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Feasibility and performance of in-house red blood cell reagents to detect unexpected antibodies in immunized patients in Burkina Faso

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Abstract
In sub-Saharan Africa, antibody detection tests remain inaccessible because of the high cost and limited shelf life of red blood cell (RBC) reagents. This study aimed at investigating the feasibility and performance of locally prepared RBC reagents for antibody detection in Burkina Faso. We conducted an experimental study comparing commercial RBC panels and a local panel prepared from phenotyped blood donors in Ouagadougou, Burkina Faso. Antibody detection testing was performed by the indirect antiglobulin test using a gel card filtration column in a low-ionic-strength solution. Judgment criteria were the concordance rate and the kappa agreement coefficient of results generated by the two panels. A total of 302 blood donors were phenotyped for the major antigens of the RH, KEL, MNS, FY, JK, LE, and P1PK blood group systems. From this pool of donors, we designed an RBC detection panel that was used to screen for unexpected antibodies in 1096 plasma samples from 832 patients with a history of transfusion and 264 recently delivered or pregnant women with no history of blood transfusion. A positive antibody detection test was observed in 8.1 percent of the samples using the local panel versus 6.4 percent with the commercial panels. A total of 23 samples were negative with the commercial panels and positive with the local panel, while the findings were reversed for four samples. The concordance rate was 97.5 percent, and the kappa agreement coefficient was 0.815. Our results suggest that the development of local RBC panels can be an alternative to commercial panels in countries with limited resources. It could also be a cost-effective intervention, mainly for children under 5 years of age, women of childbearing age, and pregnant women, all of whom are most at risk for malaria and sickle cell disease complications. Blood services could develop and implement appropriate strategies to make phenotyped donor pools available for the design of suitable RBC panels. Immunohematology 2023;39:172–180. DOI: 10.2478/immunohematology-2023-025.

Author Keywords
compatibility tests; local red blood cell panel; performance; unexpected antibodies

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