



# Canadian Organ Replacement Register

## Methodology Notes and Supplementary Information

2012 to 2021



Canadian Institute  
for Health Information

Institut canadien  
d'information sur la santé

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# Section 1: Canadian Organ Replacement Register board of directors

## CORR board of directors<sup>i</sup>

- Dr. Jagbir Gill, University of British Columbia and Providence Health Care — CORR Board President
- Dr. Karthik K. Tennankore, Dalhousie University and Nova Scotia Health Authority — CORR Board Vice President
- Dr. Scott Klarenbach, University of Alberta and University of Alberta Hospital — CORR Board Past President
- Ms. Catherine Butler, Canadian Blood Services
- Dr. Allison Dart, University of Manitoba and Health Sciences Centre Winnipeg
- Dr. Daniel H. Kim, University of Alberta and University of Alberta Hospital
- Dr. Joseph Kim, University of Toronto and University Health Network — Toronto General Hospital
- Ms. Lydia Lauder, Kidney Foundation of Canada
- Dr. Louise Moist, University of Western Ontario and London Health Sciences Centre — Victoria Hospital
- Dr. Annie-Claire Nadeau-Fredette, Université de Montréal and Hôpital Maisonneuve-Rosemont
- Dr. Jeffrey Perl, University of Toronto and St. Michael's Hospital
- Dr. Jean Tchervenkov, McGill University and McGill University Health Centre
- Ms. Alison Thomas, Unity Health Toronto — St. Michael's Hospital

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i. Reflects membership as of August 30, 2022.

## Section 2: Canadian transplant hospitals, renal programs and independent centres\*

Hospital/facility	Types of transplants performed in 2021							Dialysis programs in 2021	
	Kidney	Liver	Heart	Lung/ heart- lung	Intestine/ multi- visceral	Pancreas/ kidney- pancreas	Islet cell	HD	PD
<b>Northwest Territories</b>									
Hay River Health Authority*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	n/a
Stanton Territorial Health Authority*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	n/a
<b>British Columbia</b>									
Abbotsford Regional	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
B.C. Children's	X	n/a	X	n/a	n/a	n/a	n/a	X	X
Kelowna General	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Kootenay-Boundary Regional	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Nanaimo Regional	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Penticton Regional	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Royal Columbian	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Royal Inland	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Royal Jubilee	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
St. Paul's	X	n/a	X	n/a	n/a	n/a	n/a	X	X
Surrey Memorial	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
University of Northern B.C.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Vancouver General	X	X	n/a	X	n/a	X	X	X	X
<b>Alberta</b>									
Alberta Children's	X	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Foothills Medical Centre/AKC-South	X	n/a	n/a	n/a	n/a	X	n/a	X	X
University of Alberta/AKC-North	X	X	X	X	X	X	X	X	X

Hospital/facility	Types of transplants performed in 2021							Dialysis programs in 2021	
	Kidney	Liver	Heart	Lung/ heart- lung	Intestine/ multi- visceral	Pancreas/ kidney- pancreas	Islet cell	HD	PD
<b>Saskatchewan</b>									
Regina General	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
St. Paul's	X	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Manitoba</b>									
Brandon Regional	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Children's Hospital of Winnipeg	X	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Health Sciences Centre	X	n/a	n/a	n/a	n/a	n/a	n/a	X	n/a
Seven Oaks General	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
St. Boniface General	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Ontario</b>									
Brockville Dialysis Clinic*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	n/a
Children's Hospital of Eastern Ontario	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Dialysis Management Clinics Inc. — Markham*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	n/a
Dialysis Management Clinics Inc. — Peterborough*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	n/a
Dialysis Management Clinics Inc. — Pickering*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	n/a
Grand River	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Halton Healthcare Services	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Health Sciences North	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Hospital for Sick Children	X	X	X	X	n/a	n/a	n/a	n/a	n/a
Humber River	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Kingston Health Sciences Centre	X	n/a	n/a	n/a	n/a	n/a	n/a	X	X

Hospital/facility	Types of transplants performed in 2021							Dialysis programs in 2021	
	Kidney	Liver	Heart	Lung/ heart- lung	Intestine/ multi- visceral	Pancreas/ kidney- pancreas	Islet cell	HD	PD
<b>Ontario (continued)</b>									
Lakeridge Health	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
LHSC — University	X	X	X	n/a	n/a	X	n/a	X	n/a
LHSC — Victoria	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Mackenzie Richmond Hill	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
McMaster Children's	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Michael Garron	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	n/a
Niagara Health System	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
North Bay General	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Orillia Soldiers' Memorial	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Ottawa–Carleton Dialysis Clinic*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	n/a
Ottawa Hospital	X	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Peterborough Regional Health	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Renfrew Victoria	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Sault Area Hospitals — Plummer Memorial	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Scarborough and Rouge	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
St. Joseph's (Hamilton)	X	n/a	n/a	n/a	n/a	n/a	n/a	X	X
St. Joseph's (Toronto)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
St. Michael's	X	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Sunnybrook Health Centre	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Thunder Bay Regional	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Timmins and District	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Toronto General — University Health Network	X	X	X	X	X	X	n/a	X	X

Hospital/facility	Types of transplants performed in 2021							Dialysis programs in 2021	
	Kidney	Liver	Heart	Lung/ heart- lung	Intestine/ multi- visceral	Pancreas/ kidney- pancreas	Islet cell	HD	PD
<b>Ontario (continued)</b>									
<b>Trillium Health Partners — Credit Valley</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>University of Ottawa Heart Institute</b>	n/a	n/a	X	n/a	n/a	n/a	n/a	n/a	n/a
<b>William Osler</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Windsor Regional</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Quebec</b>									
<b>CH De Lanaudière</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>CH de St. Mary</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>CHUL</b>	X	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>CHUM</b>	X	X	n/a	X	n/a	X	n/a	X	X
<b>CHU Sainte-Justine</b>	X	X	X	n/a	n/a	n/a	n/a	X	X
<b>CHUS — Hôpital Fleurimont</b>	X	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>CSCD La Sarre*</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>CUSM — site Glen</b>	X	X	X	X	n/a	X	n/a	X	X
<b>Hôpital Anna-Laberge</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Hôpital Charles-Le Moyne</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Hôpital de Chicoutimi</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Hôpital de Hull</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Hôpital de la Cité-de-la-Santé</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Hôpital de Montréal pour enfants</b>	X	X	X	n/a	n/a	n/a	n/a	X	X
<b>Hôpital de Rouyn-Noranda*</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Hôpital de Saint-Jérôme</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Hôpital de Verdun</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Hôpital du Haut-Richelieu</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X



Hospital/facility	Types of transplants performed in 2021							Dialysis programs in 2021	
	Kidney	Liver	Heart	Lung/ heart- lung	Intestine/ multi- visceral	Pancreas/ kidney- pancreas	Islet cell	HD	PD
<b>Quebec (continued)</b>									
Hôpital du Sacré-Coeur de Montréal	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Hôpital du Suroît*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Hôpital et Centre de réadaptation en dépendance de Val-d'Or*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Hôpital général de Montréal	n/a	n/a	n/a	X	n/a	X	n/a	X	X
Hôpital général du Lakeshore	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Hôpital général juif	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Hôpital Honoré-Mercier	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Hôpital Maisonneuve-Rosemont	X	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Hôpital régional de Rimouski	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Hôtel-Dieu de Lévis	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Hôtel-Dieu de Sorel	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Institut de cardiologie de Montréal	n/a	n/a	X	n/a	n/a	n/a	n/a	n/a	n/a
IUCPQ — Université Laval	n/a	n/a	X	n/a	n/a	n/a	n/a	n/a	n/a
Pavillon Sainte-Famille*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Pavillon Sainte-Marie	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>New Brunswick</b>									
Chaleur Regional	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Dr.-Georges-L.-Dumont	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Edmundston	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
Saint John Regional	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X

Hospital/facility	Types of transplants performed in 2021							Dialysis programs in 2021	
	Kidney	Liver	Heart	Lung/ heart- lung	Intestine/ multi- visceral	Pancreas/ kidney- pancreas	Islet cell	HD	PD
<b>Nova Scotia</b>									
<b>Cape Breton Regional</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>IWK Grace Health</b>	X	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Queen Elizabeth II</b>	X	X	X	n/a	n/a	n/a	n/a	X	X
<b>Yarmouth Regional</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	n/a
<b>Prince Edward Island</b>									
<b>P.E.I. Renal Program</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Newfoundland and Labrador</b>									
<b>Central Newfoundland Regional</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Eastern Health and Labrador-Grenfell Health</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X
<b>Western Memorial Regional</b>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	X	X

**Notes**

\* Independent centres that provide dialysis to chronic renal failure patients.

HD: Hemodialysis; PD: Peritoneal dialysis.

n/a: Not applicable.

## Section 3: Canadian organ donation organizations

### **British Columbia**

BC Transplant  
260-1770 West 7th Avenue  
Vancouver, British Columbia V6J 4Y6  
[www.transplant.bc.ca](http://www.transplant.bc.ca)

### **Alberta**

Southern Alberta Organ and Tissue Donation Program — Calgary (SAOTDP)  
Foothills Medical Centre Site  
1403 29th Street NW  
Calgary, Alberta T2N 2T9  
<https://www.albertahealthservices.ca/findhealth/service.aspx?id=1738>

Human Organ Procurement and Exchange (HOPE) Program — Edmonton  
University of Alberta Hospital  
Transplant Services  
8440 112th Street  
Edmonton, Alberta T6G 2B7  
<https://www.albertahealthservices.ca/services/page13174.aspx>

### **Saskatchewan**

Saskatchewan Transplant Program  
Provincial Office  
St. Paul's Hospital  
1702 20th Street West  
Saskatoon, Saskatchewan S7M 0Z9  
<https://www.saskhealthauthority.ca/your-health/conditions-diseases-services/all-z/tissue-organ-donation/saskatchewan-transplant>

Saskatchewan Transplant Program  
Regina Office  
235 Albert Street North  
Regina, Saskatchewan S4R 3C2

The Saskatchewan Health Authority Donation Program

Royal University Hospital

103 Hospital Drive

Saskatoon, Saskatchewan S7N 0W8

<https://www.saskhealthauthority.ca/your-health/conditions-diseases-services/all-z/tissue-organ-donation/sha-donation-program>

The Saskatchewan Health Authority Donation Program

Regina General Hospital

1440 14th Avenue

Medical Office Wing 3M02

Regina, Saskatchewan S4P 0W5

**Manitoba**

Transplant Manitoba — Gift of Life Program

Health Sciences Centre

820 Sherbrook Street

Winnipeg, Manitoba R3A 1R9

<https://www.transplantmanitoba.ca/>

**Ontario**

Ontario Health (Trillium Gift of Life Network)

483 Bay Street, South Tower, 4th Floor

Toronto, Ontario M5G 2C9

[www.giftoflife.on.ca](http://www.giftoflife.on.ca)

**Quebec**

Transplant Québec

Head Office

4100 Molson Street, Suite 200

Montréal, Quebec H1Y 3N1

[www.transplantquebec.ca/en](http://www.transplantquebec.ca/en)

Transplant Québec

Québec Site

1305 du Blizzard Street, Suite 100

Québec, Quebec G2K 0A1

## **New Brunswick**

New Brunswick Organ and Tissue Procurement Program

The Moncton Hospital

135 MacBeath Avenue

Moncton, New Brunswick E1C 6Z8

[www.gnb.ca/0051/0217/organ/index-e.asp](http://www.gnb.ca/0051/0217/organ/index-e.asp)

## **Nova Scotia**

Multi-Organ Transplant Program (MOTP)

Queen Elizabeth II Health Sciences Centre

6 South, Room 291

Victoria Building

1276 South Park Street

Halifax, Nova Scotia B3H 2Y9

[www.motpatlantic.ca](http://www.motpatlantic.ca)

Legacy of Life Organ Donation Program

Abbie J Lane Building, Room 4119

5909 Veterans' Memorial Lane

Halifax, Nova Scotia B3H 2E2

## **Newfoundland and Labrador**

Organ Procurement and Exchange of Newfoundland and Labrador (OPEN)

Health Sciences Centre

300 Prince Phillip Parkway

St. John's, Newfoundland and Labrador A1B 3V6

<https://www.easternhealth.ca/find-health-care/organ-donation/>

## Section 4: Acronyms and glossary

### Acronyms

**APD:** automated peritoneal dialysis

**BMI:** body mass index

**CAPD:** continuous ambulatory peritoneal dialysis

**COPD:** chronic obstructive pulmonary disease

**CORR:** Canadian Organ Replacement Register

**DCD:** donation after cardiocirculatory death

**eGFR:** estimated glomerular filtration rate

**ESKD:** end-stage kidney disease

**HD:** hemodialysis

**ICU:** intensive care unit

**MDRD:** Modification of Diet in Renal Disease

**NDD:** neurological determination of death

**ODO:** organ donation organization

**PAK:** pancreas after kidney transplantation

**PD:** peritoneal dialysis

**PRA:** panel reactive antibody

**PTA:** pancreas transplant alone (isolated pancreas transplantation)

**RPMP:** rate per million population

**RRT:** renal replacement therapy

**SD:** standard deviation

**SKP:** simultaneous kidney–pancreas transplantation

**Tx:** transplant

## Glossary

**body mass index (BMI):** Body mass index is a relationship between weight and height that is associated with body fat and health risk. The equation for BMI is body weight in kilograms divided by the square of height in metres. In the Canadian adult weight classification system, 4 categories of BMI ranges are defined:

- Underweight (BMI less than 18.5)
- Normal weight (BMI 18.5 to 24.9)
- Overweight (BMI 25 to 29.9)
- Obese (BMI 30 and higher)

**diabetes:** A disease caused by the lack of insulin in the body or the body's inability to properly use normal amounts of insulin.

- **type 1:** Occurs when the pancreas no longer produces any insulin or produces very little insulin. The body needs insulin to use sugar for energy.
- **type 2:** Occurs when the pancreas does not produce enough insulin or when the body does not use insulin that is produced effectively.

**dialysis:** A type of renal replacement therapy, whereby the blood is cleaned, and wastes and excess water are removed from the body. Sometimes dialysis is a temporary treatment, but when the loss of kidney function is permanent, as in end-stage kidney disease, dialysis must be continued on a regular basis. The only other treatment for kidney failure is kidney transplantation. There are 2 kinds of dialysis: hemodialysis and peritoneal dialysis.

- **hemodialysis:** The blood is cleaned by being passed through a machine that contains a dialyser. The dialyser has 2 spaces separated by a thin membrane. Blood passes on one side of the membrane and dialysis fluid passes on the other. The wastes and excess water pass from the blood through the membrane into the dialysis fluid, which is then discarded. The cleaned blood is returned to the bloodstream.
- **peritoneal dialysis:** The peritoneal cavity inside the abdomen is filled with dialysis fluid, which enters the body through a permanently implanted catheter. Excess water and wastes pass from the blood through the lining of the peritoneal cavity (the peritoneum) into the dialysis fluid. This fluid is then drained from the body and discarded. In most cases, this treatment can be performed without assistance from hospital personnel.

**end-stage kidney disease (ESKD):** A condition in which the kidneys are permanently impaired and can no longer function normally to maintain life.

**estimated glomerular filtration rate (eGFR):** Estimated rate of the volume of plasma filtered by the kidney, in mL/min/1.73 m<sup>2</sup>. Rates of filtration are currently calculated from serum creatinine using the Modification of Diet in Renal Disease (MDRD) study equation. eGFR is used to determine renal function.

**graft survival:** A measure of whether an organ is still functioning at a certain time after transplantation.

**median wait time:** This statistic reports the middle wait time value for recipients of an extra-renal transplant. It means that half the recipients waited less than this value and the remaining half waited more than the value. CORR does not have patient-level data for patients who were listed for a transplant but ultimately did not receive a transplant, and therefore these wait times provide only a partial picture. For kidney transplant patients, this statistic reports the middle wait time between first dialysis and first kidney transplant.

**medical urgency status code:** Liver, heart and lung patients are assigned a status code at the time of their listing for a transplant. This status code corresponds to their medical condition and how urgently they require transplantation. The status codes are updated regularly until a patient receives a transplant. CORR collects the initial listing status and the status at the time of transplant.

**new patient:** A patient with end-stage kidney disease who began renal replacement therapy for the first time (either dialysis or renal transplantation) in the calendar year. Also known as an incident patient.

**organ donor:** A person who donates 1 or more organs that are used for transplantation. Organ donors may be deceased or living.

- **deceased donor:** A person for whom neurological or cardiac death has been determined, consent has been obtained and organs are offered for transplantation. Within CORR, deceased donors are defined as those donors who originated in Canada and who had at least one solid organ used for transplantation. Solid organs that can be donated after death include the heart, liver, kidneys, pancreas, lungs, intestine and stomach.
  - Neurological determination of death (NDD) means that there is an irreversible absence of clinical neurological function as determined by definite clinical and/or neuro-imaging evidence.
  - Non–heart beating donor refers to the donation of organs for transplantation from an individual who is declared dead after cardiac arrest; also known as “donation after cardiocirculatory death” (DCD).
- **living donor:** A donor with a biological (related) or emotional (unrelated) relationship to the transplant recipient. Living donors most commonly donate one of their kidneys. A lobe of the liver, a lobe of the lung or a segment of the pancreas or the intestine may also be donated by a living donor. At the time of this report, living pancreas and intestine transplants have not been performed in Canada.



**organ donation organization (ODO):** An organization responsible for coordinating the recovery and distribution of organs from deceased donors in its province or region. Since not all provinces in Canada perform extra-renal transplants, ODOs from across the country coordinate their activities to ensure that those patients on the extra-renal organ transplant wait-lists who most urgently require a transplant are offered a suitable organ first. Previously referred to as “organ procurement organizations.”

**organ transplant wait-list:** A list of patients awaiting organ transplantation. Lists are maintained by the ODOs. Information on urgent liver and heart patients is shared across provinces. Each list identifies active and on-hold patients.

- **active patient:** A patient on the organ transplant wait-list who can receive a transplant at any time.
- **on-hold patient:** A patient on the organ transplant wait-list who cannot receive a transplant for medical or other reasons for a short period of time.

**organ transplantation:** Surgical procedure that involves transplantation of organs or parts of organs recovered from deceased or living donors to recipients with end-stage organ failure. Organs that can be transplanted, alone or in combination, include the heart, liver, kidneys, pancreas, lungs, intestine and stomach. The single-organ kidney transplant is the most commonly performed transplant procedure. In rare cases, 2 or more organs may be transplanted. Organs used in these transplants may be from 1 or more donors. Types of organ transplantation include the following:

- **combination organ transplantation:** Surgical procedure that involves transplantation of multiple organs or parts of organs to recipients who have more than one organ in end-stage organ failure. The most frequent examples of combination transplants in Canada are kidney–liver and kidney–heart transplants, where patients have end-stage kidney failure along with liver or heart failure. Organs used in these transplants are usually from the same donor.
- **islet cell transplantation:** A medical procedure that involves replacing the insulin-producing cells of the pancreas (islet cells), which are destroyed in people with type 1 diabetes. In Canada, islet cells are retrieved from the pancreas of deceased organ donors and may be preserved for a period of time prior to being used for transplantation. Islet cell transplants are captured within CORR.
- **kidney transplantation:** A procedure during which 1 or 2 kidneys from a deceased organ donor or 1 kidney from a living organ donor are surgically recovered and implanted into a person with end-stage kidney disease. Not all persons with end-stage kidney disease are candidates for kidney transplantation. Most people with end-stage kidney disease receive dialysis prior to a kidney transplant.

- **multi-visceral transplantation:** A rare surgical procedure that involves transplantation of the liver, small intestine, pancreas, stomach and duodenum (also known as a cluster transplant).
- **pre-emptive kidney transplant:** An organ transplant that includes a kidney, where the patient has not been treated with dialysis prior to the transplant.

**patient survival:** A measure of whether a transplant recipient is still alive at a certain time after transplantation.

**pediatric patient:** A patient who is age 17 or younger.

**prevalent patient:** A patient who is either living with a functioning organ transplant or receiving renal replacement therapy for end-stage kidney disease on December 31 of a given year, regardless of date of initiation of treatment.

**registered patient:** A patient who has received organ replacement therapy and is registered in CORR. The progress of registered patients is monitored each year.

**renal replacement therapy:** Procedures to temporarily or permanently replace a person's failed kidneys, including hemodialysis, peritoneal dialysis and kidney transplantation.

## Section 5: Analytical methods

### Age calculation

The computation of patient age is based on a count of months between birthdate and treatment date, which is then divided by 12. This calculation yields a number that is rounded to a whole number in years. For donors, age is collected in terms of a code (e.g., *newborn, days, months, years*) and unit (e.g., 2, 12, 35), as birthdate is not part of the donor data set. For the purposes of this report, donor age is converted to a year-based whole number.

### Incident ESKD renal replacement therapy patients

Counts and rates are based on patients registered during a given calendar year (January 1 to December 31). An incident patient must start renal replacement therapy for ESKD in a Canadian facility. Patients who began renal replacement therapy for ESKD outside of Canada but are subsequently treated in Canada are included in registered and prevalent, but not incident, counts.

## Organ recovery rates

Organ recovery rates (deceased) are based on organs recovered and transplanted from deceased donors identified in Canadian hospitals.

## Patient and graft survival

Unadjusted survival probabilities (expressed as percentages from 0 to 100) are calculated using the Kaplan–Meier method. The cohorts are dialysis and transplant patients who started dialysis or received a first graft between 2010 and 2021. For dialysis survival, patients were censored if they received a kidney transplant, were lost to follow-up, left the country, recovered function, withdrew from treatment or survived to the end of the observation period. For kidney graft survival, patients were censored if they were lost to follow-up, left the country or survived to the end of the observation period. For extra-renal graft survival, patients were censored if they were lost to follow-up, left the country or received a second transplant. Death with a functioning graft is considered graft failure.

## Population estimates used in rate calculations

Rates presented are either crude or age-specific and are not age-standardized.

$$\text{Crude rate} = (\text{Number of cases} \div \text{Population}) \times 1,000,000$$

$$\text{Age-specific rate} = (\text{Number of cases in age group} \div \text{Population of age group}) \times 1,000,000$$

All Canadian population estimates are from Statistics Canada and are based on total population figures for July 1 of the respective year.

Province	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
<b>B.C.*</b>	4,603,003	4,666,598	4,744,240	4,814,078	4,897,797	4,968,994	5,050,995	5,136,158	5,200,902	5,257,791
<b>Alta.†</b>	3,952,868	4,060,153	4,163,503	4,225,216	4,277,685	4,323,537	4,381,399	4,446,238	4,504,556	4,527,786
<b>Sask.</b>	1,083,755	1,099,736	1,112,979	1,120,967	1,135,987	1,150,331	1,161,767	1,172,479	1,179,300	1,179,844
<b>Man.</b>	1,249,975	1,264,620	1,279,014	1,292,227	1,314,139	1,334,790	1,352,825	1,369,954	1,380,648	1,383,765
<b>Ont.</b>	13,390,632	13,510,781	13,617,553	13,707,118	13,875,394	14,070,141	14,308,697	14,544,701	14,745,712	14,826,276
<b>Que.</b>	8,061,101	8,110,880	8,150,183	8,175,272	8,225,950	8,302,063	8,401,738	8,503,483	8,578,300	8,604,495
<b>Atlantic‡</b>	2,372,888	2,370,186	2,369,963	2,368,030	2,382,535	2,395,380	2,407,663	2,428,217	2,447,786	2,466,151
<b>Canada (excl. Que.)</b>	<b>26,653,121</b>	<b>26,972,074</b>	<b>27,287,252</b>	<b>27,527,636</b>	<b>27,883,537</b>	<b>28,243,173</b>	<b>28,663,346</b>	<b>29,097,747</b>	<b>29,458,904</b>	<b>29,641,613</b>
<b>Canada (incl. Que.)</b>	<b>34,714,222</b>	<b>35,082,954</b>	<b>35,437,435</b>	<b>35,702,908</b>	<b>36,109,487</b>	<b>36,545,236</b>	<b>37,065,084</b>	<b>37,601,230</b>	<b>38,037,204</b>	<b>38,246,108</b>

**Notes**

\* Includes Yukon.

† Includes the Northwest Territories and Nunavut.

‡ Includes New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland and Labrador (see breakdown below).

**Source**

Statistics Canada, Demography Division. Estimates of population (2016 Census and administrative data), by age group and sex for July 1, Canada, provinces, territories, health regions (2018 boundaries).

Atlantic provinces	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
<b>N.B.</b>	758,378	758,544	758,976	758,842	763,350	766,621	770,301	777,128	783,204	789,225
<b>N.S./P.E.I.</b>	1,088,165	1,084,528	1,082,828	1,081,071	1,089,759	1,100,510	1,111,802	1,127,662	1,143,218	1,156,373
<b>N.S.</b>	943,635	940,434	938,545	936,525	942,790	950,108	958,406	970,243	981,889	992,055
<b>P.E.I.</b>	144,530	144,094	144,283	144,546	146,969	150,402	153,396	157,419	161,329	164,318
<b>N.L.</b>	526,345	527,114	528,159	528,117	529,426	528,249	525,560	523,427	521,364	520,553
<b>Total</b>	<b>2,372,888</b>	<b>2,370,186</b>	<b>2,369,963</b>	<b>2,368,030</b>	<b>2,382,535</b>	<b>2,395,380</b>	<b>2,407,663</b>	<b>2,428,217</b>	<b>2,447,786</b>	<b>2,466,151</b>

**Source**

Statistics Canada, Demography Division. Estimates of population (2016 Census and administrative data), by age group and sex for July 1, Canada, provinces, territories, health regions (2018 boundaries).

## Prevalent patients

Prevalent patient numbers at year-end are based on the record-level data for patients registered in CORR.

## Primary diagnosis

For extra-renal transplant recipients, primary diagnosis is based on the diagnosis made at the time of the patient's first transplant. In some cases, most usually for liver transplant recipients, more than one diagnosis may be recorded. For kidney transplant recipients, primary diagnosis is based on the diagnosis provided at the time of incident dialysis treatment, as well as diagnosis at the time of kidney transplant (pre-emptive kidney transplant recipients will have only primary diagnosis at the time of transplant).

## Province of treatment

Patients residing in the territories are required to start, and often continue, their dialysis in the provinces. As a result, statistical analyses of patients are presented by province of treatment, with Yukon being combined with British Columbia, and the Northwest Territories and Nunavut being combined with Alberta.

## Registered patients

Registered patients are those who received organ replacement therapy (dialysis or transplantation) and are registered in CORR. Their progress is monitored each year. For renal replacement data, CORR reports on registered patients from 1981 onward, and for extra-renal transplant data, from 1988 onward.

## Transplant recipients

Information presented on transplant recipients in this report looks at recipients of first grafts of a specific organ where the transplant occurred at a Canadian transplant facility. The tables and figures refer to either transplant procedures or recipients, with the latter counting patients only 1 time for their first organ-specific graft. Recipient characteristics and province-specific rates are based on transplant recipients.

## Wait-list

Data reported on patients waiting for transplants comes from counts provided by provincial and regional ODOs. Patient-level data is not available. For patients waiting for a kidney transplant, the definition of a pediatric patient was changed in 2002 from younger than 15 to younger than 18. This definition is now in line with the definition of pediatric patient used for extra-renal transplants.

## Wait times

Wait times are calculated for patients who received extra-renal transplants and do not include patients who died while waiting or who withdrew from the list because they became too sick to undergo a transplant. There is currently no national source of information on wait times for all patients listed for transplantation.

For patients who received a kidney transplant, a proxy measure of wait time (i.e., time spent on dialysis pre-transplant) is used. While this approach avoids the problem of incomplete data on wait-list start dates for prospective kidney transplant recipients within CORR, it does not factor in the wait time for patients who were listed for a kidney transplant but for whom no transplant occurred. A wait time of 0 is allocated to patients who received a pre-emptive kidney transplant.

## Section 6: Primary diagnoses captured by CORR

The tables below list the diagnostic categories that are captured by CORR for primary diagnosis. The tables are organized by organ.

### End-stage kidney disease

Primary diagnosis codes — End-stage kidney disease	
<b>Generic</b>	
<b>00</b>	Chronic renal failure — etiology uncertain
<b>Glomerulonephritis/autoimmune diseases</b>	
<b>05</b>	Mesangial proliferative glomerulonephritis
<b>06</b>	Minimal lesion glomerulonephritis
<b>07</b>	Post-strep glomerulonephritis
<b>08</b>	Rapidly progressive glomerulonephritis
<b>09</b>	Focal glomerulosclerosis — adults
<b>10</b>	Glomerulonephritis, histologically <b>not</b> examined
<b>11</b>	Severe nephrotic syndrome with focal sclerosis (pediatric patients)
<b>12</b>	IgA nephropathy — proven by immunofluorescence (not code 85)
<b>13</b>	Dense deposit disease — proven by immunofluorescence and/or electron microscopy (MPGN type II)
<b>14</b>	Membranous nephropathy
<b>15</b>	Membranoproliferative mesangiocapillary glomerulonephritis (MPGN type I)
<b>16</b>	Idiopathic crescentic glomerulonephritis (diffuse proliferative)
<b>17</b>	Congenital nephrosis or congenital nephrotic syndrome (pediatric only)
<b>19</b>	Glomerulonephritis, histologically examined — specify
<b>73</b>	Polyarteritis nodosa
<b>74</b>	Wegener's granulomatosis
<b>84</b>	Lupus erythematosus
<b>85</b>	Henoch–Schönlein purpura
<b>86</b>	Goodpasture syndrome
<b>87</b>	Scleroderma
<b>88</b>	Hemolytic uremic syndrome (Moschowitz syndrome)

<b>Primary diagnosis codes — End-stage kidney disease</b>	
<b>Nephropathy, drug-induced</b>	
<b>30</b>	Nephropathy caused by drugs or nephrotoxic agents, cause not specified
<b>31</b>	Nephropathy due to analgesic drugs
<b>32</b>	Nephropathy due to cisplatin
<b>33</b>	Nephropathy due to cyclosporin A
<b>39</b>	Nephropathy caused by other specific drug — specify
<b>Polycystic kidney</b>	
<b>41</b>	Polycystic kidneys, adult type (dominant)
<b>42</b>	Polycystic kidneys, infantile and juvenile types (recessive)
<b>Congenital/hereditary renal diseases</b>	
<b>21</b>	Pyelonephritis/interstitial nephritis associated with neurogenic bladder
<b>22</b>	Pyelonephritis/interstitial nephritis due to congenital obstructive uropathy with or without vesicoureteric reflux
<b>24</b>	Pyelonephritis/interstitial nephritis due to vesicoureteric reflux without obstruction
<b>40</b>	Cystic kidney disease, type unspecified
<b>41</b>	Polycystic kidneys, adult type (dominant)
<b>42</b>	Polycystic kidneys, infantile and juvenile types (recessive)
<b>43</b>	Medullary cystic disease, including nephronophthisis
<b>49</b>	Cystic kidney disease, other type — specify
<b>50</b>	Hereditary familial nephropathy, type unspecified
<b>51</b>	Hereditary nephritis with nerve deafness (Alport syndrome)
<b>52</b>	Cystinosis
<b>53</b>	Oxalosis
<b>54</b>	Fabry disease
<b>55</b>	DRASH syndrome
<b>58</b>	Posterior urethral valves
<b>59</b>	Hereditary nephropathy, other — specify
<b>60</b>	Congenital renal hypoplasia — specify
<b>61</b>	Oligomeganephronic hypoplasia
<b>62</b>	Segmental renal hypoplasia (Ask-Upmark kidney)
<b>63</b>	Congenital renal dysplasia with or without urinary tract malformation
<b>66</b>	Syndrome of agenesis of abdominal muscles (prune belly syndrome)
<b>Diabetes</b>	
<b>80</b>	Diabetic nephropathy associated with type 1
<b>81</b>	Diabetic nephropathy associated with type 2



<b>Primary diagnosis codes — End-stage kidney disease</b>	
<b>Renal vascular disease</b>	
<b>70</b>	Renal vascular disease, type unspecified
<b>71</b>	Malignant hypertension (no primary renal disease)
<b>72</b>	Renal vascular disease due to hypertension (no primary renal disease)
<b>73</b>	Polyarteritis nodosa
<b>78</b>	Atheroembolic renal disease
<b>79</b>	Renal vascular disease, classified (nephrosclerosis, renal vascular thrombosis)
<b>Other</b>	
<b>20</b>	Pyelonephritis/interstitial nephritis, cause not specified
<b>23</b>	Pyelonephritis/interstitial nephritis due to acquired obstructive uropathy — specify
<b>25</b>	Pyelonephritis/interstitial nephritis due to urolithiasis
<b>29</b>	Pyelonephritis, other causes
<b>44</b>	Infection (Coronavirus)
<b>56</b>	Sickle cell nephropathy
<b>57</b>	Wilms' tumour
<b>82</b>	Multiple myeloma
<b>83</b>	Amyloid
<b>89</b>	Multi-system disease, other — specify
<b>90</b>	Cortical or acute tubular necrosis
<b>91</b>	Tuberculosis
<b>92</b>	Gout
<b>93</b>	Nephrocalcinosis and hypercalcemic nephropathy
<b>94</b>	Balkan nephropathy
<b>95</b>	Kidney tumour
<b>96</b>	Traumatic or surgical loss of kidney
<b>97</b>	HIV nephropathy
<b>99</b>	Other identified renal disorders — specify

## Liver transplant

Primary diagnosis codes — Liver transplant	
<b>Acute hepatic failure (fulminant)</b>	
01	Hepatitis, type A
02	Hepatitis, type B
61	Hepatitis, type C
58	Hepatitis, type non-A, -B, -C
35	Hepatitis with delta
05	Toxics
04	Drug-induced, other
56	Drug-induced, acetaminophen
47	Other/fulminant hepatic failure (including Budd–Chiari syndrome and Wilson disease)
<b>Chronic hepatic failure</b>	
12	Budd–Chiari syndrome
36	Byler disease (intra-hepatic cholestasis)
09	Cirrhosis, alcoholic
10	Cirrhosis, other
08	Cryptogenic cirrhosis
49	Post-necrotic cirrhosis
07	Primary biliary cirrhosis
14	Secondary biliary cirrhosis
45	Drug-induced, other
42	Hepatitis, type A
43	Hepatitis, type B
60	Hepatitis, type C
59	Hepatitis, type non-A, -B, -C
51	Neonatal hepatitis
06	Autoimmune chronic active hepatitis
13	Primary biliary atresia
11	Sclerosing cholangitis
46	Toxic
15	Watson–Alagille disease (arterio-hepatic dysplasia)
62	Polycystic liver disease
64	Non-alcoholic steatohepatitis (NASH)

<b>Primary diagnosis codes — Liver transplant</b>	
<b>Hepatic tumours</b>	
50	Angiosarcoma
17	Cholangiocarcinoma
18	Fibrolamellar hepatoma
16	Hepatocellular carcinoma
19	Metastatic tumour
53	Hepatic tumour, other
<b>Metabolic disorders</b>	
20	Alpha-1-antitrypsin deficiency
28	Crigler–Najjar syndrome
21	Glycogen storage disease
23	Hemochromatosis
27	Hyperlipoproteinemia type 2
24	Niemann–Pick
26	Phenylketonuria
25	Protoporphyrria
29	Tyrosinemia
22	Wilson disease
34	Metabolic disorder, other
<b>Other primary diagnosis</b>	
30	Congenital hepatic fibrosis
31	Caroli disease
32	Cystic disorders
44	Infection (Coronavirus)
52	Thrombosed hepatic artery
98	Unknown/missing
99	Other

## Heart transplant

Primary diagnosis codes — Heart transplant	
32	Cardiomyopathy
29	Dilated cardiomyopathy
01	Idiopathic cardiomyopathy
30	Other dilated cardiomyopathy — specify
33	Metabolic/genetic cardiomyopathy
34	Cardiomyopathy related to muscular dystrophy
35	Drug-induced cardiomyopathy (chemotherapy)
12	Restrictive cardiomyopathy
31	Hypertrophic cardiomyopathy
24	Myocarditis
07	Coronary artery disease (ischemic cardiomyopathy)
04	Valvular heart disease
23	Acute myocardial infarction
15	Congenital heart disease — specify
16	Congenital heart disease — acyanotic lesions
17	Congenital heart disease — cyanotic lesions
36	Metabolic disorder
37	Cardiac tumour
38	Refractive arrhythmia
39	Muscular dystrophy
44	Infection (Coronavirus)
98	Unknown
99	Other — specify

## Lung, heart–lung transplant

Primary diagnosis codes — Lung, heart–lung transplant	
08	Eisenmenger syndrome
11	Idiopathic pulmonary fibrosis
13	Emphysema
15	Lung failure due to congenital disease
17	Primary pulmonary hypertension
18	Chronic obstructive lung disease
19	Alpha-1-antitrypsin deficiency
20	Cystic fibrosis
22	Bronchiectasis
26	Sarcoidosis
27	Asbestosis
28	Bronchiolitis obliterans
32	Cardiomyopathy — not specified
44	Infection (Coronavirus)
98	Unknown
99	Other — specify

## Pancreas transplant

Primary diagnosis codes — Pancreas transplant	
01	Chronic pancreatitis
02	Diabetes type 1
03	Pancreatectomy
04	Cystic fibrosis
05	Trauma
06	Diabetes type 2
07	Pancreatic cancer
08	Bile duct cancer
44	Infection (Coronavirus)
98	Unknown
99	Other — specify

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