OP 61. Application development for implementation of electronic crossmatch at Western Province Blood Transfusion Service (WPBTS) - an I.T. perspective

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Aim
Detail the process and design of an in-house application in order to implement electronic crossmatch at WPBTS.

Background
Electronic Crossmatch (EXM)/Computer Crossmatch has been implemented in countries such as Scandinavia, USA, Australia and China. EXM was first introduced at the University of Michigan Medical Centre in 1992.

WPBTS runs an in-house Laboratory Information System (LIS) which encompasses the processes from collection through to the issue of blood. This LIS had held donor and patient data since 1992.
The program languages used in development of the LIS include Universe Basic, Visual Basic and A4GL. In May 2013 WPBTS embarked on a plan to develop and implement EXM and extend this to all its Blood Banks

Process
Literature review, including American Association of Blood Banks - (AABB) Guidelines for Implementing an EXM and the British Committee for Standards in Haematology (BCSH) - Guidelines for Blood bank Computing was done to assist with establishing the rules that needed to be coded into the program.

Detailed end user specifications were compiled by the Blood Banks, incorporating the necessary rules for EXM implementation. These included decision-making algorithms, automated exclusion of unsuitable EXM patients, automated electronic validation, on-board user manual and a user friendly interface.

An I.T. Project Plan was developed including time lines, defining infra-structure requirements such as network capabilities, communication and hardware requirements.
A Risk Analysis was performed to identify areas where patient safety could be compromised.
Development of the new software application (Phoenix) included:

- Review of flow processes
- Screen design for user friendly data input and retrieval as well as easy information review
- Facility for :-
    - Deferring patients from EXM
    - Full audit trails
    - Decision making rules and warnings
    - Excluding unsuitable blood group product selection
    - Review of donor and patient results
    - Barcoded labelling of samples and products
    - Checking data verification and integrity

Validation
A phased approach was used:

- Pre- release software was checked, utilising over 300 cases, in an in-house test environment which included registration of samples, allocation of products, checking of data and issuing units electronically.
- Modifications to the program were done where required before release to Blood Bank for validation.
- Phoenix application was successfully installed at Tygerberg Blood Bank in August 2015 for on-site validation This validation was done in phases:
- Patient registration and data verification
- Verification of results downloaded from the Autoview analyser
- Initially only group O patients were registered, products allocated and data checked
- This was then extended to other blood groups
- Once validation at TBH was complete the program was rolled out to all other Blood banks

The Risk analysis identified no additional risk to patient safety

Conclusion
EXM was successfully developed in-house at WPBTS, validated and implemented at all Blood Banks in 2015. During 2016 minor modifications and improvements were made. This has resulted in a decrease in workload and costs in the blood banks. To date 42% of the patients qualify as EXM candidates.