



CIHI Snapshot

December 2019

Annual Statistics on Organ Replacement in Canada

Dialysis, Transplantation and Donation, 2009 to 2018

This document provides a summary of the latest annual statistics from the Canadian Organ Replacement Register (CORR) at the Canadian Institute for Health Information (CIHI). The statistics examine characteristics of and trends in dialysis for end-stage kidney disease (ESKD), as well as for all solid organ transplantation, donation and patient outcomes in Canada over the 10 years between 2009 and 2018. An area of focus is living and deceased organ donors, including donor characteristics and organ-level information to provide insights beyond the number and rate of organ donation. The full range of statistics on which this summary is based is presented in the companion data tables.

This summary document includes data for Quebec where possible in national totals for transplantation and organ donor statistics. Summary findings on ESKD and the corresponding tables and figures do not include Quebec because of ongoing under-reporting. For more information on under-reporting in CORR, please refer to *Data Quality Documentation for Users: Canadian Organ Replacement Register, 2009 to 2018 Data*.

How to cite this document:

Canadian Institute for Health Information. *Annual Statistics on Organ Replacement in Canada: Dialysis, Transplantation and Donation, 2009 to 2018*. Ottawa, ON: CIHI; 2019.



Canadian Institute
for Health Information

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Key findings

- There were 40,289 Canadians (excluding Quebec) living with ESKD at the end of 2018, an increase of 35% since 2009.
- Looking at all solid organs, the deceased organ donor rate in Canada in 2018 (including Quebec) was 20.6 donors per million population, an increase of 42% since 2009. The living donor rate was 15.0 donors per million population, a decrease of 2% since 2009.
- In 2018, a total of 2,782 transplant procedures (all organs) were performed in Canada (including Quebec), an increase of 33% since 2009.

Table 1 Organs transplanted, waiting lists and deaths on waiting list, by organ, Canada including Quebec, as of December 31, 2018*

Organ type	Number of organs transplanted	Number of patients on waiting list		Number of patients who died on waiting list
		Total	Active	
Kidney	1,706	3,150 [†]	2,045	95
Liver	533	527	377	82
Heart	189	157	109	9
Lung	361	270	219	28
Pancreas	57	156	83	2
Total[‡]	2,849	4,351	2,890	223

Notes

* This includes aggregate data from Transplant Québec to supplement national totals. Waiting list statistics for simultaneous kidney–pancreas (SKP) transplants are included in the pancreas section.

† Manitoba data on the number of patients on the kidney transplant waiting list who are on hold is not available.

‡ The Total row includes intestines and other (non-SKP) combination organ transplants.

Source

Canadian Organ Replacement Register, 2019, Canadian Institute for Health Information.

Transplantation and donation in Canadaⁱ

In 2018, a total of 2,782 transplant procedures were performed in Canada (including Quebec), 148 fewer than in 2017. The number of transplants performed had increased over the previous 5 years, up from 2,363 in 2013. The 2,782 transplant procedures performed in 2018 resulted in the transplant of 2,849 solid organs. There were 4,351 people on a waiting list for an organ transplant, including 2,890 who were active on the list. In total, 223 people died while waiting for a transplant.

In 2018, there were 762 deceased organ donors in Canada (including Quebec), 41 fewer than the 803 reported in 2017. In addition, there were 555 living organ donors.

- The deceased donor rate was 20.6 donors per million population, an increase of 42% since 2009. This rate is comparable with rates in Australia (22.2 per million population) and the United Kingdom (23.1 per million population).¹
- The living donor rate was 15.0 donors per million population. Canada has one of the higher living donation rates compared with other countries, but this rate went down by 2% over the 10 years studied.
- The number of deceased donors increased 56% over the 10 years, from 487 in 2009 to 762 in 2018. The number of living donors was mostly steady over the same time period.

Profiling organ donors in Canada

In 2018, there were 762 deceased donors and 555 living donors. Of the 762 deceased donors, 71% were donation after brain death (NDD, or neurological determination of death) and 29% were donation after cardio-circulatory death (DCD) (Figure 1). Over the 10 years studied, NDD donors increased by 21%, whereas DCD donors increased by 429%. The impact of the increase in the number of DCD donors on the number of organs used for transplantation differs by organ type. Notably, fewer (or no) livers, hearts and pancreases were used from DCD donors, compared with kidneys and lungs. The transplantation of organs from deceased donors depends on a number of factors, including the organ being retrieved, the age and characteristics of the donor, medical suitability of the organs and the availability of a suitable transplant recipient.

Of the 762 deceased donors in 2018

- 60% of donors were male.
- The average number of organs used for transplantation was 3 for all donors and 4 for those age 39 and younger.

i. This section includes aggregate data from Transplant Québec to supplement national totals.

Table 2 Deceased donor organ use, donor age and proportion DCD, by organ, Canada including Quebec, 2018

Organ type	Average deceased donor age (years)	Proportion of deceased donors having an organ used for transplantation	Proportion of organs from DCD*
Kidney	44	86% at least one kidney 79% both kidneys	30%
Liver	44	60%	10%
Heart	34	24%	0%
Lung	43	42% at least one lung 38% both lungs	27%
Pancreas	27	9%	10%

Notes

* Proportion of the total deceased donor organs used for transplantation that were from DCD donors. For comparison, DCD donors represent 29% of all deceased donors.

DCD: Donation after cardio-circulatory death.

Source

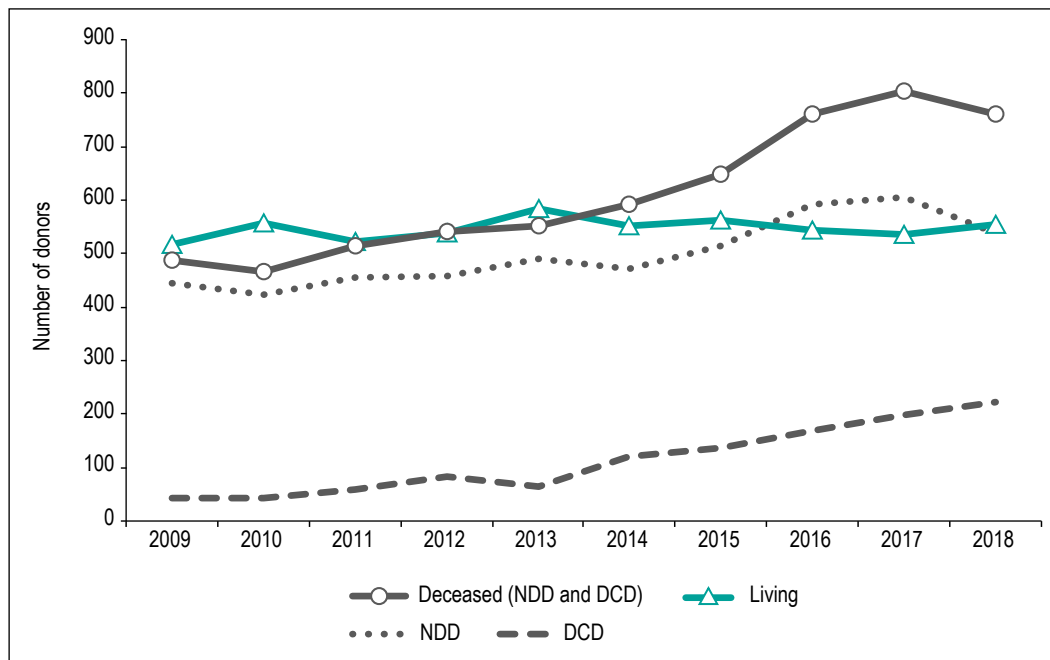
Canadian Organ Replacement Register, 2019, Canadian Institute for Health Information.

- Figure 2 illustrates changes over the 10 years studied in the proportion of organs used from deceased donors. Whereas the use of lungs for transplantation has been increasing, the other donated organs have had steady or declining use. For organs such as the liver, this may be in part because of the lower use of these organs from DCD donors.
- 50% of deceased donors had blood type O, 34% had blood type A, 12% had blood type B and 4% had blood type AB.

Of the 555 living donors in 2018

- 63% of donors were female.
- 87% donated a kidney. The average age of these donors was 46. Between 2009 and 2018, the proportion of living donors that donated a kidney varied between 89% and 83%.
- 13% donated a lobe of liver. The average age of these donors was 35. Between 2009 and 2018, the proportion of living donors that donated a lobe of liver varied between 11% and 17%.
- 54% of living organ donors were unrelated to the transplant recipient.

Figure 1 Number of donors, by donor type and year, Canada including Quebec, 2009 to 2018



Type of donor	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Deceased (NDD and DCD)	487	466	515	541	553	591	649	760	803	761
NDD	445	424	456	459	489	470	513	591	604	539
DCD	42	42	59	82	64	121	136	169	199	222
Living	516	557	521	538	585	553	563	544	535	555

Notes

NDD: Neurological determination of death (donation after brain death).

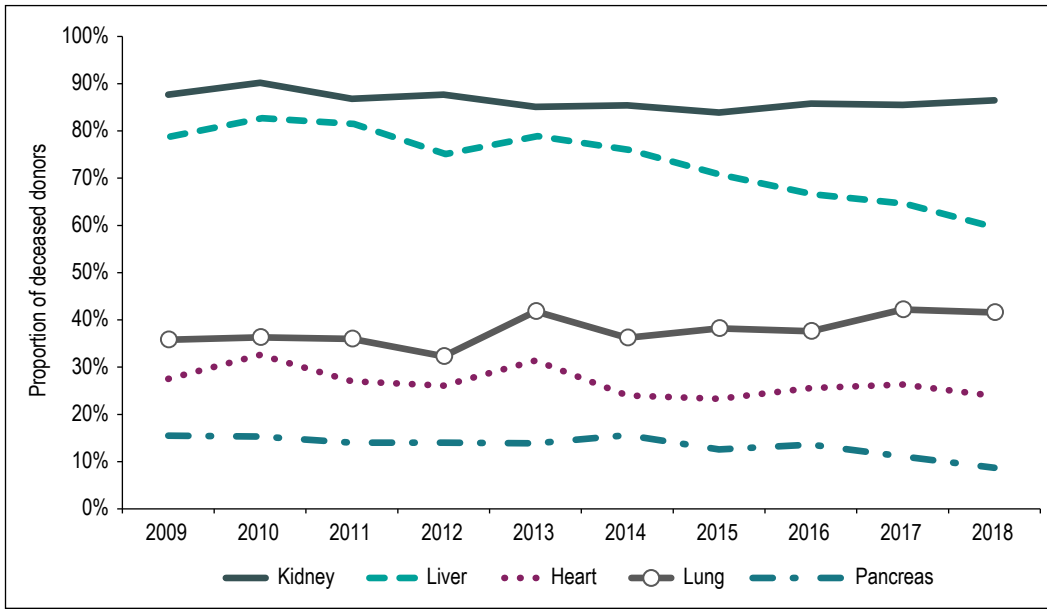
DCD: Donation after cardio-circulatory death.

1 deceased donor in 2018 had missing data regarding donor type (NDD or DCD) and was excluded.

Source

Canadian Organ Replacement Register, 2019, Canadian Institute for Health Information.

Figure 2 Proportion of deceased donors who had an organ used for transplantation, by organ and year, Canada including Quebec, 2009 to 2018



Organ	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Kidney	87.7	90.2	86.8	87.7	85.1	85.4	83.9	85.8	85.5	86.5
Liver	78.8	82.7	81.5	75.1	78.9	76.0	70.7	66.6	64.6	59.5
Heart	27.5	32.6	27.0	26.1	31.4	24.0	23.3	25.6	26.3	23.9
Lung	35.8	36.3	36.0	32.3	41.8	36.2	38.2	37.6	42.2	41.6
Pancreas	15.5	15.3	14.0	14.0	13.9	15.6	12.6	13.6	11.1	8.7

Source
Canadian Organ Replacement Register, 2019, Canadian Institute for Health Information.

End-stage kidney disease in Canada

In 2018, there were 40,289 Canadians (excluding Quebec) living with ESKD, 57.8% of whom were receiving some form of dialysis. The remaining 42.2% had a functioning kidney transplant. Between 2009 and 2018, the number of Canadians living with ESKD increased 35% (from 29,821).

- Of the 23,305 patients on dialysis, three-quarters were receiving institutional hemodialysis, the most expensive treatment option.
- In 2018, a total of 6,045 ESKD patients started renal replacement therapy (dialysis or transplant), an increase of 32% from 2009. The population rate of new patients starting renal replacement therapy in 2018 was 211 patients per million population.
- More than half (54%) of the ESKD patients who started renal replacement therapy were age 65 and older, and 62% were male.
- Approximately 38% of patients who started renal replacement therapy had diabetes as the main cause of their kidney failure.
- According to the latest available data from CORR, 44.4% of patients on dialysis treatments survived at least 5 years.
- The average age of patients receiving a deceased donor kidney transplant was 56, and 45.3% of patients were 60 and older.
- For patients with ESKD, transplantation generally has better patient outcomes than dialysis:
 - According to the latest available data from CORR on unadjusted 5-year patient survival, 42.8% of patients on hemodialysis survived at least 5 years, compared with 50.6% of patients on peritoneal dialysis.
 - Patients who've had a kidney transplant may have the option to receive dialysis when the graft fails; therefore, survival can be measured for the graft. According to the latest available data from CORR on unadjusted 5-year graft survival, 81.3% of grafts for patients who received a kidney from a deceased donor survived at least 5 years, compared with 88.1% of grafts for patients who received a kidney from a living donor.

Additional highlights from the annual statistics

Liver

- There were 5,900 Canadians (excluding Quebec) living with a liver transplant in 2018.
- Cancer was the cause of liver failure for 23% of liver transplant patients between 2009 and 2018.
- According to the latest available data from CORR on unadjusted 5-year patient survival, 80.9% of patients who received a first liver transplant from a deceased donor survived at least 5 years.

Heart

- There were 2,219 Canadians (excluding Quebec) living with a transplanted heart in 2018.
- Between 2009 and 2018, 20% of heart transplants resulted from a weakening of the heart muscle that had become stretched and thinner (dilated cardiomyopathy).
- According to the latest available data from CORR on unadjusted 5-year patient survival, 85.0% of patients who received a first heart transplant survived at least 5 years.

Lung

- There were 1,868 Canadians (excluding Quebec) living with a lung transplant in 2018.
- Between 2009 and 2018, 35% of lung transplants resulted from lung tissue scarring with no known cause (idiopathic pulmonary fibrosis). Emphysema and chronic obstructive pulmonary disease (COPD) were the causes of an additional 24% of lung transplants.
- According to the latest available data from CORR on unadjusted 5-year patient survival, 66.6% of patients who received a first lung transplant from a deceased donor survived at least 5 years.

Pancreas

- According to the latest available data from CORR on unadjusted 5-year graft survival, 89.7% of simultaneous kidney–pancreas transplants survived at least 5 years.

Small intestine

- Small intestine transplantation is an emerging and evolving field with the potential to improve the outcomes of children and adults with intestinal failure in Canada. Between 1999 and 2018, there were 55 such procedures performed in Canada (excluding Quebec), with more than half (53%) of the recipients younger than age 18.

Conclusion and additional information

End-stage organ failure presents complex issues and challenges for Canadian patients, clinicians and health care systems. Treatment options continue to evolve, and organ donation practices and processes are continuously examined to optimize outcomes. It is only through the ongoing and systematic collection of data that sound information can be produced to assist with decision-making.

In addition to this summary, more detailed information and data tables are available online at www.cihi.ca/corr, in the form of special reports, Quick Stats (pre-formatted and interactive data tables) and reports from organ procurement organizations titled *e-Statistics on Organ Transplants, Waiting Lists and Donors*.

If you have questions about these annual statistics or would like further information, please write to corr@cihi.ca.

Reference

1. International Registry in Organ Donation and Transplantation. [Preliminary Numbers 2018](#). 2019.



For data-specific information:

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