

THE LANCET

Public Health

Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

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Supplementary Appendix

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1. SUPPLEMENTARY TABLES

Table S1: Sources of data documenting the volume of solid organ transplants

Nation	Data source	Date of 100th COVID-19 case*
Argentina	Instituto Nacional Central Único Coordinador de Ablación e Implante	March 20 2020
Austria	Eurotransplant	March 8 2020
Belgium	Eurotransplant	March 6 2020
Brazil	Brazilian Organ Transplant Association	March 13 2020
Canada	Organ & Tissue Donation and Transplantation- CBS	March 11 2020
Chile	Corporación Nacional de Trasplantes de Chile	March 15 2020
Croatia	Donor Network of Croatia Eurotransplant	March 19 2020
Finland	Provided by the only transplant center	March 13 2020
France	Agence de la Biomédecine	February 29 2020
Germany	Deutsche stiftung organ transplantation Eurotransplant	March 1 2020
Greece	Hellenic National Transplant Organization	March 13 2020
Hungary	Eurotransplant	March 21 2020
Italy	Centro Nazionale per i Trapianti	February 23 2020
Japan	Japanese Organ Transplant	February 21 2020
Netherlands	Eurotransplant	March 6 2020
Norway	Scandiatransplant	March 6 2020
Portugal	Instituto português de sangue e da transplantação	March 13 2020
Slovenia	Eurotransplant	March 13 2020
Spain	Organización Nacional de Trasplantes	March 2 2020
Switzerland	Swiss National Foundation for Organ Donation and Transplantation	March 5 2020
United Kingdom	United Kingdom National Health Service	March 2 2020
United States	United Network for Organ Sharing/Organ Procurement and Transplantation Network	March 4 2020

*: Dates obtained from Johns Hopkins University dashboard.

Table S2: Changes in deceased donor transplant rates by country between 2020 (from the date of the first 100 reported COVID-19 cases up until December 31st 2020) and the same period of time in 2019

Nation	Overall	Kidney	Liver	Lung	Heart
Argentina, N. (%)*	-423 (-55.08%)	-288 (-56.58%)	-107 (-56.61%)	-8 (-47.06%)	-20 (-37.74%)
Austria, N. (%)	-25 (-5.23%)	-25 (-10.55%)	9 (8.41%)	0 (0%)	-9 (-16.36%)
Belgium, N. (%)	-155 (-22.66%)	-70 (-22.51%)	-46 (-21.4%)	-16 (-17.39%)	-23 (-34.85%)
Brazil, N. (%)	-1536 (-23.59%)	-1118 (-25.42%)	-286 (-16.56%)	-50 (-56.82%)	-82 (-27.42%)
Canada, N. (%)†	-177 (-9.23%)	NA	NA	NA	NA
Chile, N. (%)*	-47 (-54.02%)	-23 (-46.94%)	-10 (-45.45%)	-6 (-85.71%)	-8 (-88.89%)
Croatia, N. (%)	-81 (-36.65%)	-30 (-34.09%)	-35 (-33.98%)	NA	-16 (-53.33%)
Finland, N. (%)	-54 (-16.17%)	-44 (-19.13%)	5 (9.26%)	-5 (-20.83%)	-10 (-38.46%)
France, N. (%)	-1262 (-28.54%)	-898 (-34.43%)	-214 (-18.9%)	-101 (-31.27%)	-49 (-13.65%)
Germany, N. (%)	-260 (-9.8%)	-176 (-12.74%)	-38 (-5.77%)	-36 (-11.32%)	-10 (-3.4%)
Greece, N. (%)*	-20 (-28.57%)	-15 (-30.61%)	-2 (-14.29%)	1 (Inf%)‡	-4 (-57.14%)
Hungary, N. (%)	-127 (-38.96%)	-74 (-40.22%)	-27 (-39.71%)	0 (0%)	-26 (-43.33%)
Italy, N. (%)	-459 (-15.69%)	-238 (-15.53%)	-154 (-14.81%)	-40 (-30.08%)	-27 (-12.27%)
Japan, N. (%)	-143 (-34.54%)	-77 (-38.89%)	-22 (-28.95%)	-18 (-26.47%)	-26 (-36.11%)
Netherlands, N. (%)	-59 (-9.25%)	-35 (-9.19%)	-10 (-7.19%)	-19 (-21.35%)	5 (17.24%)
Norway, N. (%)	-20 (-6.92%)	-2 (-1.31%)	3 (4.11%)	-6 (-22.22%)	-15 (-41.67%)
Portugal, N. (%)	-130 (-21.81%)	-43 (-14.68%)	-73 (-33.18%)	-10 (-15.62%)	-4 (-21.05%)
Slovenia, N. (%)	7 (8.43%)	7 (21.21%)	-2 (-9.52%)	6 (66.67%)	-4 (-20%)
Spain, N. (%)	-934 (-23.4%)	-655 (-26.4%)	-167 (-18.02%)	-88 (-26.19%)	-24 (-9.68%)
Switzerland, N. (%)	18 (5.06%)	18 (10.59%)	-16 (-12.6%)	6 (20%)	10 (34.48%)
United Kingdom, N. (%)	-769 (-23.66%)	-546 (-25.4%)	-148 (-18.48%)	-69 (-47.92%)	-6 (-3.87%)
United States, N. (%)	310 (1.15%)	510 (3.48%)	-31 (-0.44%)	-237 (-10.18%)	68 (2.25%)
Overall, N. (%)†	-6169 (-11%)	-3823 (-11.91%)	-1370 (-9.33%)	-697 (-16.64%)	-279 (-5.46%)

*Argentina, Chile, and Greece follow-up ended earlier than other countries: Argentina ends at 2020-08-18, Chile end at 2020-05-27, and Greece ends at 2020-07-28. Data for all other countries was available through December 31st 2020.

†Canadian data could not be stratified by donor type and organ and was therefore excluded from the overall calculation.

‡There were no deceased lung transplants in Greece in 2019.

Table S3: Changes in living donor transplant rates by country between 2020 (from the date of the first 100 reported COVID-19 cases until December 31st 2020) and the same period of time in 2019.

Nation	Overall	Kidney	Liver
Argentina, N. (%) [*]	-141 (-89.24%)	-141 (-89.24%)	0 (NA%) [‡]
Austria, N. (%)	-31 (-44.29%)	-28 (-47.46%)	-3 (-27.27%)
Belgium, N. (%)	-11 (-20%)	-8 (-24.24%)	-3 (-13.64%)
Brazil, N. (%)	-638 (-63.17%)	-617 (-70.35%)	-21 (-15.79%)
Canada, N. (%) [†]	-50 (-12.86%)	NA	NA
Chile, N. (%) [*]	0 (NA%) [‡]	0 (NA%) [‡]	0 (NA%) [‡]
Croatia, N. (%)	-4 (-57.14%)	-5 (-71.43%)	1 (Inf%) [‡]
Finland, N. (%)	6 (35.29%)	6 (35.29%)	0 (NA%) [‡]
France, N. (%)	-148 (-33.11%)	-143 (-33.33%)	-5 (-27.78%)
Germany, N. (%)	-68 (-14.72%)	-60 (-14.53%)	-8 (-16.33%)
Greece, N. (%) [*]	9 (45%)	9 (45%)	0 (NA%) [‡]
Hungary, N. (%)	-5 (-17.86%)	-5 (-17.86%)	0 (NA%) [‡]
Italy, N. (%)	-66 (-20.69%)	-58 (-19.53%)	-8 (-36.36%)
Japan, N. (%)	-1270 (-74.53%)	-1034 (-73.96%)	-236 (-77.12%)
Netherlands, N. (%)	-128 (-30.33%)	-131 (-32.43%)	3 (16.67%)
Norway, N. (%)	-4 (-8.33%)	-4 (-8.33%)	0 (NA%) [‡]
Portugal, N. (%)	-26 (-53.06%)	-24 (-52.17%)	-2 (-66.67%)
Slovenia, N. (%)	0 (NA%) [‡]	0 (NA%) [‡]	0 (NA%) [‡]
Spain, N. (%)	-99 (-32.04%)	-90 (-31.03%)	-9 (-47.37%)
Switzerland, N. (%)	-24 (-26.09%)	-25 (-27.78%)	1 (50%)
United Kingdom, N. (%)	-528 (-58.99%)	-529 (-60.32%)	1 (5.56%)
United States, N. (%)	-1680 (-27.2%)	-1620 (-28.3%)	-60 (-13.27%)
Overall, N. (%)	-4857 (-39.52%)	-4508 (-40.19%)	-349 (-32.53%)

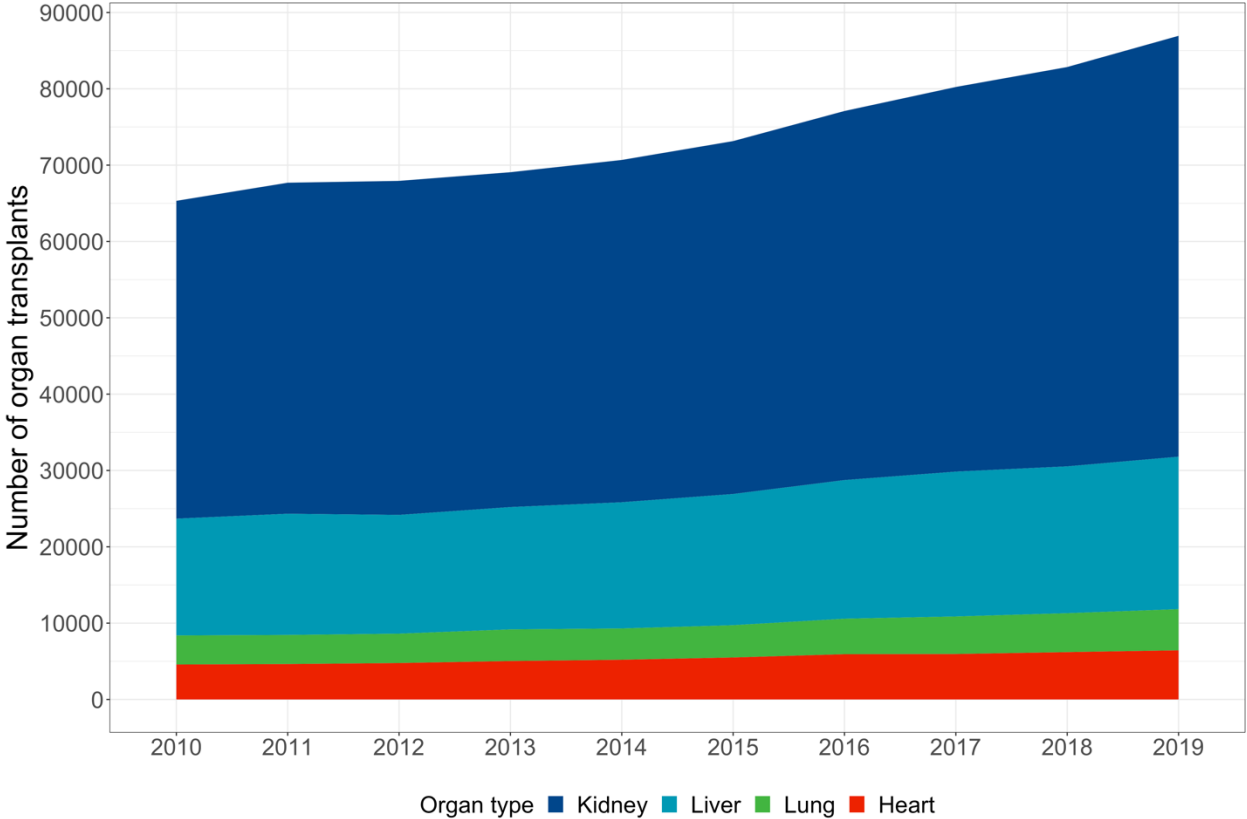
^{*}Argentina, Chile, and Greece follow-up ended earlier than other countries: Argentina ends at 2020-08-18, Chile ends at 2020-05-27, and Greece ends at 2020-07-28. Data for all other countries was available through December 31st 2020.

[†]Canadian data could not be stratified by donor type and organ and was therefore excluded from the overall calculation.

[‡]There were no living kidney or lung transplants in Argentina, Chile, Croatia, Finland, Greece, Hungary, Norway, or Slovenia in 2019.

2. SUPPLEMENTARY FIGURES

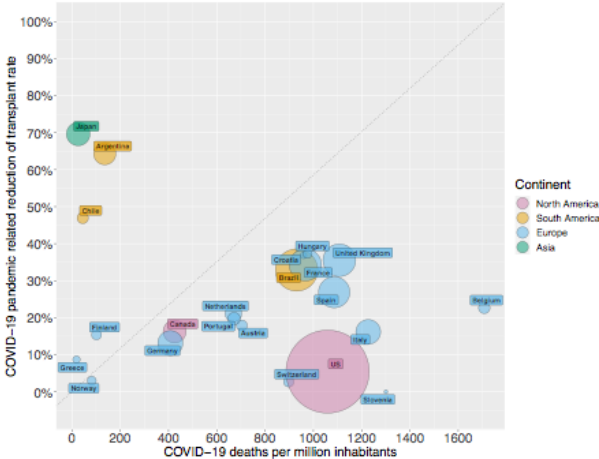
Figure S1: Historic annual number of organ transplants in the 22 countries included in the study from 2010 to 2019 stratified by organ type



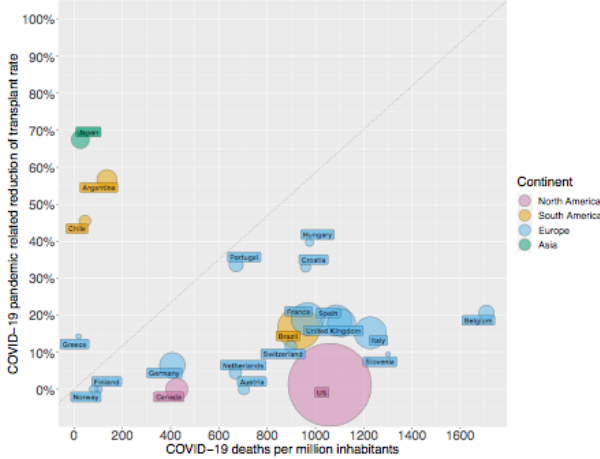
2010 to 2019 transplant data were obtained from the Global Observatory on Donation and Transplantation (GODT), generated by the WHO-ONT collaboration.

Figure S2: Diminution of total transplants between 2020 from the date of the first 100 reported COVID-19 cases until December 31st 2020 and the same period of time in 2019 according to the number of COVID-19-related deaths per million in each country by organ

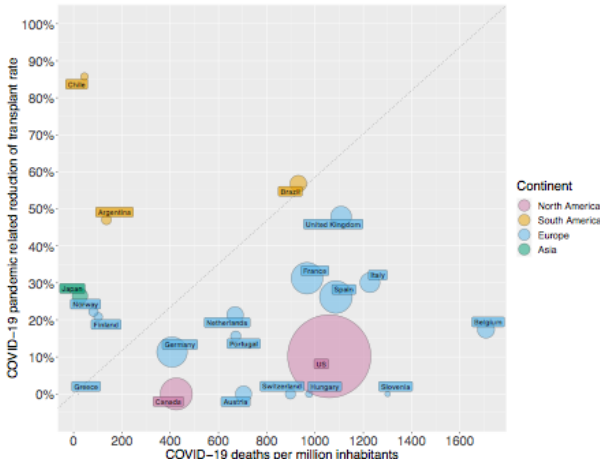
Kidney



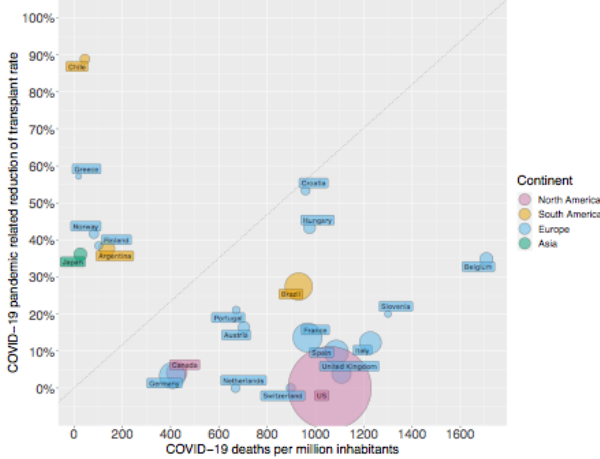
Liver



Lung



Heart

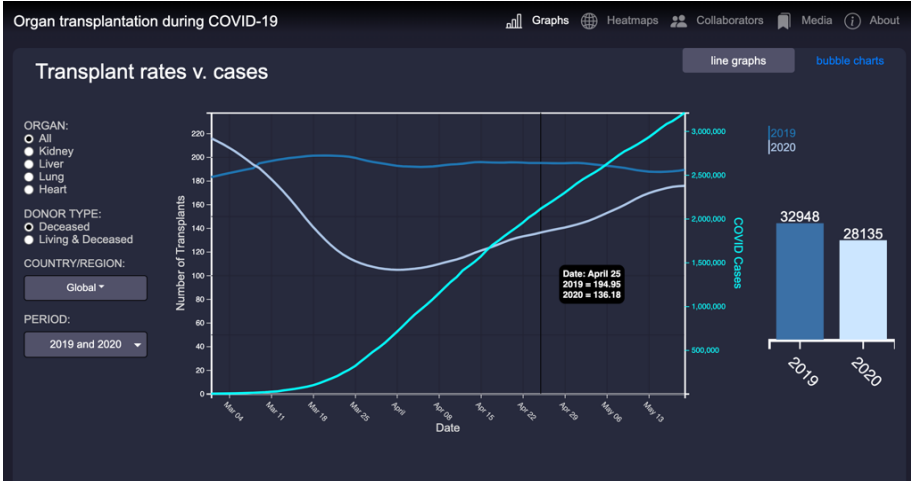


The graphs show the association of the cumulative COVID-19 deaths per million inhabitants with respect to the decrease in transplant rate according to organ type. The timeline for transplant rate is from the onset 100th cumulative COVID-19 cases up through December 31st 2020. Cumulative COVID-19 deaths per million is at the end of 2020. Pink bubbles correspond to North American countries, yellow bubbles to South American countries, blue bubbles to European countries, and green bubble to Japan. Dotted diagonal line is purely for visual reference.

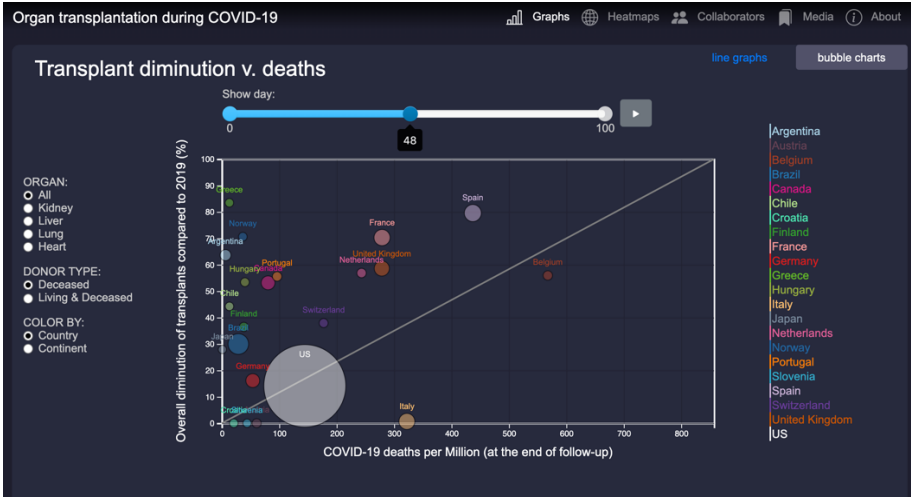
Bubble size was calculated by 2019 transplant data based on the Global Observatory on Donation and Transplantation (GODT) data, produced by the WHO-ONT collaboration. There were no lung transplants in Greece and Croatia in 2019. Argentina, Chile, and Greece have earlier follow-up dates. Argentina ends at 2020-08-18, Chile end at 2020-05-27, and Greece ends at 2020-07-28. The rest countries go up until through December 31st 2020

Figure S3: An interactive dashboard of COVID-19 cases and solid organ transplants in 2019 and 2020.

A



B



C

