

Non-utilization of cryopreserved stem cell products from unrelated donors during the COVID-19 pandemic

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Overview

Before the COVID-19 pandemic, cryopreservation of stem cell products from unrelated donors was only carried out in few well-founded cases (4.9% in 2019).

During the pandemic it has often been unclear whether a fresh stem cell product would arrive in time for the already conditioned patient due to flight cancellations, border closings and other crisis-related restrictions. Therefore, in many cases, cryopreservation has been – and sometimes still is – advisable before starting patient conditioning.

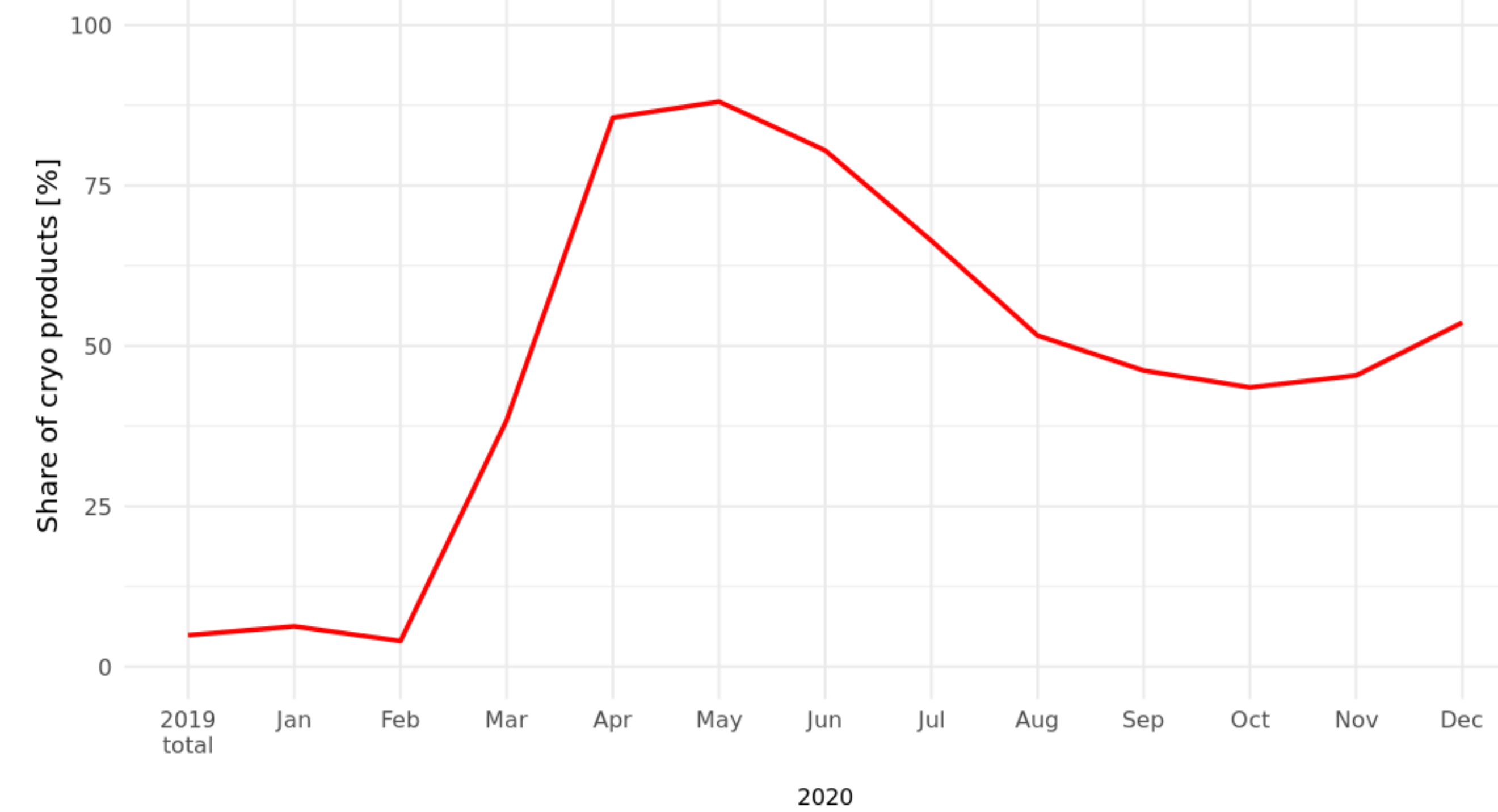


Figure 1 Share of cryopreserved products in 2019 (total) and throughout the year 2020.

Accordingly, the share of cryopreserved stem cell products from DKMS Germany donors has strongly increased. In 2020, 2,830 of 5,618 products (PBSC & BM) collected between January 1st and December 31st (50.4%) were cryopreserved with a maximum share of 88.1% in May (Fig. 1).

From an ethical point of view, it seems very problematic when unrelated donors undergo a stem cell collection in vain as their cryopreserved stem cells are not transfused.

Non-infusion of cryopreserved products during the COVID-19 pandemic

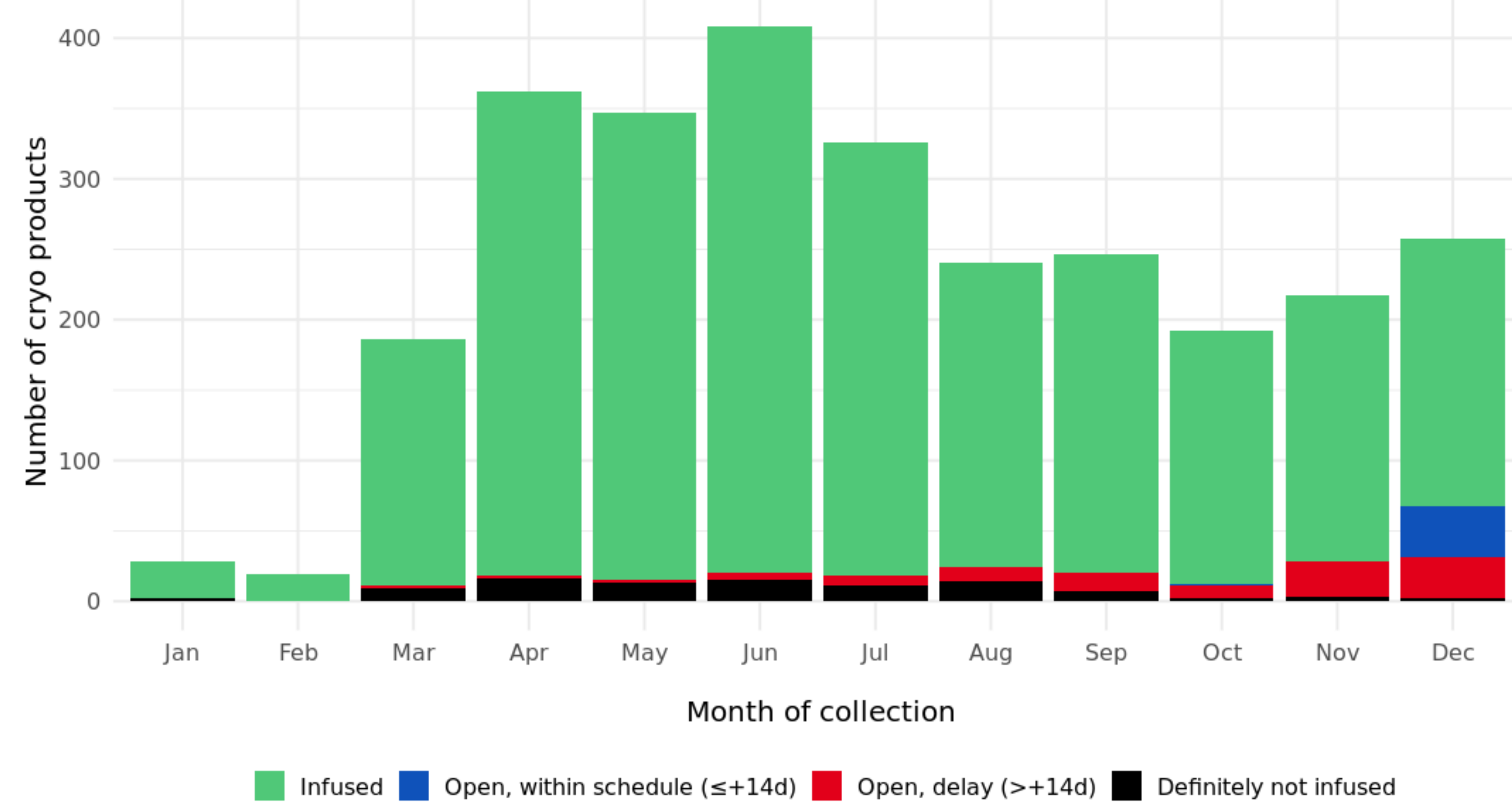


Figure 2 Status of cryopreserved products by month of stem cell collection. Status assignment as of data available on January 18th 2021.

Based on information available on January 18th, 2021, 92 (3.3%) of all cryopreserved products (2,783) since March 2020 (marking the start of the Covid-19 pandemic) will definitely never be transfused opposed to 2 non-infused products from January 2020 (Fig. 2). 38 cases (1.4%) were still due and/or within 14 days according to the transplant schedule of the transplant center. However, for another 104 products (3.7%) more than 14 days have passed since the scheduled infusion date. The issue of non-infused products does not limit to single countries (Fig. 3) showing that non-infusion of cryopreserved products is a general issue worldwide. The share of non-infused products in 2020 does not differ significantly when compared to 2019 (data not shown) but the total numbers are alarming. With every week delay the risk increases that the patient may not receive the product. Main reasons of non-infusion of definitely not-infused products (n=92) include patient death (n=49), deterioration of patient status (n=24) and dissatisfaction with product characteristics such as cell count (n=13; Fig. 4).

We currently assume that 5-10% of the cryopreserved products will eventually not be transfused, summing up to probably > 125 products from DKMS Germany donors alone until the end of the COVID-19 crisis.

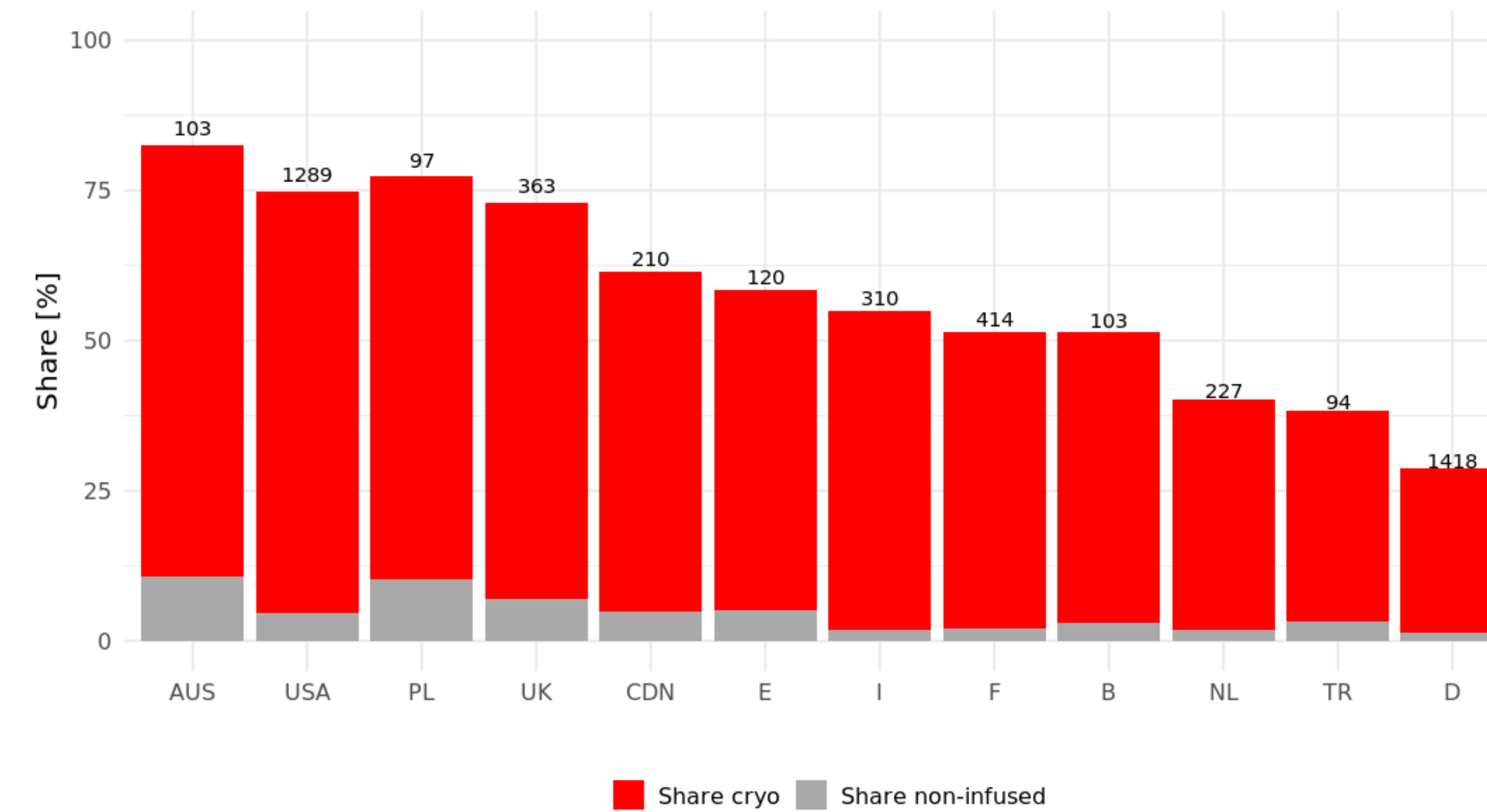


Figure 3 Share of cryopreserved products in 2020 and share of non-infused products (definitely not infused and open with delay >14d, data retrieval date January 18th, 2021). The 12 countries with the highest number of collections from German DKMS donors are depicted. Share of cryo and non-infused products refer to total collections per country (given on top of each column).

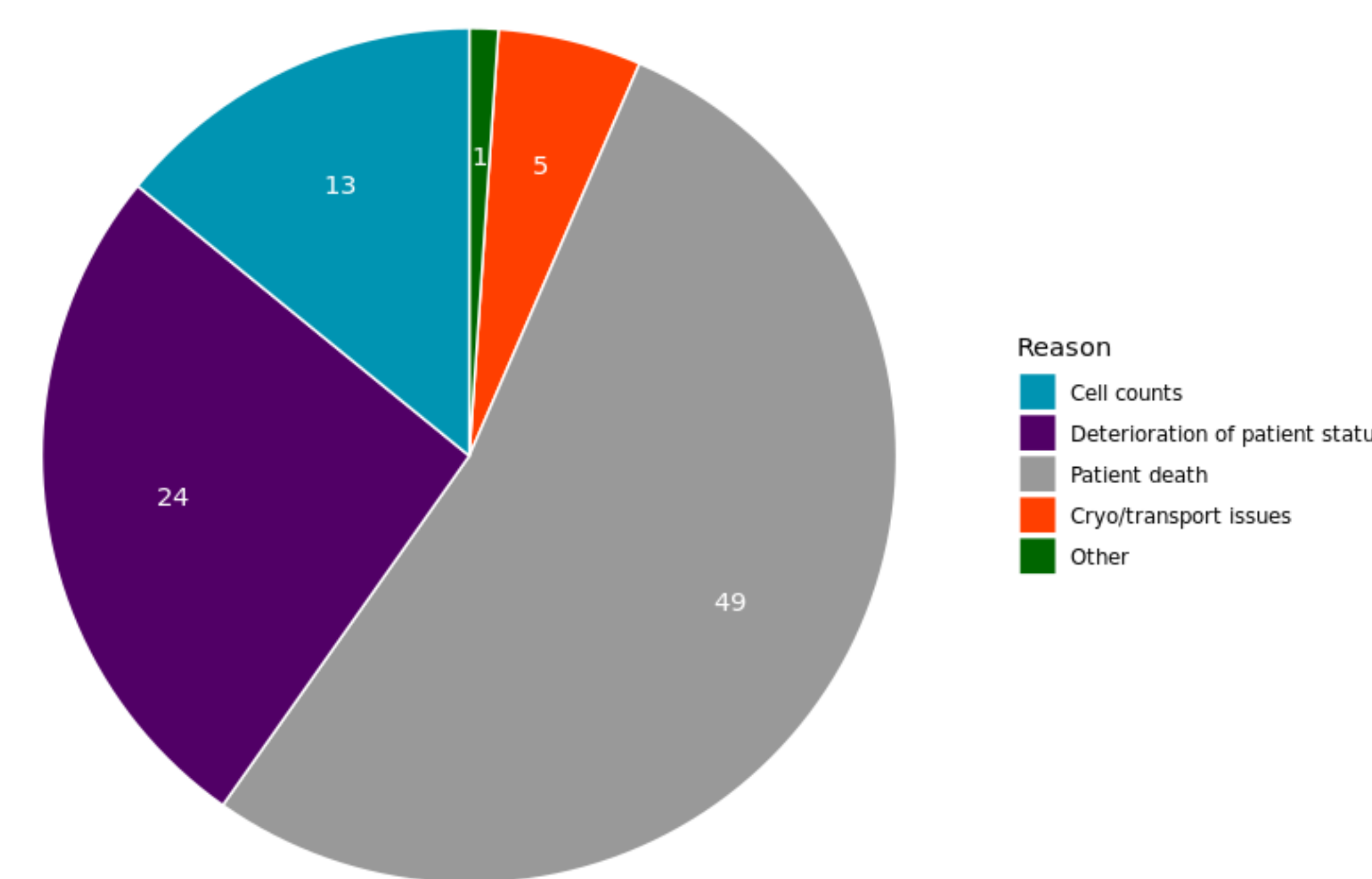


Figure 4 Reasons for non-infusion of definitely not infused products (total numbers).

DKMS Stem Cell Bank

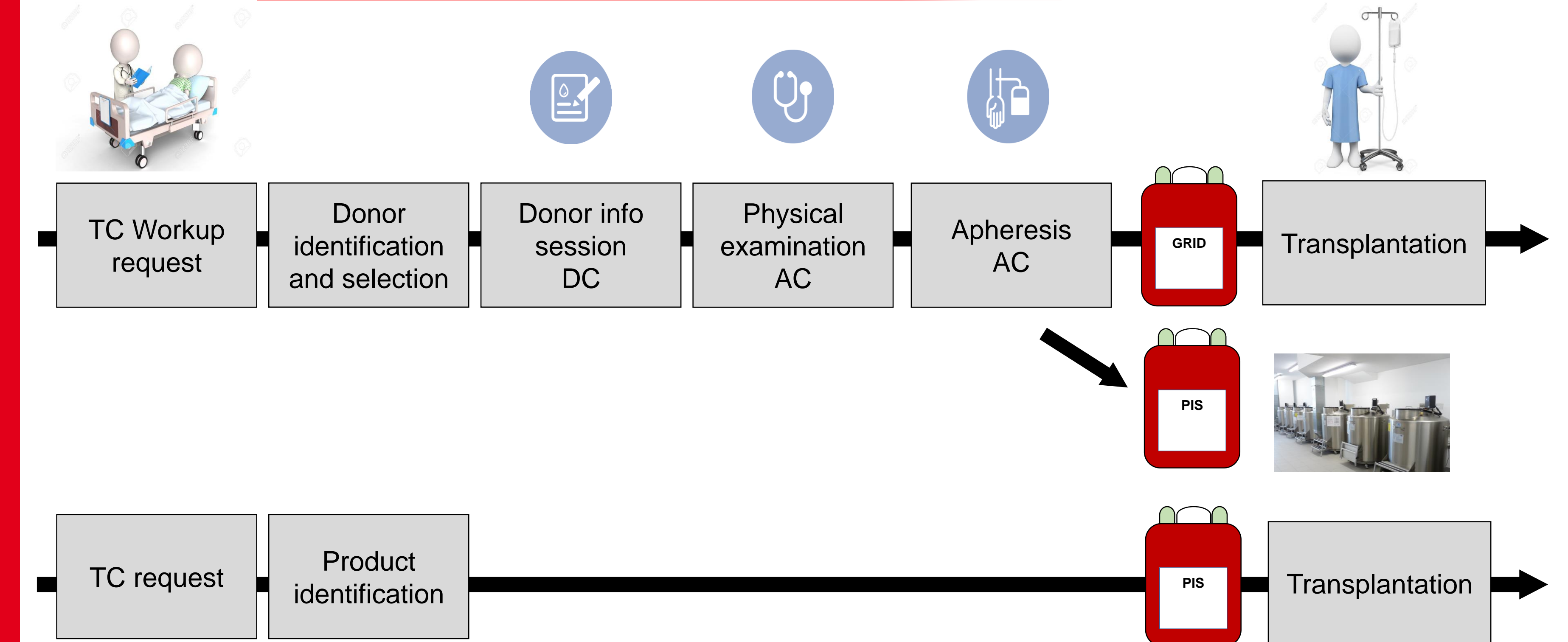


Figure 5 Schematic process of cryopreservation at DKMS Stem Cell Bank and request process.

The DKMS Stem Cell Bank will include additional cells from PBSC collections that take place anyway, thus minimizing additional donor burden (Fig. 5). We will focus on young male donors with frequent HLA genotypes and on collections with favorable donor-patient weight ratio. This approach considers the interests both of unrelated donors, who should not be exposed to the risks of stem cell donation for an ultimately non-transfused product, and of patients and their physicians, for whom time to transplantation and sometimes the logistical advantages of a cryopreserved product have priority. DKMS Stem Cell Bank plans to cryopreserve and store its first products no later than Q2 of 2021.

Conclusion

During the COVID-19 pandemic, in many cases cryopreservation has been an appropriate means to ensure safe receipt of the stem cell product at the transplant center before start of conditioning of the patient. However, it should be carefully examined in all cases whether the immediate circumstances of the crisis really require cryopreservation. One important factor is that patients are thoroughly assessed again shortly before the start of the donation procedure. After the crisis, a return to the long-standing practice of predominantly using fresh preparations is necessary.