Canadian Blood Services
Société canadienne du sang

DIAGNOSTIC SERVICES

ONTARIO

YEAR IN REVIEW

JANUARY – DECEMBER 2014

Diagnostic Services “Year in Review” statistics are based on a January to December calendar year. The calendar year provides better correlation with Health Canada birth statistics.

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RED CELL SEROLOGY REFERENCE LABORATORY

The Red Cell Serology Reference Laboratory within Diagnostic Services provides testing for hospitals in the Central Ontario Region and Hamilton Region, and for private laboratories.

Testing Performed

The Reference Laboratory routinely performs the following tests:

- ABO/Rh blood type
- Screen for red blood cell antibodies
- Antibody Identification, if antibodies are detected
- Phenotyping (patient)
- Direct Antiglobulin Test
- Elution and Absorption

Antibody Screening and identification is routinely performed using a Gel Card testing methodology. A combination of Gel Card testing methodology and indirect antiglobulin tube testing using saline, enzymes or PEG enhancement are the most common antibody identification methods.

The laboratory also coordinates Red Cell Genotyping referral through the Canadian Blood Services National Immunohematology Reference Laboratory (NIRL). The Toronto laboratory is also responsible for maintaining the Central Ontario Sickle Cell Registry..

A. **Specimens Tested**

The data in this report reflects a calendar year period to enable better correlation to other government statistical data.

Table 1: Specimens Tested

Specimen Type	Test Type	2013	2014
Red Cell Serology Reference	Type and Screen-Pretransfusion	557	585
	ABO Resolutions	0	3
	Antibody Investigations-Pretransfusion	557	585
	Type and Screen-Prenatal	217	226
	Antibody Investigations- Prenatal	217	226
	Phenotyping (Number of Antigens)	2,376	2,248
Test Totals (excluding components distributed)		**3,924**	**3,873**
Number of Patients Tested		**701**	**728**

Figure 1: Most Common Clinically Significant Antibodies (CSA) Detected

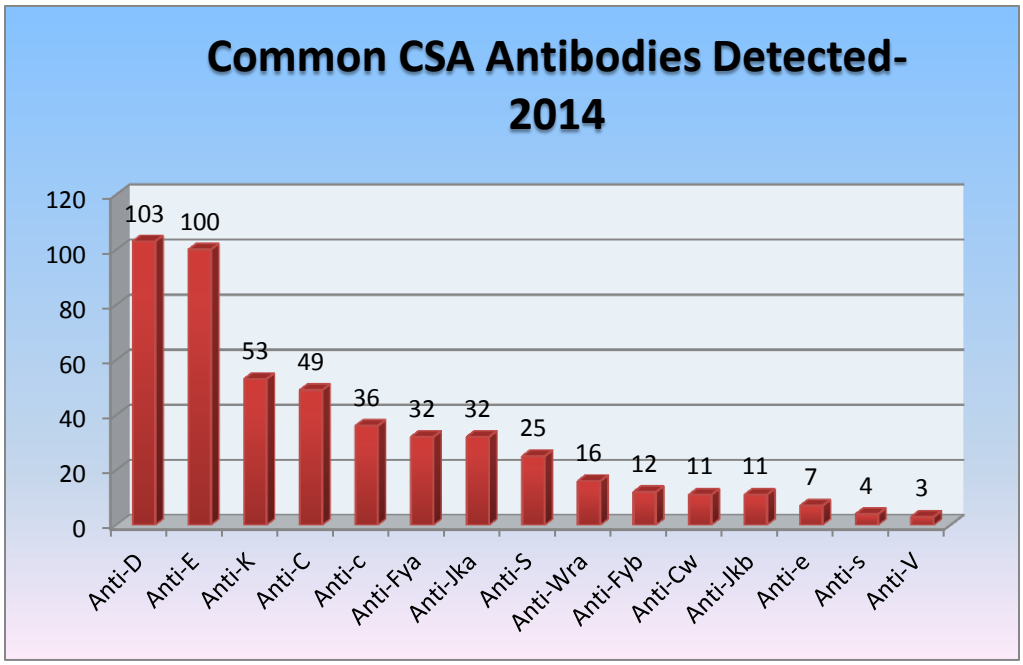


Table 2: Number of High Incidence and Low Incidence Antibodies Detected

HIGH INCIDENCE	
Antibody	#
Anti-Ch	6
Anti-Yka	1
Anti-U	1
Anti-Lub	1
Anti-H	1
Anti-Rg	1
Anti-JMH	1
Anti-Kpa	1
Anti-Ge3	1
Anti-McCa	0
Anti-Rga	1
Anti-Inb	1

LOW INCIDENCE	
Antibody	#
Anti-Cw	11
Anti-Cob	5
Anti-Lua	1
Anti-V	3
Anti-Sc2	2

Specimen Complexity

The investigations that are referred to the Diagnostic Services Immunohematology laboratory are classified into two categories. Depending on the investigation's 'complexity' they are tracked as follows:

Complexity 1: Antibody investigation uncomplicated: Antibody identifications completed using a single cell panel of 12 cells or fewer, by up to three techniques (e.g. single antibody / no antibody).
Complexity 2: Antibody investigation complex: Antibody identifications completed using more than a single cell panel of 12 cells or fewer, or by more than three techniques (e.g. multiple antibodies, autoantibodies).

A breakdown of complexity 1 and 2 cases for 2014 calendar year follows.

Table 3: Antibody Complexity 2014

Complexity 1	Complexity 1 Percent of Total	Complexity 2	Complexity 2 Percent of Total	# of Samples
231	28%	580	72%	811

Table 4: Antibody Complexity 2014

Number of Special Procedures 2014	
Procedures	Number
Alloadsorption	35
Autoadsorption	159
Auto and Alloadsorption	39
Elution	224
Titre	27

PLATELET IMMUNOLOGY LABORATORY

At the end of December 2014, Human and platelet specific (HPA) antigen typing and antibody investigation testing was discontinued. Any request for platelet investigation testing is referred to the CBS Winnipeg Platelet Immunology. Since the transfer turnaround time for hospitals receiving test results has significantly improved.

A. Specimens Tested

Canadian Blood Services provides human leukocyte (HLA) and platelet specific (HPA) antigen typing and antibody investigation testing to assist health care providers in the management of thrombocytopenic patients who have become refractory to vital platelet transfusions, patients affected by neonatal alloimmune thrombocytopenia and autoimmune disorders and patients suspected to be affected by platelet function disorders (PTP). The figure below indicates the number of samples tested in 2014:

Table 5: Platelet Immunology Specimens Tested

Number of HPA Procedures 2014	
Procedures	Number
HPA Antigen Typing	123
HPA Antibody Screen/ID	93
Selection of HLA/HPA Matched Donor	32

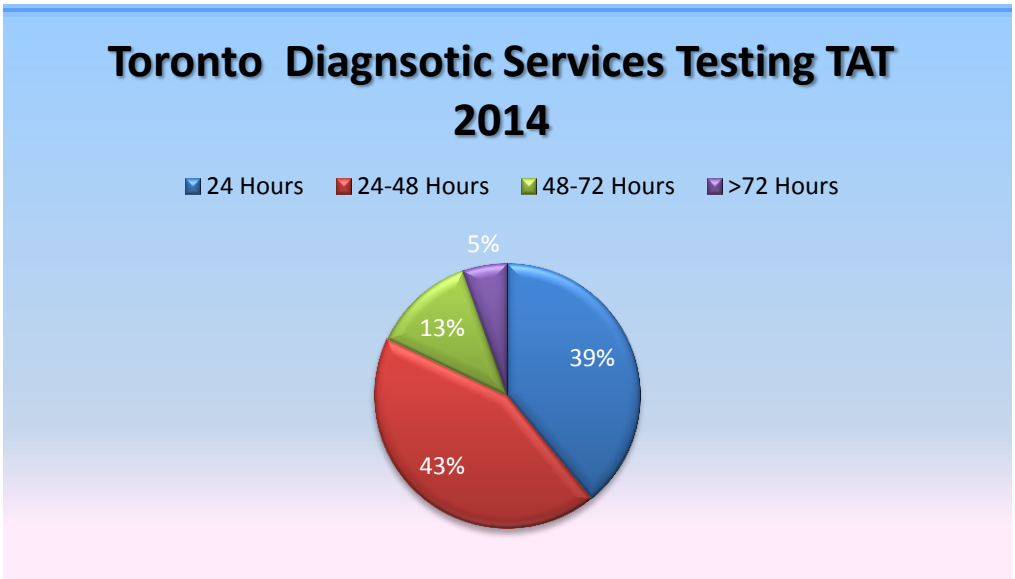
QUALITY INDICATORS

The laboratories monitor many quality indicators and the one which is most relevant to this document is turnaround times and rejected specimens which are presented below.

A. Turnaround Times

To ensure timely reporting of patient test results, Canadian Blood Services monitors turnaround time (TAT) from when the specimen is received at Canadian Blood Services in Toronto to the time when the results are available. Since monitoring of this quality indicator began in 2008, the percentage of specimens has consistently exceeded the predefined TAT threshold. Samples whose testing exceeds the expected TAT are usually those where complex clinically significant antibodies are detected or where a referral to the National Immunohematology Reference Laboratory is required.

Figure 2: Red Cell Serology Reference Testing Turnaround Time



ACCOMPLISHMENTS IN 2014

A. Business Continuity Planning

Canadian Blood Services continues to refine the business continuity plans for all sites. The Diagnostic Services plan is nearing completion and discussions are ongoing with internal and external stakeholders to ensure the Diagnostic Services plan meshes seamlessly with other plans.

B. Genotyping – Red Cell

Canadian Blood Services is able to provide red cell antigen genotyping services through our National Immunohematology Reference Laboratory (NIRL). A process for the referral of perinatal and pre-transfusion specimens to NIRL for genotyping was developed and implemented. This service is used to aid in resolving complex immunohematology cases. Molecular testing combined with hemagglutination testing can provide better resolution to serological problems and guide patient transfusion requirements in some circumstances, in particular for sickle cell patients and patients with frequent transfusion requirements.

In 2014, a total of 69 samples from 20 health care facilities in Central Ontario were referred to NIRL for Rh genotyping and 64 samples from 25 health care facilities in Central Ontaro for extended red cell genotyping.

C. Perinatal Advisory Committee

The PNAC held their annual meeting on April 29 and 30, 2015 in Edmonton. Attendees included the Director, Testing, the Associate Director, Diagnostic Services and the Associate Medical Director, Clinical

Services for CBS. The Medical Officers and Managers for the CBS Diagnostic Services Laboratories across the country and representatives from the CBS National Reference Laboratory (NIRL) in Ottawa as well as guests from user hospitals were also in attendance. The meeting included an overview of Diagnostic Services activities over the past year, and discussion of procedures and quality issues affecting these laboratories.

Highlights of the two day meeting include the following:

- Human platelet antigen and antibody testing has been consolidated in the CBS Platelet Immunology Laboratory in Winnipeg and subsequent to this, an increase in test volumes has been observed. This laboratory has obtained College of American Pathologists (CAP) accreditation.
- Roll-out of the Trace Line hospital module has been completed in Manitoba.
- All testing services operating under the CBS umbrella have been consolidated into a single management structure.
- Genotyping using the Immucor BioArray BeadChip system was implemented in June 2014. Discussion occurred around the reporting and management of patients with weak D types 4.0, 4.1 and 4.3 in the context of a recent article by S. G. Sandler on behalf of the AABB/CAP Working Group on RHD Genotyping (Sandler SG et al. Transfusion March 2015; 55:680-689).
- Discussion occurred around expanding availability of testing for fetal DNA using maternal blood samples to provinces outside Alberta where this process is already in place.
- Report comments for anti-M in pregnancy was discussed in light of a recent article suggesting that this antibody rarely causes severe hemolytic disease of the fetus and newborn (HDFN) and/or delayed anemia in affected infants, particularly with patients of Asian extraction (Yasuda H et al. Transfusion Medicine Reviews 2014; 28: 1-6).

D. Platelet Donor Selection (PDS) Software Stabilization

The software used to select platelet donors for patients requiring HLA/HPA compatible platelet transfusions was upgraded in order to stabilize the operating platform. In addition, enhancements were added for entering search criteria resulting in the ability to further customize the eligible donors to the patient needs.

GOALS FOR 2015

A. Revising operating procedures and processes to enhance a standardized approach for antibody investigation with NIRL and Donor Testing.

B. Choose a solution for the replacement of the Diagnostic Services Access Database for specimen tracking and recording of historical patient information.

C. Finalize the preparation to transfer the testing operations from 67 College to the new Brampton Laboratory facility.