

Is Norway heading for a blood-supply crisis?

Norway is no longer self-sufficient in plasma products. The shortfall is covered from the commercial plasma market, in which plasma from paid blood donors is included as a source. This conflicts with the altruistic foundation of the transfusion services. There is also a risk of a supply crisis with regard to cellular blood components. A long-term effort is required to redress the balance between production and consumption in the transfusion services.

Hans Erik Heier
h.e.heier@medisin.uio.no
Richard W. Olausen
Vibeke M. Svenningsen

Norwegian blood donors are unpaid volunteers who remain anonymous to the patients, in accordance with the recommendations of the World Health Organization (WHO), the Council of Europe, The International Committee of the Red Cross and the International Society of Blood Transfusion (1–4). The WHO and the Council of Europe have recommended their member states to maintain self-sufficiency in blood and plasma products (1, 2).

Voluntary, unpaid blood donation was started in the allied countries during World War II, as the civilian population's support to a free society (5). Donating blood on a voluntary basis and without pay involves a socio-ethical stance (6). A secondary rationale may be that paid blood donors may be more exposed to infections that are transferred through blood than are voluntary, unpaid donors (3, 7), but such differences have not invariably been discernible (8).

Norway achieved self-sufficiency in blood and plasma products in the early 1980s (9). In 2007–2008, the consumption of gammaglobulin for intravenous administration (IvIg) reached a level that could not be sustained with the use of Norwegian fresh-frozen plasma as a source (Figure 1) (J.E. Ørn, Octapharma, and S. Slaastad, Baxter, personal communication). The regional health authorities addressed this supply crisis by replacing the national self-sufficiency programme with contractual deliveries from the commercial plasma market, starting from July 2009. Norwegian fresh-frozen plasma is now being sold to a fractionation firm, which also uses paid plasma donors, and which sells albumin, prothrombin complex and gammaglobulin back to Norway. The fractionation firm complies with the EU's blood directive and

the European pharmacopoeia. There is thus no reason to worry about patient safety, but the altruistic foundation of the transfusion services has been disregarded in order to cover the demand.

Norway has always been self-sufficient in cellular blood components. Of all the Nordic countries, ours has the lowest consumption of erythrocyte concentrates (10), although the consumption increased by 15 % from 2000 to 2010 (11). The consumption of thrombocyte concentrates doubled from 1999 to 2010 (11). Most of the recipients of erythrocyte concentrates are elderly people, who often suffer from cancer (12). An increasing number of elderly people and an increasing incidence of cancer may thus give rise to a further increase in the consumption of cellular blood components. In order to cover such an increase, Norway needs more blood donors. There is no European market for cellular blood components.

Accidents, terrorist attacks etc. rarely lead to a high demand for blood products (13, 14). It will be different, however, if the country is struck by a major epidemic that would cause many donors to be quarantined. Norway is far removed from having a stock of blood donors that can provide sufficient preparedness for epidemics.

Can the number of Norwegian blood donors be increased?

The number of active Norwegian donors has for a long period remained at 90 000–100 000 (11). Donation frequency per blood donor is the second highest in Europe (10). The sociologists Wollebæk & Siveind have recently shown that voluntary, unpaid activities are constantly declining in popularity in Norway (15). They interpret this as a consequence of increasing material prosperity in particular.

Among the member states of the Council of Europe in 2009, only Estonia had fewer blood

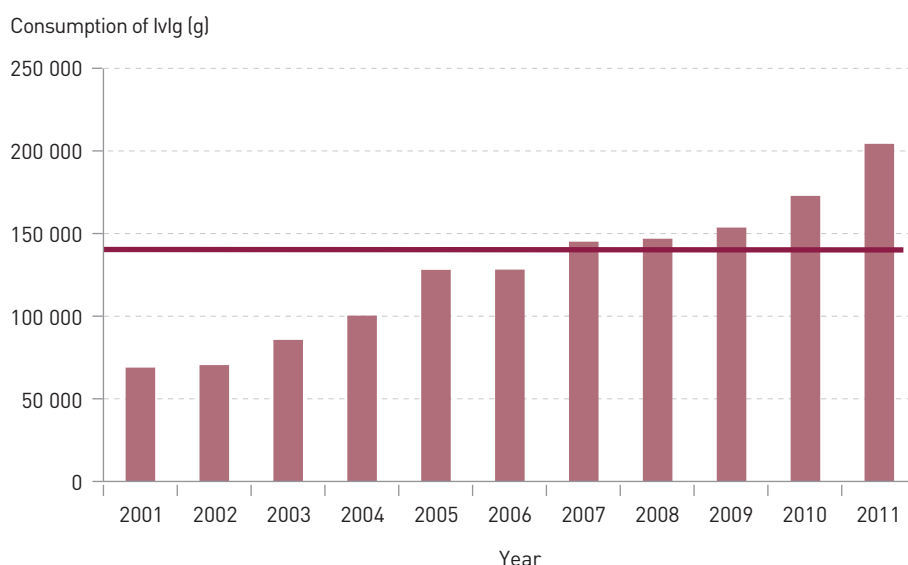


Figure 1: Consumption of gammaglobulin for intravenous administration (IvIg) in Norway from 2001–2011 (J.E. Ørn, Octapharma, and S. Slaastad, Baxter, personal communication). The red line denotes estimated production from Norwegian plasma in 2007 (40 229 litres of plasma, 140 800 grams of IvIg)

donors than the high-income country of Norway in proportion to the population (Figure 2) (10). Østfold county, with the second-lowest average income among the counties around the Oslo fjord (16), has the nation's highest blood-donation frequency (17). A pilot study undertaken at the Oslo Blood Bank in 2010 may indicate a low blood-donation frequency in the high-income districts in the west of Oslo (unpublished data). We can therefore not exclude the hypothesis that the willingness for voluntary, unpaid blood donation in Norway has declined as a result of rising living standards, although there is still a considerable potential for donation of blood among the population (18).

Recruitment campaigns and crisis reports have often spurred a short-term supply of new donors. The campaign undertaken by the Red Cross in 2010 proved especially effective. The Crown Prince was a highly visible campaign participant, and the number of active blood donors increased by more than five per cent nationwide (11). After the terrorist attacks on 22 July 2011, masses of new donors registered (unpublished statistics from the Oslo Blood Bank). A key challenge to the blood banks is to retain new donors over time, so as to stabilise the number of donors at a higher level.

New blood donors are most often recruited by existing ones (19). One may assume that systematic efforts to make blood donation an enjoyable experience may have a positive effect on the recruitment of blood donors. In this context, many factors need to work in unison. The waiting period from registering to being summoned for an examination must be short. The blood banks must be easily accessible, have a pleasant interior and plenty of parking spaces (20). Summons and making of appointments should take place through updated electronic systems. The staff of the blood banks need to have sufficient time, equipment (21) and capacity to deal with the blood donors in an efficient and agreeable manner. We believe that Norwegian blood banks can do a lot to improve the experience of donating blood.

Total safety of transfusion cannot be achieved, and the health authorities need to balance the risk involved in slackening the selection criteria against their possibly negative effect on the supply of blood donors. For example, one may assume that many will be reluctant to expose their sexual habits every time they donate blood.

Number of blood donors per 1 000 inhabitants in European countries in 2009

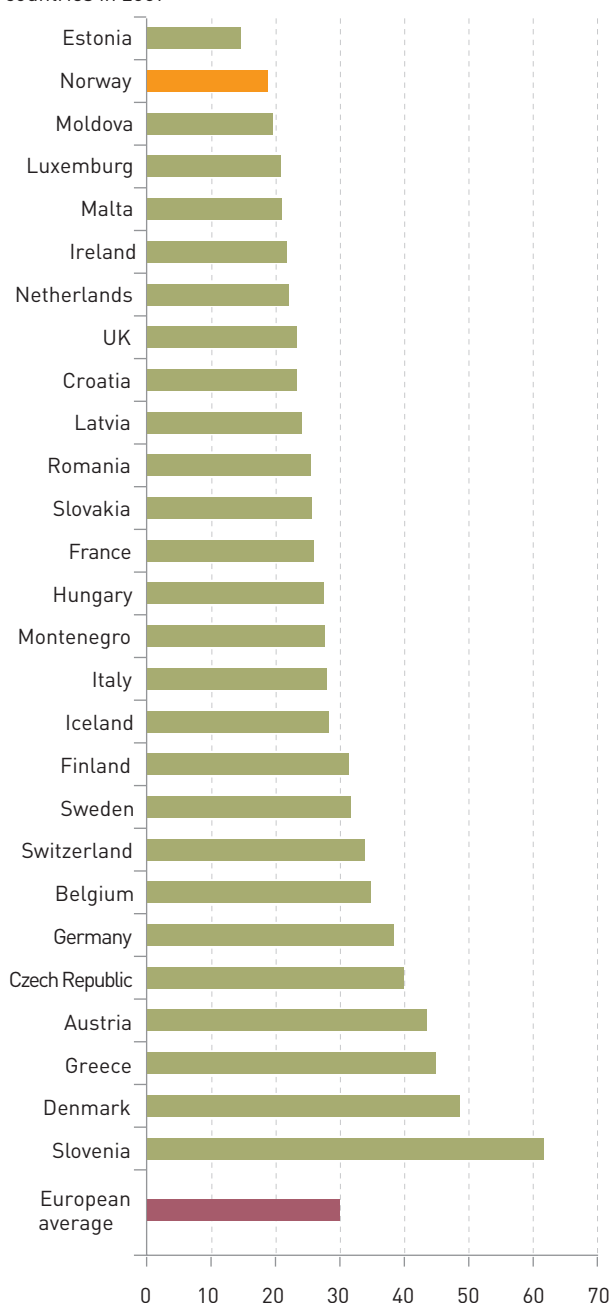


Figure 2: Number of blood donors per 1 000 inhabitants in Europe in 2009 (10)

In Norway, blood donors are defined as patients, and are thus encompassed by the restrictions that health legislation imposes on the exchange of health information between the health enterprises. It may seem rather inflexible to be restricted to donating blood at the blood bank where one is primarily registered as a donor. This problem can be solved by subordinating the blood-donor services directly to the regional health enterprises, with regional databases, or merging them into a nationwide stock of blood donors operated by, for example, the Red Cross (22). A third solution could be to no longer define blood donors as patients, but allow them to donate in accordance with a separate set of rules that could enable an easier exchange of information between the blood banks.

Can national self-sufficiency be restored?

In 2011, the consumption of gammaglobulin for intravenous administration amounted to 204 771 grams (Figure 1). With a yield of 3.5 grams of gammaglobulin per kilo of fresh-frozen plasma, a total of 58 000 kilos of fresh-frozen plasma will be required to cover this consumption. In recent years, Norway has produced up to 55 000 kilos (11) (S. Slaastad, personal communication). However, self-sufficiency will also require the country to cover the consumption of approximately 45 000 units of Octaplas, corresponding to approximately 12 000 kilos of fresh-frozen plasma. Altogether, Norway is therefore 15 000–20 000 kilos of fresh-frozen plasma short of covering domestic consumption. This corresponds to fresh-frozen plasma from more than 70 000 whole-blood collections, i.e. 35 % more than in 2010, or 30 000 plasmaphereses of 600 ml of plasma each.

Such an increase in the collection activity of the blood banks may appear unrealistic. Restoration of self-sufficiency will require a combination of an increasing number of blood donors, a reduced use of erythrocyte concentrates, IvIg and Octaplas, fewer whole-blood collections and more plasmaphereses.

In Norway, the consumption of erythrocytes has increased at a slower pace since 2006 (9), despite an increasing number of elderly people. This may reflect a tendency towards more restrictive transfusion practices (23), in adherence to recent scientific findings (24). Consumption figures from the Netherlands may nevertheless indicate that the Norwegian consumption of erythrocytes can be reduced by at least 20 % (25). We have recently proposed several measures that could reduce the consumption of erythrocytes in Norwegian hospitals (12). There is a weak knowledge basis for the use of plasma products (26, 27), and the consumption of gammaglobulin and Octaplas could possibly be reduced. A number of

blood banks possess apheresis machines, and may transfer donors from donation of whole blood to plasmapheresis if the consumption of erythrocytes declines.

Balance must be restored

Norway has addressed her supply crisis for plasma products in a manner that ensures safe products to patients, but the altruistic foundation for the transfusion services has been disregarded. If there is a further increase in the consumption of cellular blood components, a national supply crisis looms for these as well. There are good arguments to claim that the nation uses excessive amounts of erythrocyte concentrates as well as of IvIg and Octaplas.

We believe that over time, the balance between Norwegian production and consumption of blood and plasma products can be restored. To reach this goal, a long-term plan should be prepared. The medical blood-transfusion community ought to assume a leading role in these efforts, which should include re-establishment of a national agency for coordination of the activities of the blood banks (9). The largest challenge may prove to be that of allocation of funds to recruitment campaigns and upgrading of the blood banks.

Hans Erik Heier (born 1944)

is Professor Emeritus at the Institute of Clinical Medicine, University of Oslo, and former Senior Consultant at the Department of Immunology and Transfusion Medicine, Oslo University Hospital.

The author has completed the ICMJE form and declares no conflicts of interest.

Richard W. Olausson (born 1964)

is Head of Section and Senior Consultant at the Section for Blood Donation, Department of Immunology and Transfusion Medicine, Oslo University Hospital Ullevål.

The author has completed the ICMJE form and declares no conflicts of interest.

Vibeke M. Svenningsen (born 1952)

is Senior Bioengineer at the Section for Blood Donation, Department of Immunology and Transfusion Medicine, Oslo University Hospital Ullevål.

The author has completed the ICMJE form and declares no conflicts of interest.

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