provincial Developed through a demand analytics tool that is still being used by the Ministry today	• Targets were implemented at the start of the Saskatchewan Surgical Initiative, when the Ministry "couldn't give their money away"	4-5 years ago, there were almost no patients waiting > 3 months for surgery, but the budget took a hit in 2015-16 when oil prices plummeted and the province has no longer been able to achieve targets	Work has been done to understand what the regions need in order to regain the achievements realized through the Saskatchewan Surgical Initiative.

					Wait times have grown substantially (fewer than 20% of patients receive surgery within 3 months As of 2018, the new goal is to have 90% of patients receiving elective surgery within 6 months and, for cancer patients, within 3 weeks
Spain(61,211)	6 months for cataracts, cardiovascular procedures, and joint replacement	Implementation level: National	Not applicable	No information was found	Not applicable

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