

# Emerging Pathogens: Novel and Well-Known Infectious Threats in Transfusion Medicine

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The current issue of *Transfusion Medicine and Hemotherapy* is dedicated to novel aspects of emerging infectious threats in transfusion medicine. The articles in this issue focus on *Plasmodium* [1, 2] and viral threats like West Nile virus (WNV) and SARS-CoV-2 [3, 4], reflecting current national test strategies and requirements.

In recent 2 years, issues related to the SARS-CoV-2 pandemic have dominated medical reporting. Since early 2020, all blood establishments worldwide are challenged by the SARS-CoV-2-pandemic. The transfusion medical facilities were able to ensure the supply of blood products during the pandemic, even under very difficult conditions. Beyond this, transfusion medicine facilities also played a role in overcoming the crisis, whether by providing COVID-19 convalescent plasma [5], by SARS-CoV-2 testing [6], by vaccination campaigns [7], or establishing laboratory tests in the context of the complications associated with vaccination [8]. At the onset of the pandemic, the situation of SARS-CoV-2-infected blood donors was unclear with respect to the transfusion-transmission (TT) risk of the virus: Chinese investigators reported the detection of SARS-CoV-2 RNA in the plasma of asymptomatic blood donors already during the spring 2020, indicating the possible risk of transmitting SARS-CoV-2 by transfusion [9]. Meanwhile, considerably more data on possible TT of SARS-CoV-2 are available. In this context, Kieley et al. [4] present an updated and comprehensive review of SARS-CoV-2 and blood safety. By the current available data, the risk of transfusion-transmitted SARS-CoV-2 infection can be reassessed and considered as only theoretical. However, focusing on one dramatically emerging pathogen should not underestimate new threats

and require alertness for current sometimes undervalued and future infectious diseases in transfusion medicine.

In particular, other, sometimes old and already known infectious agents that are endemic in developing countries should be observed. Due to climate change, global migrations caused by touristic travel or migration due to events like war or other political or economic reasons, previously rather rare infectious agents can increasingly come into the focus of the blood transfusion services in nonendemic countries. Especially, populations with little or minimal health screening amplify the infectious risk.

Vectors (arthropods) for some agents like *Plasmodium* are not widespread and cannot be introduced in temperate climates. However, due to changes in the global climate, a further spread of vectors as well as infectious agents can be observed here. A good example of this is relevance of WNV for transfusion safety in Germany, which was considered to be a nonendemic country until 2018. Main factor for the introduction of WNV in Germany was probably global warming: increasing temperatures in Germany enable the transmission of WNV even by an already present vector (*Culex* sp) [10]. Therefore, in the last years, autochthonous mosquito-borne WNV infections in humans were reported indicating a continuous circulation in the affected areas of central-east Germany. Frank et al. [3] describe the German situation regarding spread of WNV by presenting the current data which are generated according to the Infection Protection Act and the Transfusion Act. They display measures in blood donation to minimize TT infections, give insights into the surveillance of WNV, and summarize blood donor regulation.

Because of globalization and travel, the risk of new and emerging infections is likely to increase in the years to come. An enhanced spread of infectious diseases associated with travel and migrations will include impacts related to blood transfusion, hence the traditional assumption of minimal risk associated with blood safety is being challenged by climate change, migration, and travel activities [11]. Niederhauser and Galel [1] review the status of TT malaria (TTM) and mitigation strategies in nonendemic regions. Malaria is a mosquito-borne infectious disease caused by protozoan parasites of the genus *Plasmodium*. Although malaria does not threaten to become an autochthonous infection in central Europe at least in the near future [12], the parasites can also be transmitted by blood transfusion, especially through red cell blood concentrates collected from asymptomatic and parasitemic donors from endemic countries. Overall, the risk of transfusion-associated malaria in nonendemic countries is considered to be low, and very few TTM cases occurred in these regions in the last 2 decades [1]. However, as more donors who originate from endemic countries are expected (and wanted) to introduce themselves as blood donors, sufficient strategies for the prevention of TTM are needed.

Furthermore, one exception of TTM is described in the current case report of Wagner et al. [2]. The authors demonstrate that even a low risk of TTM can lead to serious side effects. In this report, the special focus is placed on the legal perspective, whereby the compliance of blood donors with regard to accuracy and completeness with anamnestic information provided on the donor questionnaire is discussed.

Emerging infections always pose a threat to transfusion safety. Since no pathogen reduction technology is available for red blood cells, testing for the pathogen or

changing donor selection criteria are the only ways to protect blood recipients from transfusion-transmissible infections. In addition, undetected infections can also occur among concurrent donors and blood establishment personnel when they are easily transmitted from person to person like in the case of SARS-CoV-2. Countermeasures are not only costly but can also affect the supply chain for blood products. In times of continuous technological advancement and ongoing progress in the development of pathogen reduction technologies, we need to question whether the range of infectious screening of blood products is still necessary. However, the race between technological development, adaptation of measures in transfusion medicine, and the spread of new pathogens must balance cost-benefit and security of blood supply. Overall, this issue of *Transfusion Medicine and Hemotherapy* provides an insight into the history and new developments of infectious screening, as well as the challenges and difficulties concerning improvement of blood safety.

#### Conflict of Interest Statement

None.

#### Funding Sources

None.

#### Author Contributions

Not applicable.

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