Canadian Blood Services
Société canadienne du sang

DIAGNOSTIC SERVICES

BRITISH COLUMBIA / YUKON

YEAR IN REVIEW

JANUARY – DECEMBER 2016

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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TABLE of CONTENTS

Figures

Tables

PERINATAL LABORATORY

The Perinatal Laboratory, Vancouver Diagnostic Services at Canadian Blood Services provides diagnostic testing of pregnant women for blood type and red blood cell antibodies. Results from this screening assist physicians, midwives and nurse practitioners in ensuring the appropriate management of a pregnancy for both the mother and baby.

A. Testing Performed

Canadian Blood Services Perinatal Laboratory routinely performs the following tests:

- ABO/Rh blood type
- Screen for red blood cell antibodies
- Antibody Identification, if antibodies are detected
- Antibody Identification referrals
- Antibody Titre, if a clinically significant antibody is identified
- Phenotyping

B. Testing Frequency

Mothers – Initial Testing: All women should be tested upon their first prenatal visit.

Mothers – 26-28 Weeks Gestation: All Rh negative women should be retested at 26-28 weeks gestation. Rh positive women should also be retested at 26-28 weeks gestation when there is only one blood group result available (usually first pregnancy) or if patient is at increased risk of allo-immunization (e.g. previous transfusion, fetal trauma or procedure, IV drug use).

Mothers – Antibody Present: If the antibody is known to cause HDFN, it is recommended that specimens be submitted every three to four weeks for the duration of the pregnancy dependant on the specificity of the antibody and the strength of the antibody titre. More frequent testing may be indicated if the antibody titre rises rapidly or if clinical monitoring mandates that additional sampling would provide helpful information.

Mothers – Postnatal: Following delivery, specimens from the mother and her baby should be tested if the Rh of the mother is unknown, the mother is Rh negative, the mother has a clinically significant antibody or if the baby shows signs of HDFN (i.e. anemia or jaundice).

Partners: When a woman has an antibody capable of causing HDFN, specimens from the partner will be requested for ABO/Rh and antigen phenotyping. This will assist in assessing the probability of the baby being affected by the antibody. Partners' specimens may also be tested to assess Rh Immune Globulin (RhIG) eligibility of Rh negative mothers.

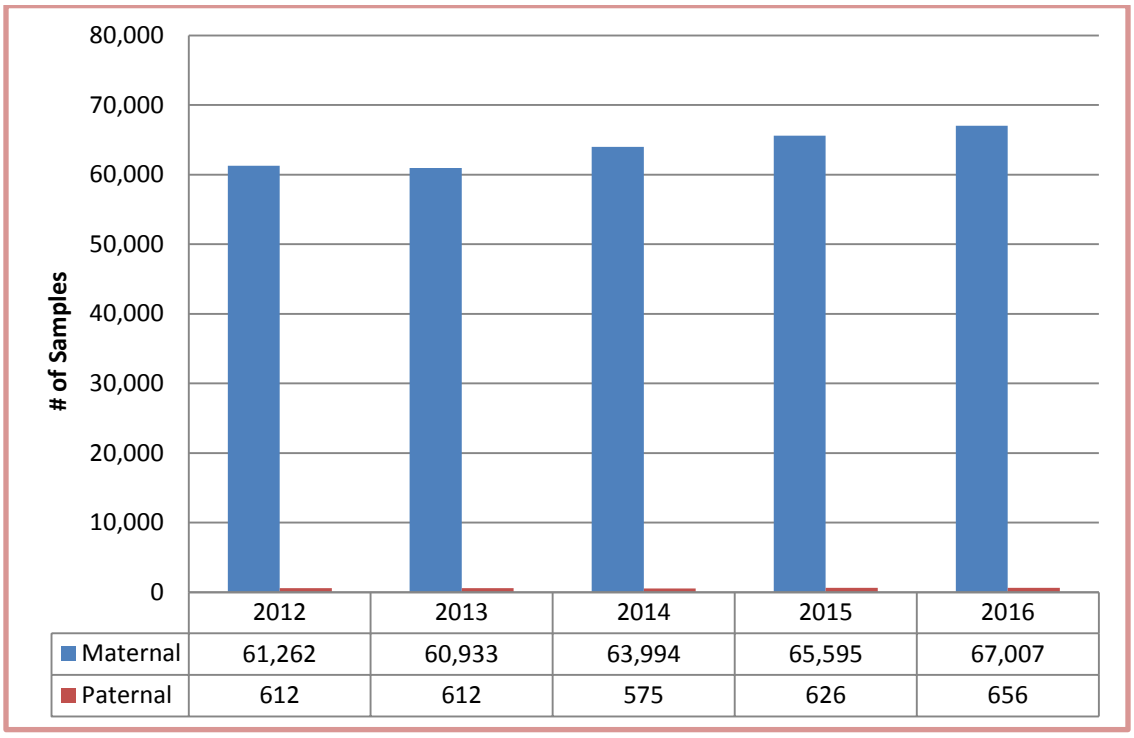
C. Specimens Tested

The data includes all women tested, including referrals.

Table 1: Perinatal Specimens Tested

Specimen Type	Test Type	2012	2013	2014	2015	2016
Maternal	Type and Screen	61,262	60,933	63,994	65,595	67,007
Paternal	ABO/Rh	612	612	575	626	656
Total # of Specimens Tested		**61,874**	**61,545**	**64,569**	**66,221**	**67,663**
Total # of Patients Tested		**53, 578**	**53,800**	**55,052**	**55,869**	**57,089**

Figure 1: Total Perinatal Specimens Tested



D. Antibodies Identified

In 2016, a total of 293 antibodies were reported (see *Table 2*). This higher than 2015 where 285 women had antibodies identified during their pregnancies. Of 293 antibodies identified in 2016; thirty-eight (38) women had multiple antibodies. Passive anti-D data has been excluded from the preceding numbers.

Antibodies identified were considered to be clinically significant if they have been reported to cause HDFN. The most common clinically significant antibodies identified were: anti-E, anti-D, anti-K, anti-M,

(see *Figure 2*`) which together represented 68% of the total antibodies identified. IgG Anti-M can be considered clinically significant as they may cause HDFN and/or delayed anemia in rare cases.

Titres for 16 of the clinically significant antibodies increased from non-critical to critical levels during the pregnancy with a total of 29 antibody titres at critical levels (see *Table 3*). Recommendations were made for all patients with a critical titre level (current or previous pregnancy) and all Kell system antibodies to be referred to a High Risk Fetal Assessment Clinic for further follow-up and monitoring during pregnancy.

Table 2: Total Number of Perinatal Antibodies Detected

Maternal Antibodies Identified (Including Passive D) – 2016					
Clinically Significant Antibodies - Antibody	**2012**	**2013**	**2014**	**2015**	**2016**
Anti-D	55	44	44	46	38
Passive Anti-D	479	469	514	651	681
Anti-C	15	11	12	8	5
Anti-C^{w}	4	4	1	2	2
Anti-Ce	2	2		1	
Anti-c	32	25	23	14	11
Anti-E	105	102	92	85	80
Anti-e	9	10	8	3	3
Anti-f					
Anti-G	6	5	2	1	2
Anti-K	36	37	43	41	33
Anti-Kp^{a}	1				
Anti-Lu^{b}	2		1	1	
Anti-M	51	45	39	46	47
Anti-S	1	6	8	8	6
Anti-s				2	2
Anti-Fya	7	2	3	4	1
Anti-Fyb	1	3	3	1	1
Anti-Jka	21	17	18	12	15
Anti-Jkb	6		3	2	1
Anti-Jk3					1
Anti-Vw	2	1	2		
Anti-Wra	2	2	9	3	3
Anti-Jra	1	1		1	
Anti-Lub		2			1
Anti-Inb	1				
Anti-Sc1				1	
Anti-Lua				1	
Anti-Cob				1	
Anti-Dantu			1	1	

Clinically Insignificant Antibodies - Antibody	2012	2013	2014	2015	2016
Anti-A1	17	14	5	10	12
Anti-Lea	28	16	17	9	7
Anti-Leb	14	10	11	1	1
Anti-N	1			3	1
Anti-P1	34	52	38	23	20
Cold Agglutinin	4	30			
Anti-Sda	15	16		6	

Table 3: Perinatal Patient Antibody Titres

Antibody	Critical Level	Non-Critical Level	Non-Critical to Critical
Anti-D	13	39	3
Anti-C	1	4	-
Anti-E	6	74	3
Anti-c	-	11	-
Anti-e	1	2	-
Anti-DC	1	-	-
Anti-DE	1	-	-
Anti-Ec	3	9	1
Anti-G	-	1	-
Anti-Fya	2	1	-
Anti-Fyb	-	1	-
Anti-Jka	1	16	1
Anti-Jkb	-	2	-
Anti-K	-	-	-
Anti-M	-	49	-
Anti-S	-	8	-
Anti-s	-	2	-

Figure 2: Total Number of Perinatal Antibodies

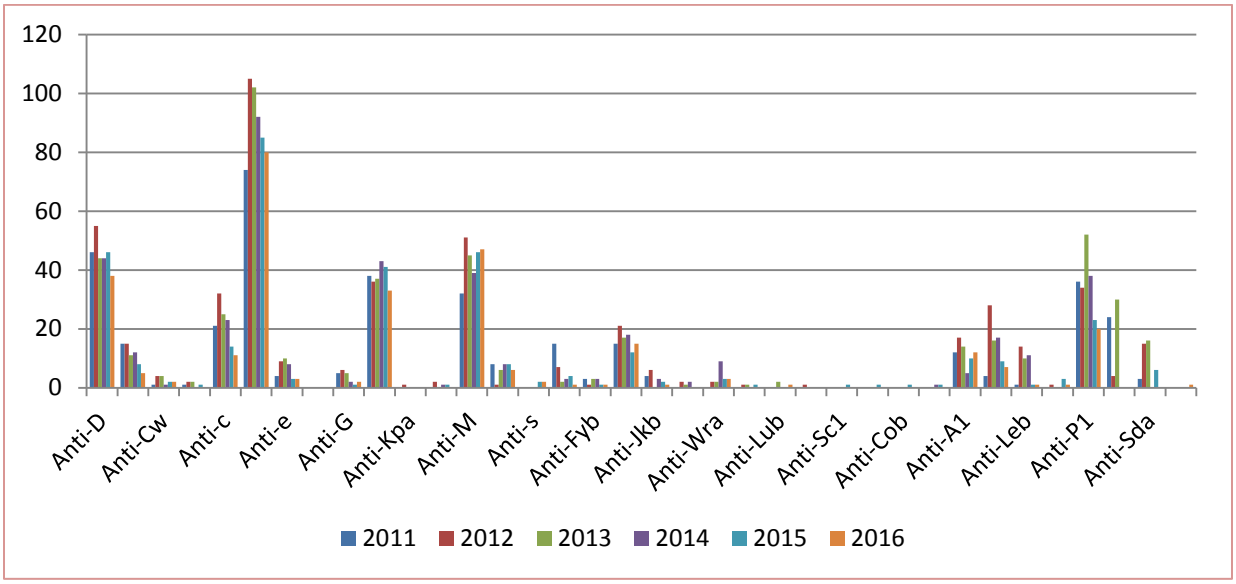


Figure 3: Frequency of Clinically Significant Antibodies

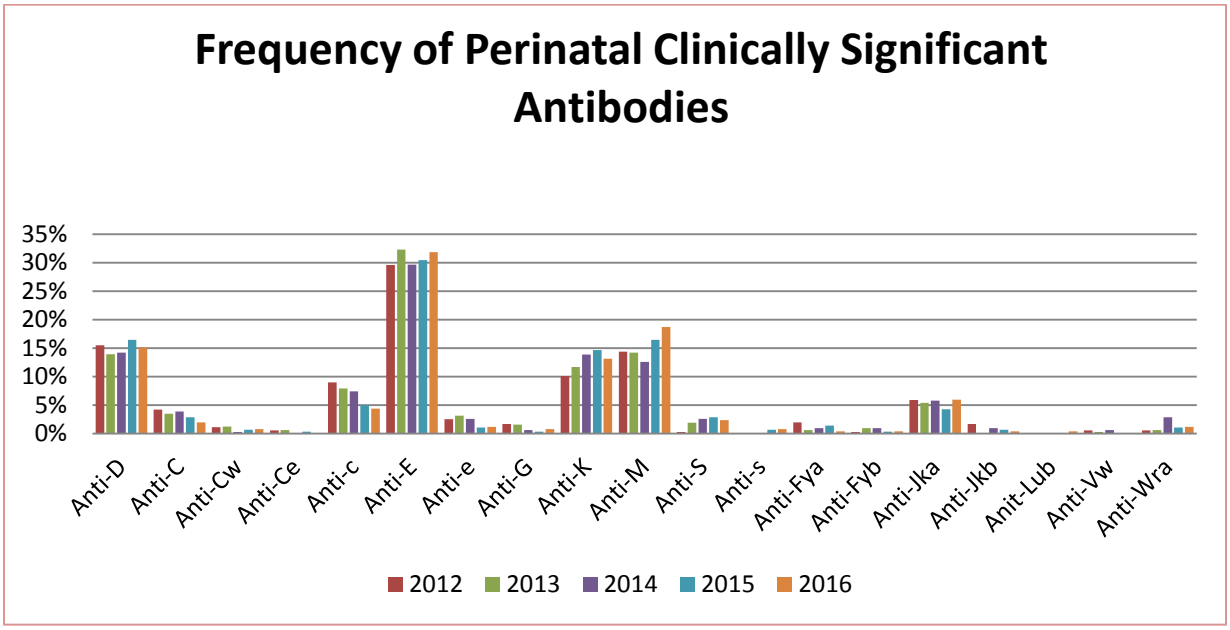


Table 4: Combination Antibodies

Antibodies	Number in 2016
Anti-A1, Anti-P1	1
Anti-C, Anti-D	1
Anti-C, Anti-D, Anti-G	2
Anti-C, Anti-D, Anti-Jkb	1
Anti-C, Anti-D, Anti-S	1
Anti-c, Anti-E	11
Anti-C, Anti-E	1
Anti-C, Anti-E, Anti-Lea, Anti-M	1
Anti-C, Anti-G	1
Anti-c, Anti-N	1
Anti-Cw, Anti-P1	1
Anti-D, Anti-E	2
Anti-D, Anti-G, Anti-S	1
Anti-D, Anti-P1	2
Anti-E, Anti-Fya	1
Anti-E, Anti-Fya, Anti-M	1
Anti-e, Anti-K	1
Anti-E, Anti-K, Anti-Lea	1
Anti-E, Anti-Lea	1
Anti-Jka, Anti-K	1
Anti-Lea, Anti-Leb	1
Anti-Lea, Anti-M	1
Anti-Lea, Anti-P1	1
Anti-Leb, Anti-P1	1
Anti-M, Anti-P1	1

REFERENCE LABORATORY

The Reference Laboratory, Vancouver Diagnostic Services provides testing for hospital transfusion medicine laboratories. Hospital patients who are repeatedly transfused may develop red cell antibodies and as a result may have difficulty in tolerating transfusions. Diagnostic Services has specialized and experienced technologists that assist and provide consultation to hospital transfusion medicine laboratories (24 hours, 7 days per week). The Reference Laboratory identifies red cell antibodies and provides transfusion recommendations. Diagnostic Services has a varied selection of specialized procedures and rare reagents to resolve more difficult red cell antibody cases. Staff within our department have published a number of papers, abstracts and posters and have collaborated with other reputable references laboratories such as the New York Blood Center and the National Immunohematology Reference laboratory (NIRL). Staff frequently presents at provincial or national transfusion medicine conferences.

Diagnostic Services Red Cell Antibody Investigations

In 2016, hospitals have referred 437 requests for red cell antibody identification.

Diagnostic Services provides support for all BC and Yukon hospitals. Since hospitals have different capabilities and expertise in resolving red cell antibody investigations, Diagnostic Services has categorized hospitals into three levels based on their capabilities.

Level 1

Level 1 is defined by hospital transfusion medicine laboratories that do not have the resources for either antibody identification or phenotyping of patient and donor units prior to transfusion. Hospital transfusion medicine laboratories capabilities usually include the following methods:

Routine Services	Additional Methods:
ABO and Rh Antibody detection Crossmatch	Gel / SIAT / PEGIAT / LIAT / Solid Phase Pre-warm Saline replacement

Diagnostic Services Support Provided - Level 1 Hospitals

- Consultation.
- Identifying and/or excluding antibodies to the major blood group antigens.
- Providing compatible/antigen negative donor units if applicable.
- Forwarding an interim report followed by the final antibody report and patient antibody wallet card (where applicable) to the hospital Transfusion Service.

Level 2

Level 2 is defined by hospital transfusion medicine laboratories that have limited resources available for antibody identification. Level 2 hospitals generally have one in-date antibody panel and a small inventory of the common antisera to some of the major blood group antigens (eg. anti-C, -E, -c, -e, -K, -Fya, -Fyb, -Jka and -Jkb). Hospital Transfusion Service capabilities usually include the following methods:

Routine Services	Additional Methods
ABO and Rh Antibody detection Crossmatch Resolve antibody cases with exclusions of most single specificity antibodies base on an in-date panel Phenotype patient and donor units if antisera is available Resolve antibody cases with exclusions of most single specificity antibodies based on the in-date panel Phenotype patient and donor units if antisera available.	Gel/SIAT/PEGIAT/LIAT/ Solid Phase Pre-warm Saline replacements Differential DAT

Diagnostic Services Support Provided - Level 2 Hospitals

- Consultation.
- Identifying and excluding antibodies to the major blood group antigens.
- Providing antigen negative donor units if the corresponding antisera is not available at the hospital and if donor testing is not able to provide phenotyped inventory.
- Forwarding an interim report followed by the final antibody report and patient antibody wallet card (where applicable) to the hospital Transfusion Services. The hospital Transfusion Service should forward a copy of the report to the patient's physician (if indicated by hospital policy) as well as the antibody wallet card to the patient.

Level 3

Level 3 is defined by Hospital transfusion medicine laboratories that have the resources to resolve the majority of serological problems. Resources would include two or more in-date panels and antisera to the major blood group antigens. Hospital Transfusion Service capabilities usually include the following methods:

Routine Services	**Additional Methods**
ABO and Rh Antibody detection Crossmatch donor units SIAT/PEGIAT/LIAT// Solid Phase and/or Gel Identify or exclude most single/multiple/rare antibodies based on two or more in-date panels Phenotype patient/donor units as required Provide a written report to the patient's physician and an antibody wallet card to the patient.	Pre-warm Saline replacement Differential DAT Elution Auto/Alloadsorptions Inhibition/Neutralization

Diagnostic Services Support Provided - Level 3 Hospitals

- Consultation
- Identifying and excluding antibodies to the major blood group antigens
- Providing antigen negative donor units if the corresponding antisera is not routinely stocked at the hospital
- Forwarding an interim report followed by the final antibody report to the hospital Transfusion Service

A. Testing Performed

The Reference Laboratory routinely performs the following tests:

- ABO/Rh blood type
- Screen for red blood cell antibodies
- Antibody Identification
- Phenotyping (patient and donor units)
- Transfusion Reaction Investigation
- Direct Antiglobulin Test

- Elution and Allo and Auto Absorptions
- Neutralization Tests
- Referral Genotype Testing

Antibody Screening is routinely performed by solid phase testing. A combination of solid phase testing and indirect antiglobulin tube testing using PEG for enhancement is the primary antibody identification methods. PEG IAT is also the manual back-up method for antibody screening.

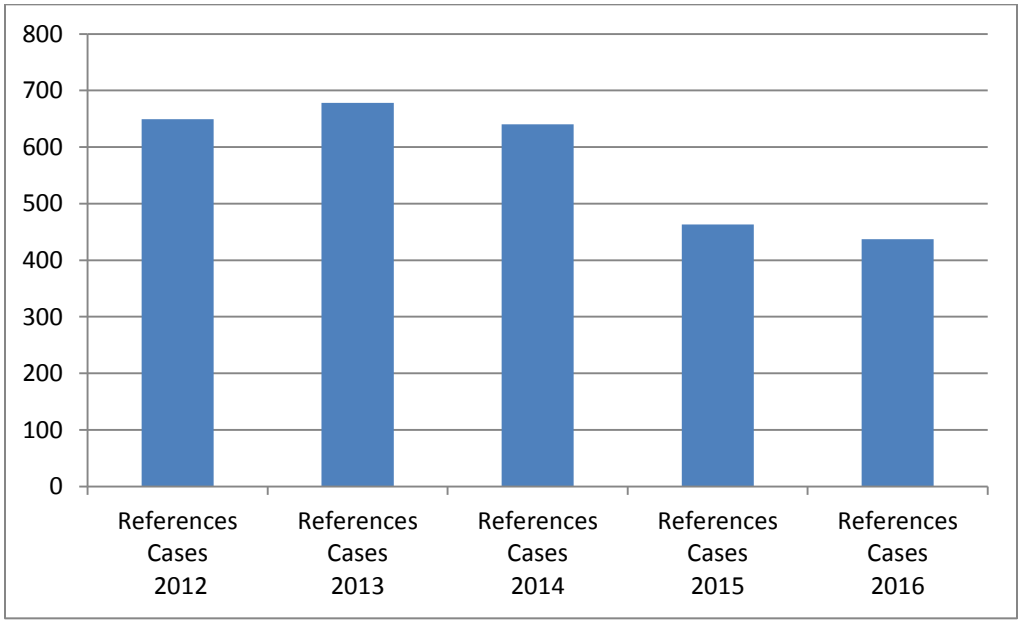
B. **Specimens Tested**

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

Table 5: Reference Specimens Tested

Specimen Type	2012	2013	2014	2015	2016
Total Reference Antibody Investigations	649	678	640	463	437

Figure 4: Total Reference Specimens Tested



C. Antibodies Identified

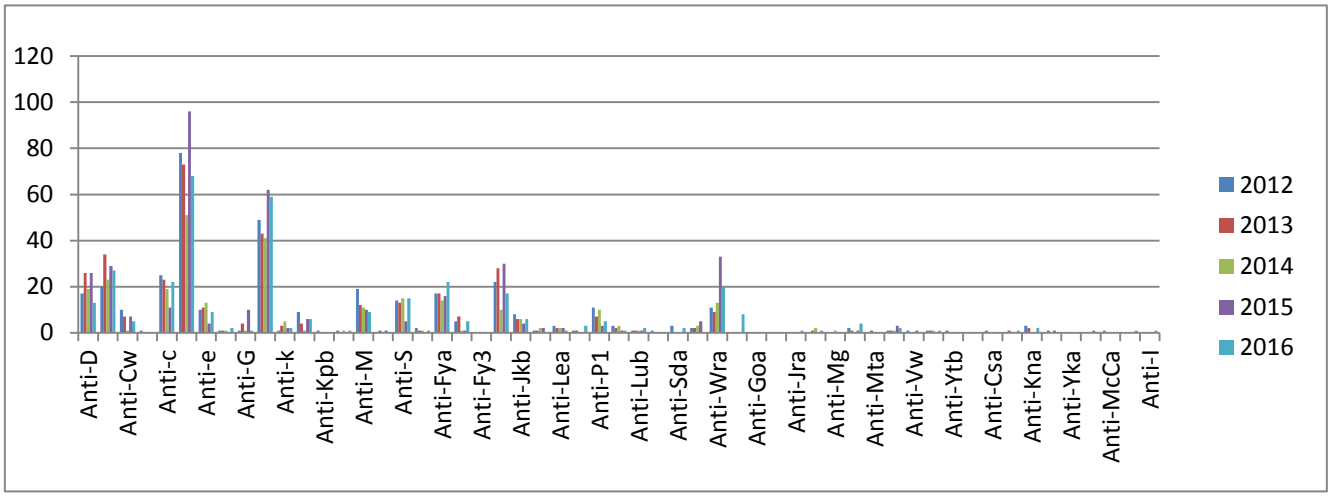
In 2016, a total of 346 antibodies were reported (see *Table 6*). The total number of antibodies detected is lower than in 2015, but the distribution of the most common antibodies remains consistent. Three hundred and fifty patients had antibodies identified, of these; fifty six patients had multiple antibodies. Antibodies identified were considered to be clinically significant if they have been reported to cause acute or delayed hemolytic transfusion reactions. The most common clinically significant antibodies identified were: anti-E, anti-K, anti-C, anti-c, anti-Fya (see *Figure 5*) which together represented 57% of the total antibodies identified.

Table 6: Total Number of Reference Antibodies Detected

Antibody	Number Detected 2012	Number Detected 2013	Number Detected 2014	Number Detected 2015	Number Detected 2016
Anti-D	17	26	19	26	13
Anti-C	20	34	23	29	27
Anti-C^{w}	10	7	1	7	5
Anti-Ce	1				
Anti-c	25	23	19	11	22
Anti-E	78	73	51	96	68
Anti-e	10	11	13	4	9
Anti-f	1	1	1		2
Anti-G	1	4	1	10	1
Anti-K	49	43	41	62	59
Anti-k	1	3	5	2	2
Anti-Kp^{a}	9	4	1	6	6
Anti-Kp^{b}	1				
Anti-Jsa	1		1		1
Anti-M	19	12	11	10	9
Anti-N		1		1	
Anti-S	14	13	15	5	15
Anti-s	2	1	1		1
Anti-Fy^{a}	17	17	14	16	22
Anti-Fy^{b}	5	7	1	1	5
Anti-Fy3					
Anti-Jk^{a}	22	28	10	30	17
Anti-Jk^{b}	8	6	6	4	6
Anti-Jk^{3}	1	1	2	2	
Anti-Le^{a}	3	2	2	2	1
Anti-Le^{b}	1	1			3

Anti-P_1	11	7	10	3	5
Anti-Lu^a	3	2	3	1	1
Anti-Lu^b	1	1	1	1	2
Anti-Lu14	1				
Anti-Sda	3				2
Anti-A_1	2	2	3	5	
Anti-Wr^a	11	9	13	33	20
Anti-Di^a					8
Anti-Goa					
Anti-Ina					
Anti-Jra					1
Anti-Dantu		1	2		1
Anti-Mg			1		
Anti-Co^b	2	1		1	4
Anti-Mta		1			
Anti-V	1	1	1	3	2
Anti-Vw	1			1	
Anti-Yta	1	1	1		1
Anti-Ytb	1				
Anti-Rg					
Anti-Csa	1				
Anti-Ch		1			1
Anti-Kna	3	2			2
Anti-McCd / Vil		1		1	
Anti-Yka					
Anti-Lan				1	
Anti-McCa	1				
Anti-He					1
Anti-I					1

Figure 5: Total Number of Reference Antibodies



FETAL GENOTYPING

Canadian Blood Services in BC has been referring out specimens for fetal genotyping to the IBGRL (NHS) in Bristol, England as they can detect fetal DNA from maternal plasma.

Specimens are submitted through the Maternal Fetal Medicine clinics in BC and are accepted if they meet the following criteria:

- The mother has an antibody capable of causing hemolytic disease of the fetus/newborn (HDFN), AND
- The father is heterozygous for the corresponding antigen (or unknown), AND
- The antibody titre has reached a critical level, OR
- There has been a previous fetus/newborn affected by HDFN, OR
- The antibody is RH and/or anti-K

Discussion with a Canadian Blood Services physician is required prior to submitting specimens for testing outside of these criteria.

The number of specimens referred for fetal genotyping has ranged between two and eight specimens in recent years.

Table 7: Fetal Genotyping Results Summary

Patient	Maternal Antibody	Paternal phenotype	Predicted Fetal Genotype	Follow-up Phenotype (on baby after delivery)
1	Anti-E and anti-c	D+ C+ E- c+ e+	c – inconclusive (on two separate samples)	Not performed
2	Anti-E	D+ C+ E+ c+ e+	E negative	E negative
3	Anti-D and anti-E	D+ C- E+ c+ e+	D+ E+	Not performed
4	Anti-D and anti-E	D- C- E- c+ e+	E+ c – inconclusive	E+ c+
5	Anti-E and anti-c	D+ C- E+ c+ e+	E+	E+
6	Anti-E	D+ C- E+ c+ e+	E+	E+

Based on the following testing algorithm patients with a serologically variable Rh D typing results may have a genetic testing for the RHD gene. For 2016, the following results were obtained in patients using one of the two Red Cell antigen genotyping platforms available at CBS:

Figure 6: Rh D Testing Algorithm

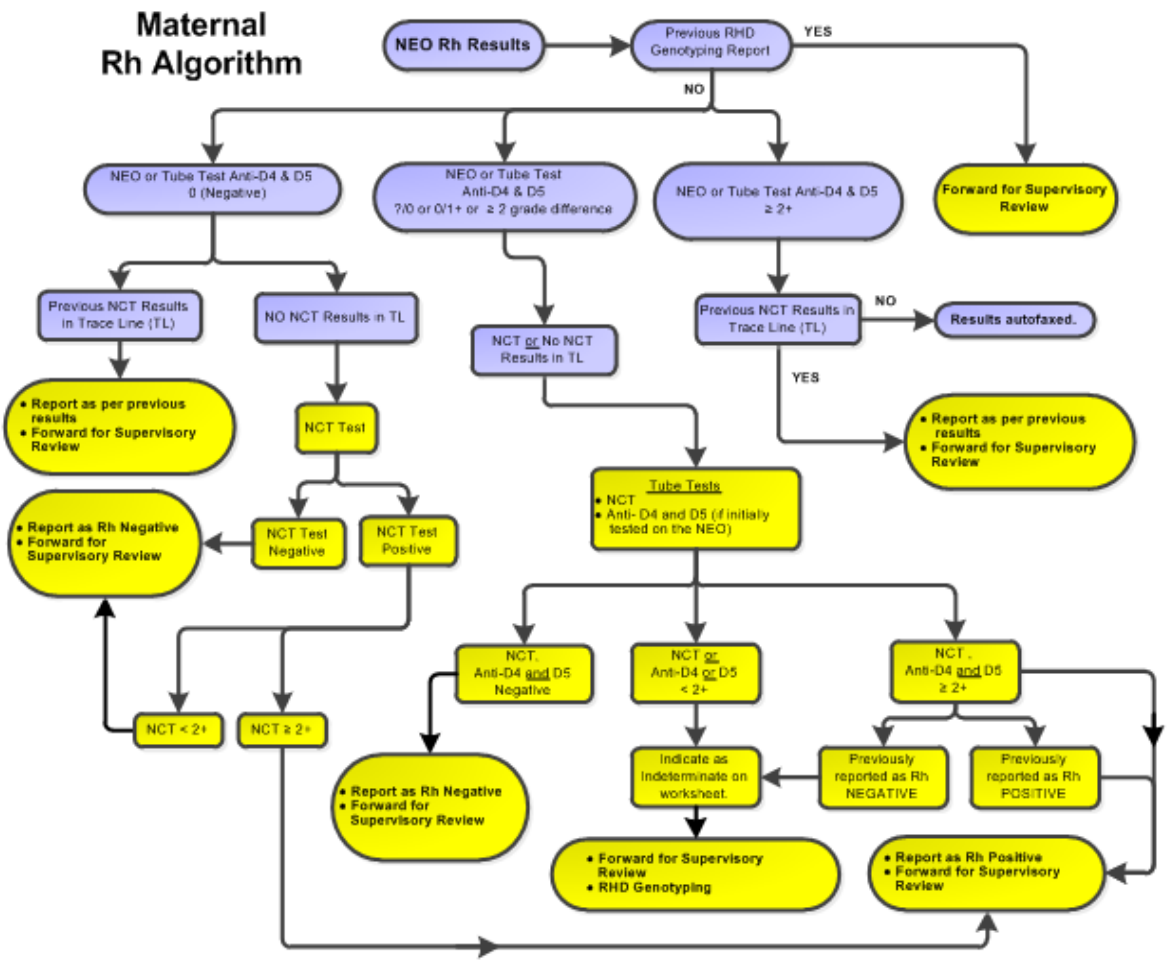


Table 8: Patient # - RHD Type/Result

Patient	RHD Genotype	Predicted Phenotype	RHD Sequencing	Rh Group
1	weak D type 2	weak D	NO	POS
2	weak D type 4.0 or 4.3	weak D	NO	NEG
3	weak D type 4.0 or 4.3	weak D	NO	NEG
4	Possible D	D variant	NO	NEG
5	weak D type 2	weak D	NO	POS
6	weak D type 1	weak D	NO	POS
7	Possible D	D varint	NO	NEG
8	Possible D	D variant	NO	NEG
9	weak D type 1	weak D	NO	POS
10	weak D type 1	weak D	NO	POS
11	DCS1 or DFV	D variant	NO	NEG
12	weak D type 3	weak D	NO	POS
13	weak D type 1	weak D	NO	POS
14	weak D type 4.0 or 4.3	weak D	NO	NEG
15	DOL or DOL 2	Partial D	NO	NEG
16	Possible D	D variant	NO	NEG
17	Possible D	D variant	NO	NEG
18	Possible D	D variant	NO	NEG
19	weak D type 3	weak D	NO	POS
20	Possible D	D variant	NO	NEG
21	weak D type 3	weak D	NO	POS
22	weak D type 3	weak D	NO	POS
23	Possible D	D variant	NO	NEG
24	weak D type 2	weak D	NO	POS
25	Possible D	D variant	NO	NEG
26	weak D type 2	weak D	NO	POS
27	weak D type 1	weak D	NO	POS
28	weak D type 3	weak D	NO	POS
29	weak D type 3	weak D	NO	POS
30	weak D type 1	weak D	NO	POS
31	Possible D	D variant	NO	NEG
32	weak D type 2	weak D	NO	POS
33	weak D type 1	weak D	NO	POS
34	weak D type 2	weak D	NO	POS
35	weak D type 3	weak D	NO	POS

36	DVI	Partial D	NO	NEG
37	weak D type 1	weak D	NO	POS
38	DAR	Partial D	NO	NEG
39	weak D type 1	weak D	NO	POS
40	Possible D	D variant	NO	NEG
41	weak D type 3	weak D	NO	POS
42	weak D type 1	weak D	NO	POS
43	weak D type 1	weak D	NO	POS
44	weak D type 1	weak D	NO	POS
45	RHD deletion	Rh Negative	NO	NEG
46	weak D type 1	weak D	NO	NEG
47	DFR or DFR3	Partial D	NO	NEG
48	weak D type 2	weak D	NO	POS
49	weak D type 2	weak D	NO	POS
50	weak D type 4.0 or 4.3	weak D	NO	NEG
51	weak D type 4.0 or 4.3	weak D	NO	NEG
52	weak D type 3	weak D	NO	POS
53	Possible D	D variant	NO	NEG
54	Possible D	D variant	NO	NEG
55	weak D type 1	weak D	NO	NEG
56	weak D type 1	weak D	NO	NEG
57	Normal RHD	Normal RHD	NO	POS
58	weak D type 2	weak D	NO	POS
59	weak D type 4.0 or 4.3	weak D	NO	NEG
60	weak D type 3	weak D	NO	POS
61	weak D type 1	weak D	NO	NEG
62	DAR	Partial D	NO	NEG
63	Possible D	D variant	NO	NEG
64	weak D type 2	weak D	NO	POS
65	Possible D	D variant	NO	NEG
66	weak D type 1	weak D	NO	POS
67	weak D type 1	weak D	NO	POS
68	weak D type 2	weak D	NO	POS
69	weak D type 2	weak D	NO	POS
70	DAR and DIIIa-CE(4-7)-D	Partial D	NO	NEG
71	RHD Deletion (possible rG)	RHD deletion	NO	NEG
72	weak D type 1	weak D	NO	POS
73	weak D type 3	weak D	NO	POS

74	DFR or DFR3	Partial D	NO	NEG
75	weak D type 2	weak D	NO	POS
76	Normal RHD	Normal RHD	NO	POS
77	weak D type 2	weak D	NO	POS
78	weak D type 1	weak D	NO	POS
79	DAR	Partial D	NO	NEG
80	DFR or DFR3	Partial D	NO	NEG
81	weak D type 1	weak D	NO	POS
82	weak D type 2	weak D	NO	POS
83	weak D type 4.0 or 4.3	weak D	NO	NEG
84	weak D type 2	weak D	NO	POS
85	weak D type 2	weak D	NO	POS
86	weak D type 1	weak D	NO	POS
87	DAR	Partial D	NO	NEG
88	weak D type 3	weak D	NO	POS
89	weak D type 1	weak D	NO	POS
90	weak D type 2	weak D	NO	POS
91	Possible D	D variant	NO	NEG
92	weak D type 1	weak D	NO	POS
93	weak D type 1	weak D	NO	POS
94	Possible D	D variant	NO	NEG
95	Possible D	D variant	NO	NEG
96	Possible D	D variant	NO	NEG
97	weak D type 1	weak D	NO	POS
98	weak D type 3	weak D	NO	POS
99	weak D type 2	weak D	NO	POS
100	weak D type 1	weak D	NO	POS
101	weak D type 1	weak D	NO	POS
102	weak D type 1	weak D	NO	POS
103	weak D type 1	weak D	NO	POS
104	weak D type 1	weak D	NO	POS

QUALITY INDICATORS

The laboratories monitor many quality indicators and the two which are most relevant to this document are 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 Vancouver 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 clinically significant antibodies are detected or where difficulty in finding compatible blood is encountered.

Table 9: Turnaround Time – Routine Criteria by Specimen Type

Specimen Type	Expected Turn-around Time	Expected % of specimens to meet or exceed TAT
Routine Perinatal	< 72 hours	≥ 85%
Reference Testing	< 72 hours	≥ 85%

Figure 6: Perinatal Routine TAT

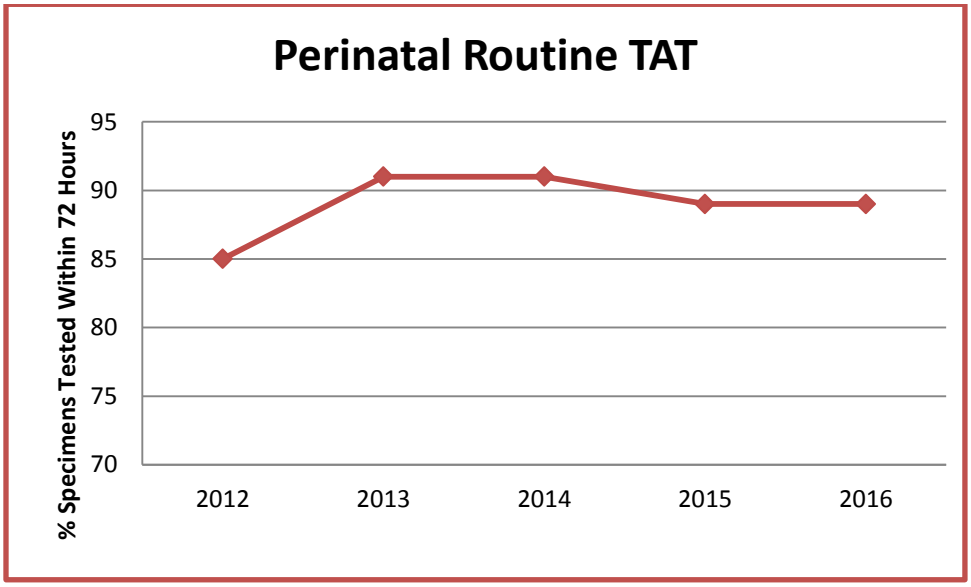


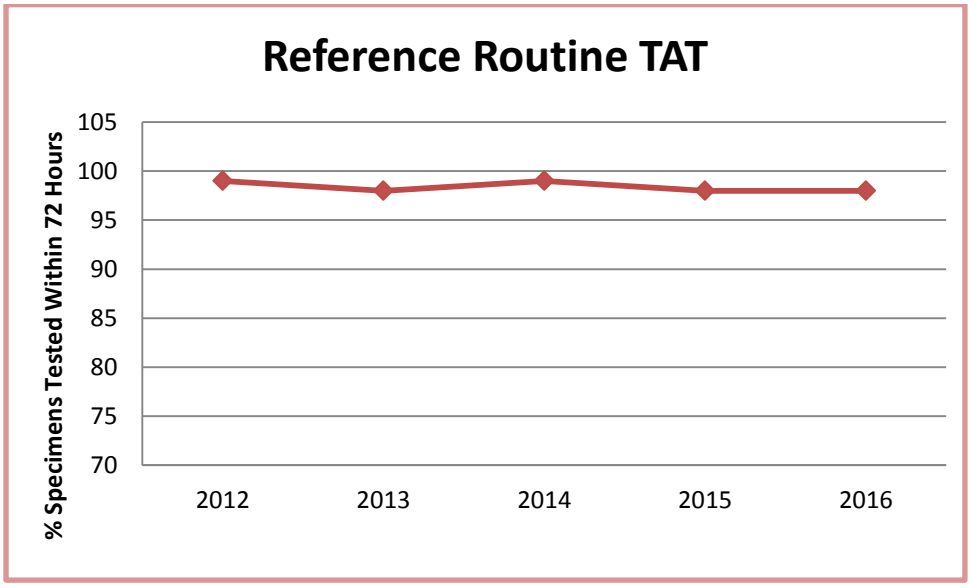
Table 10: Turnaround Time - Routine Perinatal Specimens

Turn Around Time (TAT)	2012	2013	2014	2015	2016
% of Specimens Tested within 72 hours	85%	91%	91%	89%	89%
% of Specimens Tested > 72 hours	15%	8%	8%	11%	11%

Table 11: Reference TAT

Turn Around Time (TAT)	2012	2013	2014	2015	2016
% of Specimens Tested within 72 hours	99%	98%	99%	98%	98%
% of Specimens Tested > 72 hours	1%	2%	1%	2%	2%

Figure 7: Turnaround Time - Reference Specimens



B. Rejected Specimens

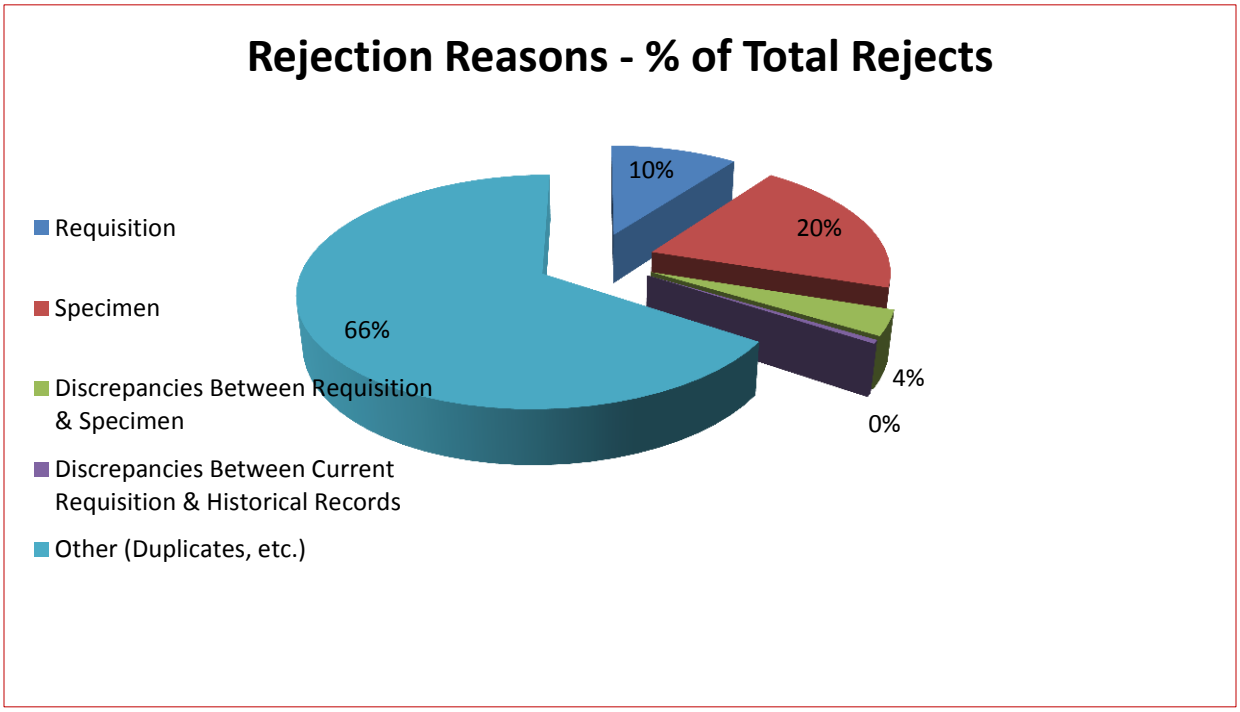
Each time a specimen is rejected, a reason for rejection is entered into our Laboratory Information System. This data is then retrieved and analyzed on a quarterly basis. The number of rejected specimens is quite low for both perinatal and reference specimens. Reference specimens come from hospitals and perinatal samples are primarily collected at external collection sites.

For perinatal specimens, the most common reason for rejecting a sample is that the sample is a duplicate. Samples are rejected if another sample from the patient was tested within the previous week. Often a duplicate sample is collected when the patient has seen their family physician and then sees their obstetrician shortly after. We do ensure that the report from the initial testing is sent to the second physician making the request. Health care professionals can access Canadian Blood Services reports for BC patients on PLIS, BC's Electronic Health Record.

Table 12: Quarterly Rejection Rates – Perinatal Specimens

Rejection Category	Q1	Q2	Q3	Q4
Requisition	3	4	2	11
Specimen	3	7	10	19
Discrepancies Between Requisition & Specimen	3	4	0	0
Discrepancies Between Current Requisition & Historical Records	0	0	1	0
Other (Duplicates, etc.)	50	27	30	22
Total # specimens rejected	59	42	43	52
Total # specimens received	17,904	16,820	16,407	16,229
Rejections as a % of total	**3%**	**2%**	**3%**	**4%**

Figure 8: Perinatal Rejection Reasons



ACCOMPLISHMENTS IN 2016

A. **Electronic Reporting – CBY Diagnostic Services Access to Care Connect (PLIS)**
BC Ministry of Health met with Canadian Blood Services to provide CBS BC Diagnostic Services staff access to the Provincial Laboratory Information System (PLIS.) With the completion of BC Ministry of Health - CBS BCY Diagnostic Services on-boarding with provincial electronic reporting (PLIS) as of March 2015, a team of BC Ministry of Health (MOH) representatives along with representatives from CBS have been conducting meetings to have BCY Diagnostic Services staff access by "CareConnect" to PLIS information. The initiative was completed in June 2016.

B. Perinatal Advisory Committee
The annual Perinatal Advisory Committee meeting for 2016 was held June 13 and 14, 2016 in Winnipeg MB. The PNAC meeting was followed by an Educational Event sponsored by Grifols. Attendees included Laboratory Directors, Associate Directors and Managers as well as perinatal supervisory staff and laboratory physicians who oversee perinatal testing. We also welcomed some hospital colleagues, both technologists and physicians, who are involved with perinatal testing laboratories. Ongoing work on standardization among our laboratories was a theme for the year. Our meeting plan and ongoing work plan for the remainder of 2016 included:

- Discussion and consensus on appropriate follow up for perinatal patients with inconclusive antibodies.
- Planning for investigation of patients with possible antibodies to low prevalence antigens in the perinatal setting. We will discuss the development of a standard "low prevalence" panel of cells

that will allow for investigation of antibodies to low prevalence antigens which may be clinically significant in pregnancy.

- Discussion and consensus on the timing of repeat samples for patients with clinically significant or potentially significant antibodies in the perinatal setting.
- Discussion on the functionality of our standardized antibody investigation algorithm, including any necessary changes following one year of use.
- We will optimize and standardize the use of our algorithm used for RHD genotyping in perinatal patients with weak or variable Rh D serological typing.
- Discussion on the optimal serological evaluation for anti G, especially in the presence of passive anti D.
- Discussion on the results of an audit of Kell negative donor unit availability in transfusion of Kell negative (or Kell unknown) females of child bearing potential.
- Updates and final discussions on completed projects including a study of anti Mia antisera in the BC perinatal testing lab as well as an update of testing and labeling strategies for platelet products in fetal/neonatal alloimmune thrombocytopenia.

C. cff DNA Testing

A proposal was developed by Canadian Blood Services, BCY Diagnostic Services laboratory for referring maternal plasma samples to an external reference laboratory for cell free fetal (cff) DNA assessment. This testing to be performed on selected patients, referred by the maternal fetal medicine physicians at BC Children and Women's hospital. These patients are selected based on clinically significant red cell allo antibodies known to cause hemolytic disease of the newborn. Results of this DNA testing will help to determine which patients require follow up in a high risk obstetrical clinic and which can return to routine prenatal care setting. The proposal is currently being reviewed by the BC Ministry of Health with a decision expected in 2016-2017.

GOALS FOR 2017

A. **cff DNA Testing**

cff DNA maternal sample preparation for fetal DNA testing is currently only processed at the Edmonton Diagnostic Services Laboratory. An initiative is being developed to have Vancouver Diagnostic Services Laboratory to have the capability to prepare maternal samples for fetal DNA testing for referral to NHS Laboratories in Bristol UK. Having a second laboratory will provide a contingency site and reduce transport time and costs for samples collected in BC to be now prepared at the Vancouver Diagnostic Services Laboratory. Target date is latter part of 2017.

B. Refresh the current Diagnostic Services (DS) Web section.

The current DS Web section was introduced in Dec 2011 and was based on an 'older' blood.ca platform. The revised web section is to include NIRL into the web update and to rename the web section from "Diagnostic Services" to "Laboratory Services" Two new features are being designed; Test Catalogue – allows quick access to available tests - by selecting test service required (e.g. Perinatal Test Services) and then the CBS test site, a pop down test menu will appear. The test menu provides test details / sample collection information / downloadable requisitions and shipping instructions and "QuickLinks" - a direct link to Requisitions and Forms, Year In Review Reports, Surveys and Licenses and Accreditation. Anticipated go-live date is scheduled for the latter part of 2017.