transfusion in military theater of operations, the French Military Health Service has developed dedicated guidelines for blood transfusion in exceptional situations. Since medical aid to the population is an important activity for forward surgical teams deployed in combat zones, we usually apply this doctrine for either civilian or combat casualties.[6,7] This dedicated strategy for blood management refers to the early administration of hemostatic drugs (tranexamic acid), French Lyophilized Plasma transfusion, and whole-blood collection.[8,9] To conclude, we would like to know if the authors could provide further details regarding incidences of hemorrhages and perioperative blood management (perioperative blood transfusion and adjuvant therapies) in the 79,383 anesthetic procedures performed on 75,536 patients, in 21 different countries, during the 6-yr study period. Especially, we would like to know what kinds of blood resources are available at Médecins Sans Frontières facilities.

Competing Interests

The authors declare no competing interests.

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In Reply:

Pasquier *et al.*[1] bring up the topic of perioperative bleeding and its management in resource-limited settings as a global public health issue, particularly in the context of massive, and often fatal, hemorrhage in the postpartum and trauma contexts. While the topic is a very pertinent one, we did not focus on it in our study, which aimed to describe anesthetic procedures that are safe and feasible in the rather unusual clinical contexts where Médecins Sans Frontières (MSF) operates.[2] Given the limitations of our database, we were unable to ascertain the cause of perioperative mortality and could not quantify the incidence of specific perioperative complications or their management, like perioperative bleeding. The extraction of such information would require a dedicated chart review of individual patient records, a topic worthy of research in the future when the resources are available.

They mention their experience with the French Military Health Service and the use of dedicated guidelines for blood transfusion in exceptional settings, such as the one their forward surgical teams apply to the combat and civilian casualties that they treat. MSF also has a comprehensive perioperative blood management policy in place, which includes a transfusion protocol for patient safety and access to adjuvant therapies such as QuikClot and tranexamic acid. Because of limited resources, the approach utilized for blood management at a particular location depends on the situational context, with most facilities not being equipped with a dedicated blood bank.

Frontline MSF facilities are usually located in "safe" zones where they operate in an expectant mode, awaiting patients to arrive at the hospital for treatment after initial stabilization in the field or other locations, usually by non-MSF personnel. They are not designated triage locations and usually do not have patients coming in with acute traumatic hemorrhage. The use of tranexamic acid is of limited value in these scenarios as patients mostly arrive outside of the safe 3-h window for administration. When acute hemorrhage in wound and trauma surgeries is encountered in these frontline facilities, clinical strategies to minimize the need for blood transfusion are utilized first. Standard resources available at frontline MSF facilities include QuikClot in the emergency department and the use of permissive hypotension, tourniquets, and autologous transfusion from appropriate hemothorax and hemoperitoneum

patients (according to the International Committee of the Red Cross recommendations) in the operating room. When blood transfusion is absolutely required, whole blood is available for use at most frontline facilities as opposed to separated blood components.

In hospitals that provide obstetrical care, the capacity for blood transfusion is required as a part of our Comprehensive Emergency Obstetric and Neonatal Care policy. While not standard, MSF is sometimes able to maintain a small blood bank in these hospitals using specialized refrigerators depending on the resources and permissions at that particular location. Otherwise, a living donor blood bank is established, where people have already been preidentified and screened for emergency blood donation. As a matter of policy, all donor blood is tested at MSF facilities, even if it is coming from the local national blood transfusion centers. It is primarily the tertiary MSF facilities located in more urban and well-resourced settings that have classic blood banks and are therefore able to handle trauma resuscitation in more traditional ways with the use of separated blood components.

In summary, we agree with Pasquier *et al.*[1] that this is an area of global public health significance. While we are unable to answer their questions regarding causes of mortality and incidences of blood transfusions at this time, we hope to investigate these further in the future. The various practices mentioned regarding blood transfusion capabilities and practices at MSF facilities have evolved to be dependent on the context of the facility's location and purpose. We feel that such an approach might potentially provide the initial outline for future programmatic work in this arena across the disparate healthcare settings found in low- and middle-income countries. We thank you for prompting the conversation on this very important topic.

Competing Interests

The authors declare no competing interests.

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Prediction Model for In-hospital Mortality Should Accurately Predict the Risks of Patients Who Are Truly at Risk

To the Editor:

With great interest, we read the article by Le Manach *et al.*[1] The article presents a prediction model for postoperative in-hospital mortality with very good discriminative abilities (C statistic of 0.93 in a validation cohort). However, we contend the conclusion that the predictive model is well calibrated.

A prediction model should first and foremost provide accurate predicted probabilities. When validating a prediction model, it is essential to answer the question whether predicted probabilities correspond to observed probabilities, especially for patients who may have a clinically relevant risk of the predicted outcome.

The reported calibration plot (fig. 2 in the article[1]) seems to show a well-calibrated model. However, the calibration plot is truncated at a predicted probability of 0.10, and the plot shows only 9 out of 10 deciles. Patients with the highest risks seem to have been omitted from the reported calibration plot. Figure 3 of the article[1] shows the observed mortality in the validation cohort for a wider range of risk scores. Supplemental Digital Content 3 reports the predicted probabilities for all Preoperative Score to Predict Postoperative Mortality (POSPOM) scores. If we overlay the predicted probabilities for all POSPOM scores onto figure 3 of the article,[1] we observe that the prediction model greatly overestimates the in-hospital mortality risk in the high-risk patients (fig. 1). Although the high-risk patients form only a small group, they are in fact the patients for whom the prediction model is most clinically relevant. We would not want to be the physician who communicates a 62% risk of death to a patient (POSPOM value of 40) while the actual risk is 23%.

From the results presented in the article, it is impossible to deduce what the reason is for the discrepancy in the results. There are several inconsistencies in the reporting of the predicted probabilities. The text of the article mentions a predicted probability of 5.65% for a POSPOM value of 30, whereas the Supplemental Digital Content reports a predicted probability 7.403%. There is no way to reconstruct the predicted probability as the model's intercept is not reported. It is possible that the predicted probabilities in Supplemental Digital Content 3 are wrong, which then could explain the overestimation of the in-hospital mortality risk. Even then, it would still be a necessity to report a continuous calibration plot of the model for the entire range of predicted probabilities, with a histogram within that calibration plot.

We believe that the prediction model may be of great value to both physicians and patients, but only after the overestimation of the high-risk patients has been addressed.

Competing Interests

The authors declare no competing interests.