

# Continuous and differential improvement in worldwide access to hematopoietic cell transplantation: activity has doubled in a decade with a notable increase in unrelated and non-identical related donors

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## **Supplementary Method**

### **Data collection and validation**

Global transplant numbers by country of origin, year of transplant, disease and donor type (autologous vs. allogeneic) are collected since 2006 in 194 WHO member states through the registries of the reporting member organizations, or national registries or transplant centers directly either in paper form or electronically using the standardized WBMT form. Detailed and validated information about main indication including stage of the disease, stem cell source, and allogeneic (family matched, family mismatched and unrelated) donor type was obtained for the years 2006 to 2018. Since 2007, reports on HCT activity from all WHO regions are being continued. Data were validated by a range of different independent systems; through confirmation by the reporting teams, following receipt of a computer printout of the entered data, by selective comparison with MED-A/TED datasets in the EBMT or CIBMTR data system or by crosschecking for double reporting with national registries. Data were validated by onsite visits to selected teams to verify reported data as part of the quality control program within the European, North American, Latin American and Asia-Pacific organizations. On-site visits to selected teams were part of the quality-control accreditation program of JACIE ([www.ebmt.org/jacie-accreditation](http://www.ebmt.org/jacie-accreditation)) or FACT ([www.factweb.org](http://www.factweb.org)). Based on quality

controls and contacts with regulatory agencies or national offices, the response rate for allogeneic HCT was estimated to be >95% and for autologous HCT 80–90%. The number of potential missing transplant numbers is estimated to be less than 5% for allogeneic HCT and less than 15% for autologous HCT. This number is much lower for Australia, Canada, Europe, Japan, and the USA. The survey focuses on the numbers of patients treated for the first time with HCT in the year of survey.

### **Definitions of the macroeconomic indicators**

General government expenditure on health as a percentage of total government expenditure is defined as the level of general government expenditure on health and is expressed as a percentage of total government expenditure. Total expenditure on health as a percentage of gross domestic product (GDP) is defined as the level of total expenditure on health expressed as a percentage of GDP, where GDP is the value of all final goods and services produced within a nation in the given year. Per capita total expenditure on health is defined as the per capita total expenditure on health, expressed at the average exchange rate for that year in US\$. Government expenditure in total expenditure on health is defined as the level of government expenditure on health and

is expressed as a percentage of total health expenditure. The values obtained for GNI per capita and per capita total expenditure on health of year 2018 are in US dollars.

### **Statistical analysis**

Descriptive statistical analysis was performed to assess HCT activity per WHO regions, indications, and donor type/stem cell source. Delta, or percentage of increase or decrease during a calendar-year period is calculated by the subtraction of the number of HCT of the first year from the last year of the period divided by the number of HCT of the first year. The cutoffs of TR were determined by considering the percentile values. All analyses were performed using Stata® version 17 (Stata Corporation, College Station TX, USA). World Bank databases were accessed by using a Stata module, “wbopendata” version 16.3. Pearson’s correlation coefficient was calculated between the GNI per capita and country-level HCT activity per 10 million population. Graphical procedures were done by using Stata® version 17 or Microsoft® Excel® of Microsoft 365.

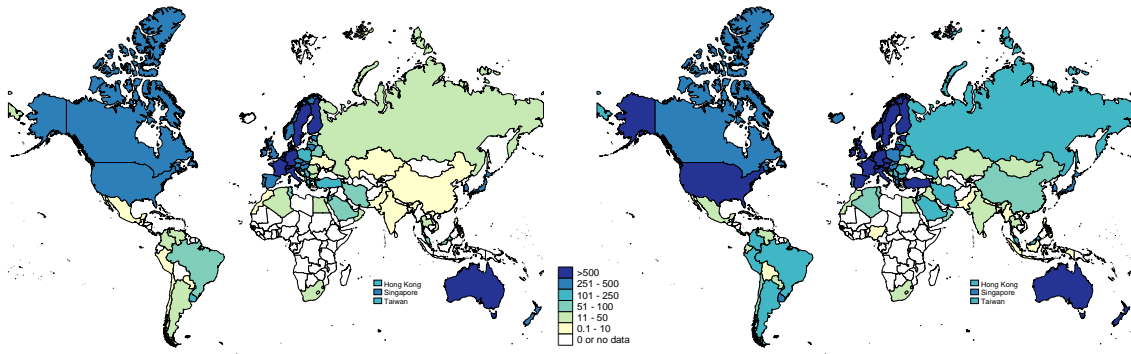
## Supplemental Figure legends

### Supplemental Figure 1. **HCT activity per 100,000 population for 2007 and 2018**

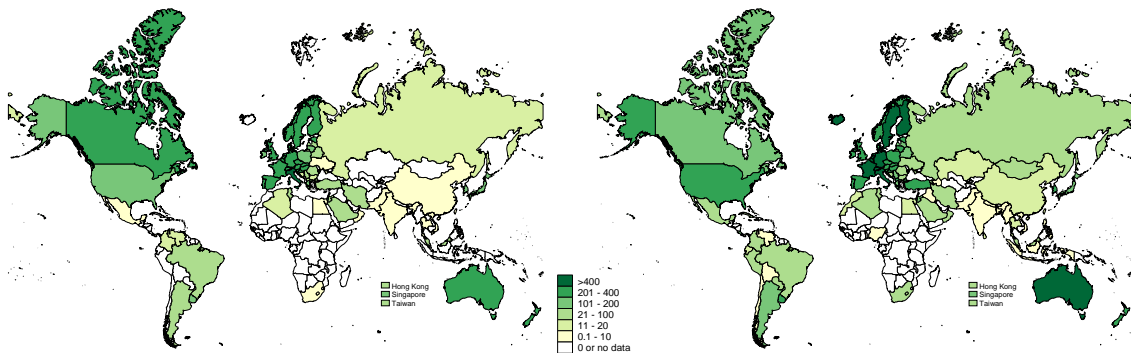
The number of HCT per 100,000 population on the same scale for 2007 and 2018, showing increasing trend in the number of HCT per population for all (A), autologous (B), allogeneic (C), related (D), and unrelated (E) HCT in all regions of the world. Team density per 100,000 population in 2007 was 4.92 (median, 25th and 75th percentile, 0.94 and 9.58) and 3.69 (median, 25th and 75th percentile, 1.09 and 8.50) in 2018 (F).

Supplemental Figure 1.

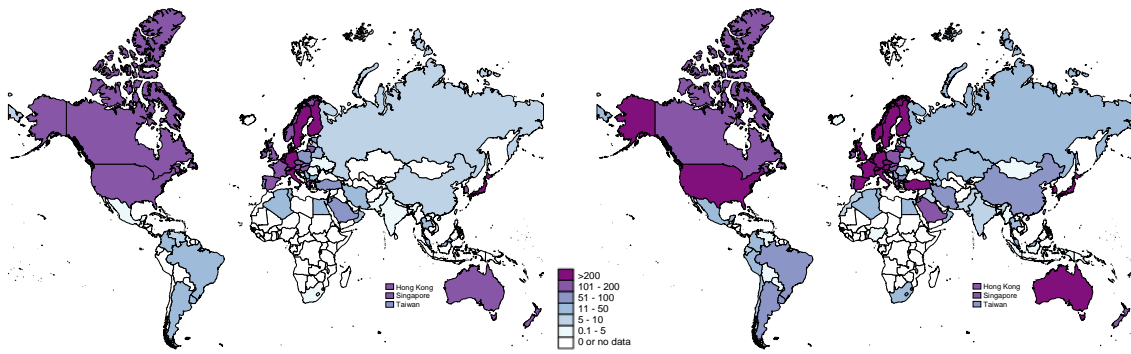
A. Total HCT in 2007 (left) and 2018 (right)



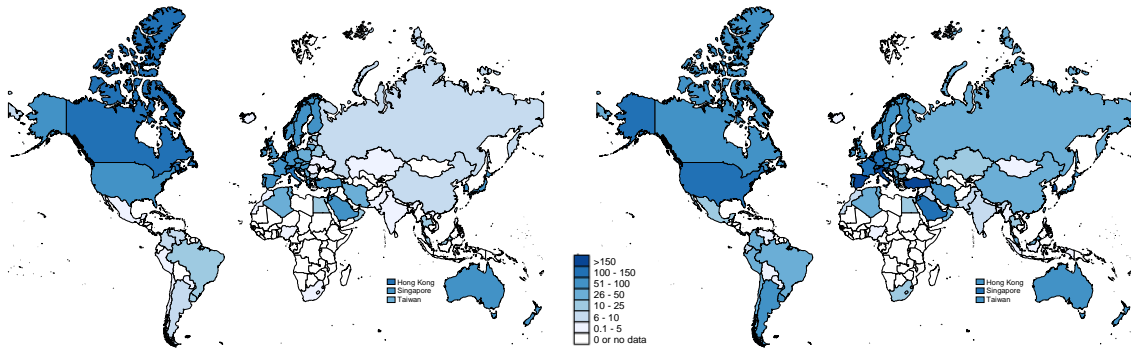
B. Autologous HCT in 2007 (left) and 2018 (right)



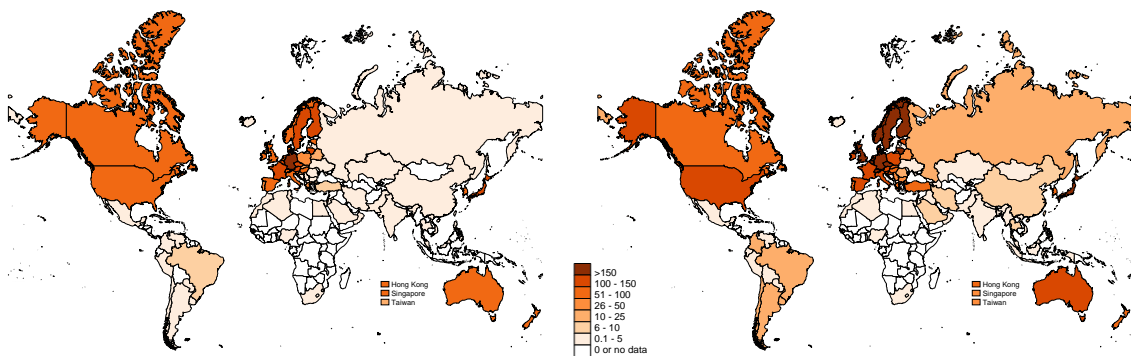
C. Allogeneic HCT in 2007 (left) and 2018 (right)



D. Allogeneic HCT from related donors in 2007 (left) and 2018 (right)



E. Allogeneic HCT from unrelated donors in 2007 (left) and 2018 (right)



F. HCT team density in 2007 (left) and 2018 (right)

