# Template 1

Improving Patient Transfusion Safety by Enhancing Alloantibody Detection Via a Communal Inter-Institutional Electronic Antibody Registry

* **S**ituation:
  + We seek to enhance blood transfusion safety by improving the acquisition of historical and current alloantibody data for patients undergoing diagnostic testing in our blood bank by adopting inter-institutional blood bank networking software using our current blood bank information system vendor and the not-for-profit 501(c)(3) Public Charity, “Alloantibody Exchange”, (https://www.alloantibody.org/).
* **B**ackground:
  + Alloantibodies to blood constituents develop in response to exposure to another person’s tissue antigens, most commonly via hemotherapy and pregnancy. The mechanism is similar to vaccine induced immunity. Like a vaccine booster, repeated exposures of foreign antigenic structures stimulate the immune system to attack the foreign tissue more vigorously (e.g., transfused blood, fetus). Therefore, identification of alloreactivity in patients and pertinent selection of blood for transfusions to patients with alloantibodies are essential for enhancing transfusion safety.
  + Blood banks typically inquire about a patient’s alloantibody history because titers of alloantibodies, over time, can wane to undetectable levels such as seen in vaccine induced immunity. Without access to comprehensive records of previously detected historical alloantibodies by other organizations, an impossible task for blood banks to collect from multiple institutions logistically and reliably across the lifespan of patients, the risk for delayed hemolytic transfusion reactions (DHTR) is ever present.
  + The current workforce state has blood bank technologists spending significant amounts of time and effort in reviewing medical charts and calling outside hospitals in attempts to gather transfusion and alloantibody histories of patients with positive antibody screens.
  + Over a dozen peer-reviewed research articles spanning the last two decades have appeared in transfusion medicine journals advocating for the creation and adoption of a shared information resource regarding the existence of historical alloantibodies in patients.( See: 1.) Harm SK, Yazer MH, Monis GF, Triulzi DJ, Aubuchon JP, Delaney M. **A centralized recipient database enhances the serologic safety of RBC transfusions for patients with sickle cell disease**. Am J Clin Pathol. 2014 Feb;141(2):256-61; 2.) Schwickerath V, Kowalski M, Menitove JE. **Regional registry of patient alloantibodies: first-year experience**. Transfusion. 2010 Jul;50(7):1465-70; and 3.) Williams LA 3rd, Lorenz RG, Tahir A, Pham HP, Marques MB. **High Percentage of Evanescent Red Cell Antibodies in Patients with Sickle Cell Disease Highlights Need for a National Antibody Database**. South Med J. 2016 Sep;109(9):588-91.)
  + In this regard the Alloantibody Exchange offers the potential for blood banks across the country to connect in the sharing of alloantibody histories, ABO types and special instructions regarding a patient’s hemotherapy to enhance transfusion safety. Currently existing efforts to connect patient health records involve a patchwork of vendor specific (e.g., “EPIC’s Care Everywhere”) and state specific (e.g., “Mass HIway”) programs. Unfortunately, these alternative tools do not connect to all vendors or states and do not reliably allow for the documenting of alloantibodies found by different blood banks.
* **A**ssessment:
  + In this blood safety initiative, The Alloantibody Exchange is clinically essential software which allows critical blood bank data to be exchanged benefiting the approximately 1% of patients at highest risk for adverse events from transfusion. Only information specific to blood transfusion compatibility is exchanged in this program.
  + With respect to data sharing, the Alloantibody Exchange has prepared documents for review by IT security (e.g., SOC 2 type 2).
  + Regarding data retrieval, the Alloantibody Exchange provides access to their secure web portal. This bidirectional functionality thus allows our Blood Bank staff to review alloantibody histories from other institutions more easily, thus aiding in the selection of compatible blood. In our current challenging workforce environment, the ability for our staff to interact in such a manner makes the patient’s serological history review more efficient and accurate improving our laboratory functioning and enhancing patient safety. For additional information regarding IT particulars, please contact the Alloantibody Exchange at george.hauser@alloantibody.org for details. Thank you.
* **R**ecommendation:
  + We recommend the necessary IT personnel contact the Alloantibody Exchange at george.hauser@alloantibody.org for details.

# Template 2

**What is the problem that needs to be solved?** Information regarding the presence of alloantibodies to red blood cells that a patient may possess is not routinely shared between blood banks in an electronic format, requiring blood banks to use alternative, less reliable, mechanisms that are inefficient and incomplete. **Why is it a problem?** Transfusion of incompatible blood products, because of an incomplete knowledge of a patient’s alloantibody status and history, creates a situation that may lead to injury and death. **Who is impacted?** All patients who receive blood products or blood bank diagnostic testing. **When, where, how, and how often is the problem observed?** Blood transfusions are essential to the lives of many patient groups including patients receiving chemotherapy, stem cell transplants, sickle cell disease, pregnancy, surgical interventions, and many other conditions. Alloantibodies exist in approximately 1% of patients, and strategies and mechanisms accounting for them and mitigating their involvement in blood transfusions are mandated by federal and state regulatory entities, e.g., the U.S. Food and Drug Administration (FDA) and accreditation organizations, e.g., The Joint Commission. Knowledge of the presence of these antibodies helps the Blood Bank find compatible blood as well as resulting in decreasing the incidence of transfusion associated adverse events invoked by them, thus enhancing patient blood safety and the hospital’s financial operations.