2

Waiting-time data used in this book

2.1 Patient progress through surgical care

Surgical care encompasses a continuum of activities through the diagnostic, preoperative, operative, and postoperative stages [28, 34]. During the diagnostic stage, the patient undergoes tests and other forms of evaluations to identify the condition causing illness, which may or may not require surgery. The preoperative stage consists of all the clinical and managerial activities that take place from when a decision to operate is taken until the patient enters the operating room. The operative stage lasts from the patient's entry into the operating room until his or her entry into the recovery suite. The postoperative stage includes recovery care and treatment in an inpatient surgical unit and/or an intensive care unit and ends with discharge from hospital.

The following is a summary of the processes in surgical care at major teaching hospitals in Canada. When necessary, primary care physicians refer to a specialist any patient who presents with signs and symptoms specific to a condition that is amenable to surgical intervention. If, following an outpatient consultation, surgery is deemed necessary, staff in the surgeon's office register the patient on an appropriate wait list and sends the request for operating room time to hospitals where the surgeon has admitting privileges. The patient is then scheduled for presurgical assessment at a preadmission clinic, where an anesthesiologist determines the patient's suitability for surgery and creates a care plan for the preoperative and postoperative periods [44]. The procedure is postponed if the patient is deemed unfit for any reason. If necessary, the patient undergoes additional preoperative investigations for assessment of surgical risks. Clinic staff provide education about the procedure and any preparation required at home.

Each patient's access to surgery is managed through the scheduling of operating room time [16]. Surgical scheduling staff identify the patients available for allocated operating room time slots and reserve hospital resources to ensure appropriate care during and after the operation [49]. Patients are selected for scheduling both from hospital wards and from the surgical wait lists on the basis of allocated operating room time slots.

Patients may be admitted to the hospital through the emergency room, the same-day admission clinic, or the patient admitting office. To allow optimal utilization of surgical suite resources, hospitals periodically release blocks of operating room time to various surgical services. Each service then places its patients on the operating room schedule, with some operative slots set aside for emergency cases [77]. Any time that is not booked by a particular service is then made available to other services. Each surgical service selects patients from its wait lists and schedules operations on the basis of urgency, best use of allocated operating time, availability of hospital resources, and plan for discharge from the hospital. Once set, the schedule for a particular service may be changed to accommodate the needs of emergency patients, who have preferential

access to hospital resources. Conversely, scheduled surgery may be moved ahead if an operating room time slot becomes available.

On the day of a scheduled procedure, the anesthesiologist and the attending surgeon assess the patient before transfer to the operating room holding area. After the operation, the patient is taken to the postanesthesia care unit for monitoring and treatment of possible side effects of anesthesia. The anesthesiologist performs a postsurgical assessment, and the patient is transferred to the intensive care unit or to a hospital ward for further treatment [14].

While the patient is on the ward, a bedside nurse reassesses the patient's pain and other aspects of his or her condition. Once the patient reaches the point where oral analgesics are sufficient to control postsurgical pain, the primary surgical service takes over the task of following the patient. Finally, when the criteria for discharge are met, the patient is discharged from the hospital to home or to after-hospital care.

2.2 Access to coronary artery bypass grafting surgery

2.2.1 Capturing events in surgical cardiac care

In this section, we describe variables that reflect a patient's progress from the time of registration on a wait list for elective coronary artery bypass grafting (CABG) in British Columbia, Canada. Patients who are to undergo CABG may encounter different events along their individual care pathways. Figure 2.1 shows the care pathways and perioperative activities that patients presenting with symptoms of coronary artery disease are likely to experience, according to initial presentation and subsequent events leading to surgery. For example, a 55-year-old woman who is registered on a surgical wait list at a particular hospital may, at the time of registration, have an urgency status of semiurgent, with no comorbidities. Her subsequent care steps may involve a visit to the preadmission clinic, assessment by an anesthesiologist, the scheduled bypass surgery itself, and discharge from hospital. Alternatively, a 75-year-old man who is registered on a surgical wait list at a different hospital may, at the time of registration, have urgent status, with chronic obstructive pulmonary disease as a major comorbidity. If his condition deteriorates, his surgery may be cancelled because he is unfit to undergo the procedure. These various care pathways and characteristics of patients scheduled for CABG are captured through events and attributes of interest.

To reconstruct the events that patients experience during the perioperative period, health services researchers develop a data model that specifies the relations between data elements and events occurring during the process of care. In this book, data on patients who were registered to undergo CABG were obtained from the British Columbia Cardiac Registry (BCCR) [120]. This prospective database contains dates of registration on the list, procedure, and withdrawal from the list, along with disease severity and other risk factors, for all patients who have been registered to undergo CABG in any of the four tertiary care hospitals that provide cardiac care to adult residents of British Columbia since 1991 [110].

A time stamp is recorded for all captured events, so the time between events in the process of care is easily recovered. Therefore, we refer to patient-level information on events and their dates as waiting-time data. In the database that we used for our analysis, the sequence of events for individual patients can be presented in terms of patient-level records, whereby one patient has only one record with multiple variables representing the date and type of event, or by means of a patient-episode data set, in which each patient has multiple records. The patient-level format is best suited to presenting events that occur at regular intervals, in which case the fields containing event dates are labeled with numeric suffixes to relate the event date to the subsequent event [102]. For some factors that vary over time, an additional set of fields is needed to store information on the date and value of each factor. For example, if the hospital capacity changes quarterly,

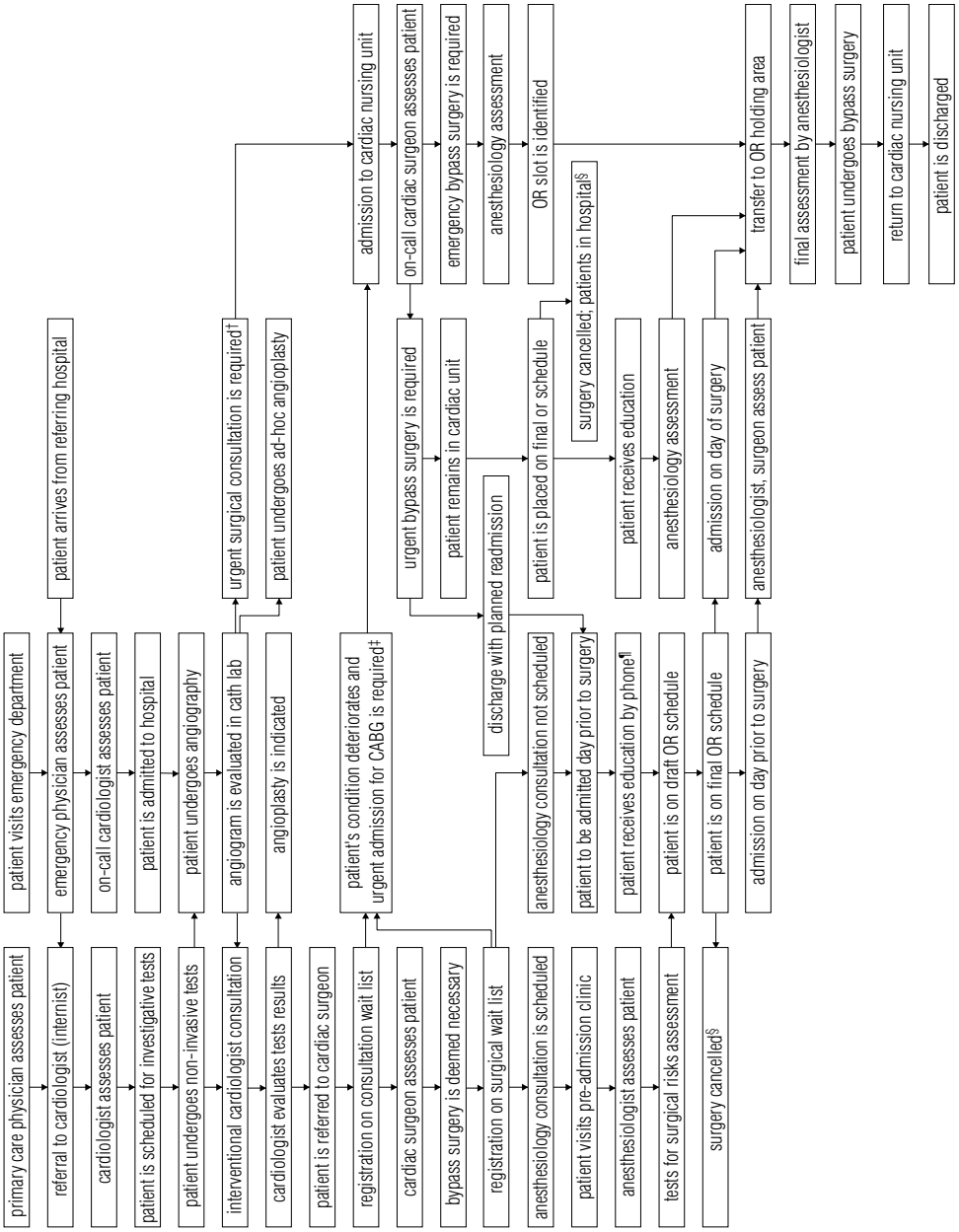

Fig. 2.1. Process of care for patients presenting with symptoms of coronary artery disease. Care coordinators †help to expedite surgical assessment, ‡contact patients at home until their procedures, §oversee re-scheduling of patients whose surgeries were cancelled, and ¶provide educational materials to patients and their families. (OR = operating room).

four additional variables are needed for 1 year of follow-up. In contrast, the person-episode record has for each patient only fields for event identification number and event date. The combination of patient identifier and sequential event number uniquely determines the record related to a certain event.

Registry records also provided information on each patient's age, sex, urgency status, coronary anatomy, and hospital at the time of registration on the wait list.

The primary events of interest for each patient were registration and removal from the wait list, hospital admission and separation, scheduled surgery and unplanned emergency surgery, and preoperative, in-hospital or follow-up death. The date of the surgeon's request to book the operating room served as the date of the decision for surgery and registration on a wait list. In British Columbia, surgical wait lists hold patient names until the surgery can be scheduled. Patients are removed from a wait list without surgery if they die, if they reconsider the decision to undergo surgery, if their condition deteriorates such that surgery is no longer possible, or if they undergo surgery elsewhere. Each week, the offices of all cardiac surgeons provide information to the registry on registrations for surgery, operations performed, wait-list reconciliation (removals), and discharge summaries.

2.2.2 Other data sources

Additional information on access to CABG was obtained from administrative health databases and provincial death records. To identify hospital admission and discharge dates, coexisting conditions, and whether the patient was discharged alive or died in hospital, we used each patient's provincial health number to link deterministically BCCR records to the British Columbia Linked Health Database Hospital Separations File. [25]. Data on coexisting conditions were retrieved in the form of diagnoses reported in discharge abstracts created during the calendar year before the treatment decision [56]. Unplanned emergency surgeries were identified by the emergent or urgent code for admission from the emergency department or by the emergent code for admission from the admitting department after the patient was registered on a surgical wait list. To identify deaths that did not occur in a hospital, we linked the BCCR to the British Columbia Linked Health Database Deaths File [117]. Underlying causes of death were coded according to the International Classification of Diseases, 9th revision (ICD-9). Deaths related to cardiovascular disease were represented by ICD-9 codes 410 to 414 (ischemic heart disease) or 420 to 429 (other forms of heart disease) [23].

2.2.3 Analytical data set

The registry records were linked to the other databases to create the analytical data set for patients registered for elective CABG. A data dictionary was created to describe the variables representing events and attributes of interest in this data set (Table 2.1). In this table, the rows show variables in the data set and the columns show characteristics of each variable, such as the name, the information stored in the variable, the data sources, the type of data, and how the data are coded. For example, the variable named "SEXF" contains data on the patient's sex and is a categorical variable where 0 indicates man and 1 indicates woman.

Table 2.1. Data dictionary for records of patients awaiting elective coronary bypass grafting

Variable	Description	Source	Code
BCCR_ID	Patient identifier	BCCR	<Text>
AGECAT	Age decade	BCCR	1 – 20–29 years
			2 – 30–39 years
			...
			8 – ≥90 years
SEXF	Sex	BCCR	0 – Man
			1 – Woman
ANATOM	Coronary anatomy	BCCR	1 – Left main disease
			2 – 2- or 3-vessel disease, with PLAD
			3 – 3-vessel disease, with no PLAD
			4 – 1-vessel disease, with PLAD
			5 – 1- or 2-vessel disease, no PLAD
			U – Otherwise and unknown
UR_BK	Urgency at booking	BCCR	0 – Emergency
			1 – Urgent
			2 – Semiurgent
			3 – Nonurgent
			U – Unknown
CM_CH	Comorbidities from Charlson index	Hospital Separations	0, 1, 2, 3, or 4 (≥4)
CM_BK	Major comorbidities	Hospital Separations	1 – CHF or diabetes or COPD or rheumatism or cancer
			0 – Other
INST_BK	Location at registration	BCCR	Hospital 1, 2, 3, or 4
WL_ST	Wait-list registration date	BCCR	mm/dd/yyyy
WL_EN	Wait-list removal date	BCCR	mm/dd/yyyy
WL_RM	Reason for removal	BCCR	0 – Underwent surgery
			1 – Death
			2 – Medical treatment
			3 – At patient request
			4 – Transfer to other hospital
			5 – Otherwise removed from list

			6 – No surgical report
			7 – Still on wait list
			8 – Other surgery
			9 – Death recorded in BCCR, not in Deaths File
DTHDATE	Death date	Deaths File	mm/dd/yyyy
			< . > – no date recorded
EXIT_CODE	Type of hospital discharge	Hospital Separations	D – Discharged alive
			S – Left against medical advice
			X – Died in hospital
			N/A – Not applicable
ADDATE	Hospital admission date	Hospital Separations	mm/dd/yyyy
			< . > – no date recorded
SEPDATE	Hospital separation date	Hospital Separations	mm/dd/yyyy
			< . > – no date recorded

Abbreviations: BCCR = British Columbia Cardiac Registry, CHF = congestive heart failure, COPD = chronic obstructive pulmonary disease, PLAD = proximal left anterior descending

Table 2.2 shows a sample of fictitious records from the analytical data set, in which each row represents a patient record and each column is a variable representing an event or attribute of interest. From each patient record, we can reconstruct the key events and attributes of the patient's care pathway. For example, patient 100002 was a man between 50 and 59 years of age, who had three-vessel disease with no proximal left anterior descending, and no comorbidities. On July 22, 1994, he was registered on a wait list for hospital 4, with semiurgent status. He was admitted to hospital on February 14, 1995; he underwent surgery and was removed from the wait list on February 17, 1995. He was discharged alive on February 27, 1995; however, he died on July 15, 1996.

2.2.4 Patient population

In Part II of this book, we present the results of several modeling studies that we performed using the records of patients for whom surgical revascularization was indicated at the time of consultation with a cardiac surgeon.

In British Columbia, there are two pathways to surgical revascularization: registration on a wait list or direct admission after coronary angiography. A patient who presents with symptoms of coronary artery disease is referred to a cardiologist, who evaluates the results of coronary angiography and recommends treatment. If coronary angioplasty is not indicated, the patient is referred to a cardiac surgeon, who assesses the need and suitability for CABG. Following the decision to operate, surgeons register on their wait lists patients who require and decide to undergo the operation.

Between January 1991 and December 2000, 9346 patients were registered for first-time isolated (without a valve-replacement procedure) CABG on the elective basis. We excluded the records of 147 patients for a variety of reasons: case was coded as an emergency at the time of registration (30 patients), patient was

Table 2.2. Sample of analytical data set for fictitious patients awaiting elective coronary artery bypass grafting

BCCR_ID	AGECAT	SEXF	ANATOM	UR_BK	CM_CH	CM_BK	INST_BK	WL_ST	WL_EN	WL_RM	DTHDATE	EXIT_CODE	ADDATE	SEPDATE
100001	5	0	1	2	0	0	2	01/29/1992	03/25/1992	0	.	D	03/24/1992	04/03/1992
100002	4	0	3	2	0	0	4	07/22/1994	02/17/1995	0	07/15/1996	D	02/14/1995	02/27/1995
100003	4	1	3	1	2	0	2	08/23/1996	08/24/1996	0	.	D	08/23/1996	09/01/1996
100004	3	0	3	3	0	0	3	09/17/1991	11/08/1991	0	.	D	11/07/1991	11/13/1991
100005	7	0	1	2	3	1	2	07/13/1997	10/24/1997	0	.	D	10/25/1997	11/09/1997
100006	4	0	3	2	2	1	2	04/21/1993	06/05/1993	0	06/15/1993	X	06/05/1993	06/10/1993
100007	5	1	3	2	4	1	2	10/09/1995	01/23/1996	1	01/15/1996	N/A	.	.
100008	6	0	3	3	3	1	1	02/20/1998	03/13/1998	2	.	N/A	.	.
100009	3	0	5	2	0	0	4	11/22/1992	12/31/1992	5	.	N/A	.	.
100010	4	0	3	2	0	0	2	12/04/1996	01/16/1997	5	03/15/2001	N/A	.	.

removed from the list on the registration date (99), operating room report was missing (4), or registration on a weekend with admission the next day, which suggests immediate access (14). The records for the remaining 9199 patients (see Table 2.3 for baseline characteristics) had either a surgery date or a date of removal without surgery (and a reason for this event). The study period ended in December 2001, which allowed only 52 weeks of follow-up after the last patients were added to the list. Therefore, we restricted the analysis to the first 52 weeks after registration, such that the 471 patients (5.1%) remaining on the lists at 12 months were censored. Of those, 167 eventually underwent surgery, 7 died, 78 became unfit for surgery, 187 declined surgery, 16 were transferred to another surgeon or hospital, and 99 were removed from the wait lists for other reasons. Among the 8728 patients (94.9%) who were removed from the list by 52 weeks, 7654 received planned surgery, 314 underwent unplanned emergency surgery, 91 died, 173 became unfit for surgery, 104 declined surgery, 98 were transferred to another surgeon or hospital, 23 received other surgery, and 188 were removed for other reasons.

Alternatively, when urgent assessment is deemed necessary, patients are admitted to a hospital cardiac ward directly from the catheterization laboratory. If suitable for surgery, such patients remain in hospital until the operation. There were 10 467 direct admissions between January 1991 and December 2001 (see Table 2.4 for baseline characteristics). The data dictionary for the analytical data set of directly admitted CABG patients is shown in the Appendix (Table A.1).

To prioritize patients and assign the target access time for surgery, all cardiac surgeons in British Columbia used established guidelines developed in 1990, which was based on the severity of angina symptoms, the extent of coronary artery disease (including the extent of left main stenosis), the results of noninvasive tests, and the presence of left ventricular dysfunction (ejection fraction less than 50%) as described elsewhere [70]. There were three priority groups at registration for CABG: urgent, semiurgent, and nonurgent. The target time to surgery was 3 days for patients with left main coronary artery stenosis greater than 70% (urgent group); 6 weeks for patients with persistent unstable angina, impaired left ventricular function, and significant obstruction, defined as left-main stenosis, triple-vessel disease, or double-vessel disease with significant stenosis of the proximal left anterior descending artery (semiurgent group); and 12 weeks for patients with intractable chronic angina, normal left ventricular function, and single-vessel disease or double-vessel disease with no lesion in the proximal left anterior descending artery (nonurgent group).

2.3 Access to elective vascular surgery

2.3.1 Data sources

Data were obtained from a hospital registry set up by the Department of Surgery, Queen's University, Kingston, Ontario, to prospectively collect data on waiting times for admission of patients registered for elective vascular surgery. The registry records accounted for all patients referred to the department for assessment at the outpatient clinic who were afterward added to the wait list. Patients who received emergency treatment were excluded. The data dictionary for the vascular data, which describes variables representing events and attributes of interest, appears in Table A.2.

2.3.2 Patient population

We studied the records of patients for whom elective vascular surgery was indicated and planned. Patients were registered on the wait list after the consultation visit during which surgery was deemed necessary.

Table 2.3. Characteristics of 9199 patients registered for elective isolated coronary artery bypass grafting in British Columbia, 1991–2000

	Priority group; no. (%) of patients			
Characteristic	**All*** **(n = 9199)**	**Urgent (n = 646)**	**Semiurgent (n = 6481)**	**Nonurgent (n = 1959)**
Age group (years)				
<50	731 (7.9)	37 (5.7)	497 (7.7)	187 (9.5)
50–59	2002 (21.8)	128 (19.8)	1404 (21.7)	452 (23.1)
60–69	3511 (38.2)	250 (38.7)	2491 (38.4)	728 (37.2)
70–79	2763 (30.0)	207 (32.0)	1963 (30.3)	554 (28.3)
≥80	192 (2.1)	24 (3.7)	126 (1.9)	38 (1.9)
Registration period				
1991–1992	1723 (18.7)	116 (18.0)	1220 (18.8)	334 (17.0)
1993–1994	1883 (20.5)	110 (17.0)	1377 (21.2)	386 (19.7)
1995–1996	1995 (21.7)	237 (36.7)	1360 (21.0)	374 (19.1)
1997–1998	1884 (20.5)	116 (18.0)	1324 (20.4)	428 (21.8)
1999–2000	1714 (18.6)	67 (10.4)	1200 (18.5)	437 (22.3)
Sex				
Men	7572 (82.3)	526 (81.4)	5365 (82.8)	1581 (80.7)
Women	1627 (17.7)	120 (18.6)	1116 (17.2)	378 (19.3)
Comorbidity at registration				
Major conditions†	2004 (21.8)	163 (25.2)	1391 (21.5)	424 (21.6)
Other conditions‡	2431 (26.4)	217 (33.6)	1765 (27.2)	421 (21.5)
None	4764 (51.8)	266 (41.2)	3325 (51.3)	1114 (56.9)
Location at registration				
Hospital 1	1895 (20.6)	130 (20.1)	1371 (21.2)	385 (19.7)
Hospital 2	3130 (34.0)	282 (43.7)	2467 (38.1)	371 (18.9)
Hospital 3	2121 (23.1)	18 (2.8)	1022 (15.8)	1019 (52.0)
Hospital 4	2053 (22.3)	216 (33.4)	1621 (25.0)	184 (9.4)
Coronary anatomy				
Left main disease	1411 (15.3)	401 (62.1)	972 (15.0)	32 (1.6)
Multivessel§	7025 (76.4)	215 (33.3)	5075 (78.3)	1692 (86.4)
Limited‖	763 (8.3)	30 (4.6)	434 (6.7)	235 (12.0)

* Includes 113 patients with unknown priority group

†Congestive heart failure, diabetes mellitus, chronic obstructive pulmonary disease, rheumatoid arthritis, or cancer

‡Peripheral vascular disease, cerebrovascular disease, dementia, peptic ulcer disease, hemiplegia, renal disease, or liver disease

§Two- or three-vessel disease with proximal left anterior descending (PLAD)

‖Two-vessel disease with no PLAD or one-vessel disease with PLAD

Table 2.4. Characteristics of 10 467 direct admissions for isolated coronary artery bypass grafting in British Columbia, 1991–2001

	Priority group; no. (%) of patients			
	All*	**Urgent**	**Semiurgent**	**Nonurgent**
Characteristic	**(n = 10467)**	**(n = 5353)**	**(n = 4536)**	**(n = 523)**
Age group (years)				
<50	808 (7.7)	384 (7.2)	374 (8.2)	46 (8.8)
50–59	2082 (19.9)	1040 (19.4)	910 (20.1)	126 (24.1)
60–69	3689 (35.2)	1851 (34.6)	1616 (35.6)	198 (37.9)
70–79	3509 (33.5)	1856 (34.7)	1493 (32.9)	141 (27.0)
≥80	379 (3.6)	222 (4.1)	143 (3.2)	12 (2.3)
Surgery period				
1991–1992	1770 (16.9)	777 (14.5)	826 (18.2)	152 (29.1)
1993–1994	1526 (14.6)	985 (18.4)	503 (11.1)	37 (7.1)
1995–1996	1686 (16.1)	1004 (18.8)	600 (13.2)	82 (15.7)
1997–1998	1997 (19.1)	1044 (19.5)	856 (18.9)	86 (16.4)
1999–2000	2454 (23.4)	1081 (20.2)	1199 (26.4)	156 (29.8)
2001	1034 (9.9)	462 (8.6)	552 (12.2)	10 (1.9)
Sex				
Men	8154 (77.9)	4059 (75.8)	3603 (79.4)	441 (84.3)
Women	2313 (22.1)	1294 (24.2)	933 (20.6)	82 (15.7)
Comorbidity at surgery				
Major conditions†	4040 (38.6)	2046 (38.2)	1803 (39.7)	171 (32.7)
Other conditions‡	5268 (50.3)	2853 (53.3)	2221 (49.0)	170 (32.5)
None	1159 (11.1)	454 (8.5)	512 (11.3)	182 (34.8)
Location at surgery				
Hospital 1	1590 (15.2)	558 (10.4)	1007 (22.2)	20 (3.8)
Hospital 2	2522 (24.1)	1500 (28.0)	920 (20.3)	101 (19.3)
Hospital 3	4362 (41.7)	2149 (40.1)	1811 (39.9)	364 (69.6)
Hospital 4	1993 (19.0)	1146 (21.4)	798 (17.6)	38 (7.3)

* Includes 55 patients with unknown priority group

† Congestive heart failure, diabetes mellitus, chronic obstructive pulmonary disease, rheumatoid arthritis, or cancer

‡ Peripheral vascular disease, cerebrovascular disease, dementia, peptic ulcer disease, hemiplegia, renal disease, or liver disease

Patients were removed from the list if they reconsidered their decision for surgery, if they died while awaiting surgery, if their condition deteriorated so that the operation was no longer possible, if their condition improved and the surgery therefore became unnecessary, or when surgery was performed.

All 1916 adult cases registered for elective vascular surgery between July 1994 and March 2002 were followed until surgery, until removal from the wait list without surgery, or December 31, 2002. Altogether, 1845 patients (96.3%) were removed from the list within 40 weeks of registration. The remainder had waits longer than 40 weeks: for 18 patients, surgery was deferred indefinitely by the surgeon; 7 patients declined planned surgery; the condition of 4 patients improved; 1 patient died; and 41 patients whose procedures had been initially deferred (24 at the physician's request and 17 at the patient's request) eventually had surgery. Missing information made it impossible to adjust these extended waits for periods when surgery could not be performed because the patients were unfit for the operation. Therefore, we restricted our analysis to the first 40 weeks of follow-up and considered these 71 observations to have been censored at 40 weeks. Of the total number of patients registered, 1743 (91.0%) underwent surgery, 71 (3.7%) were still waiting at 40 weeks, and 102 (5.3%) were removed from the list without surgery for various reasons: the patient's condition improved (23), the patient died while awaiting surgery (5), the surgical risk became too great (57), or the patient decided against surgery (17).

2.3.3 Priority groups

In vascular surgery, the urgency of the patient's need for an intervention can be clearly defined. Clinical urgency status, assigned on the basis of the patient's condition, defines the maximum allowable delay before the procedure takes place. As described elsewhere [106], an internal protocol in the Department of Surgery was used to determine the number of days that a patient can safely wait for the planned operation according to clinical urgency. However, a previous analysis showed wide variations in individual waits among patients with equal need and clinical urgency [103]. In that study, we found that for some surgical procedures patients with less urgent status had a chance of being admitted before patients with more urgent status. Patient- or hospital-related delays in scheduling surgery have been suggested as an explanation. For example, cancellations of booked surgery may lengthen waiting periods independent of the urgency status assigned at registration. We therefore based our analysis on queuing patterns observed in practice, rather than urgency status assigned at registration. Queuing priority groups were defined as shown in Table 2.5, with smaller numbers indicating higher priority.

2.4 Access to elective cholecystectomy

2.4.1 Data sources

At the time of our study, the Department of Surgery at Queen's University was housed in two tertiary referral centers providing services to more than half a million residents of southeastern Ontario. Eight general surgeons were performing cholecystectomy at that time. Each surgeon's office operated its own wait list independently, and there was no priority ranking system. Surgeons on call made the decision to operate on patients who presented to the emergency department by evaluating (a) the clinical presentation for symptoms and signs of persistent or worsening abdominal tenderness, guarding, or rebound; (b) the ultrasonographic finding of a thick-walled gallbladder with pericholecystic fluid or a finding of hepatobilary iminodiacetic acid on radionuclide scan; or (c) both (a) and (b).

Data on the timing and type of surgery were retrieved from the hospital's electronic patient information system. Information on the date of the consultation visit was obtained from patient records through the

Table 2.5. Characteristics of 1916 patients registered for elective vascular surgery in Ontario, 1994–2002

	Priority status*; no. (%) of patients				
	1	**2**	**3**	**4**	**5**
Characteristic	**(n = 344)**	**(n = 149)**	**(n = 247)**	**(n = 313)**	**(n = 863)**
Age group (years)					
<45	2 (0.6)	0 (0.0)	3 (1.2)	0 (0.0)	105 (12.2)
45–64	83 (24.1)	22 (14.8)	60 (24.3)	60 (19.2)	293 (34.0)
65–74	137 (39.8)	63 (42.3)	112 (45.3)	158 (50.5)	287 (33.3)
≥75	122 (35.5)	64 (43.0)	72 (29.1)	95 (30.4)	178 (20.6)
Registration period					
1994–1996	232 (67.4)	89 (59.7)	167 (67.6)	189 (60.4)	629 (72.9)
1997–2002	112 (32.6)	60 (40.3)	80 (32.4)	124 (39.6)	234 (27.1)
Sex					
Men	219 (63.7)	116 (77.9)	144 (58.3)	250 (79.9)	510 (59.1)
Women	125 (36.3)	33 (22.1)	103 (41.7)	63 (20.1)	353 (40.9)
Procedure					
AAA repair	23 (6.7)	149 (100.0)	0 (0.0)	313 (100.0)	0 (0.0)
CEA	0 (0.0)	0 (0.0)	247 (100.0)	0 (0.0)	164 (19.0)
PVD surgery	321 (93.3)	0 (0.0)	0 (0.0)	0 (0.0)	331 (38.4)
AVF	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	368 (42.6)

Abbreviations: AAA = abdominal aortic aneurysm, CEA = carotid endarterectomy, PVD = peripheral vascular disease, AVF = arteriovenous fistula

* Lower numbers indicate greater priority

quality assurance program of the Department of Surgery. Patients who underwent emergency surgery without a prior clinic appointment were excluded. All cholecystectomies were initially attempted as laparoscopic procedures. Conversion to the open procedure was required when the dissection was not technically feasible or safe. The data dictionary for the cholecystectomy data, which describes variables representing events and attributes of interest, appears in Table A.3.

2.4.2 Patient population

We identified, for the period 1997 to 2000, all adult patients who underwent emergency or elective cholecystectomy after being seen in clinic for biliary colic. Forty-one of the patients were excluded from the analysis because they had immediate access (within 3 days) to planned surgery, which left a sample of 761 patients (Table 2.6).

Table 2.6. Characteristics of 761 patients registered for cholecystectomy in Ontario, 1997–2000

	No. (%) of patients		
Characteristic	**All cases (n = 761)**	**Elective (n = 710)**	**Emergency (n = 51)**
Age group (years)			
<25	33 (4.3)	28 (3.9)	5 (9.8)
25–34	105 (13.8)	98 (13.8)	7 (13.7)
35–44	142 (18.7)	138 (19.4)	4 (7.8)
45–54	170 (22.3)	161 (22.7)	9 (17.6)
55–64	155 (20.4)	148 (20.8)	7 (13.7)
65–74	107 (14.1)	97 (13.7)	10 (19.6)
≥75	49 (6.4)	40 (5.6)	9 (17.6)
Sex			
Men	189 (24.8)	179 (25.2)	10 (19.6)
Women	572 (75.2)	531 (74.8)	41 (80.4)
Registration period			
1997–1998	282 (37.1)	263 (37.0)	19 (37.3)
1998–1999	270 (35.5)	254 (35.8)	16 (31.4)
1999–2000	209 (27.5)	193 (27.2)	16 (31.4)
Surgeon's annual case volume			
<20	54 (7.1)	34 (4.8)	20 (39.2)
20–40	292 (38.4)	278 (39.2)	14 (27.5)
>40	415 (54.5)	398 (56.1)	17 (33.3)

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