BCCH BioBank

Annual Report

BC Children's Hospital BioBank

APRIL 1, 2017 – MARCH 31, 2018

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1.0 Overview

This is the third annual report of the BC Children's Hospital BioBank (BCCHB), which has been operational since January 1, 2015 and made possible by a generous contribution from Mining for Miracles - the BC mining community's longstanding fundraising campaign for BC Children's Hospital. This report will cover operations and finance from April 2017 – March 2018.

The mission of the BCCH BioBank is to provide a comprehensive service for the collection, processing, storage, rapid access and retrieval of biospecimens and clinical information for research projects using a professional and compassionate approach to patient consenting that adheres to the highest standards of research ethics and patient privacy.

The BCCHB has a two pronged approach to supporting research, "general biobanking" and " PI driven research". In the general biobank specimens are collected under the mandate of the BCCHB for future research. For PI driven research the BCCHB provide researchers with specified services to enable their own research.

Pages 12 – 18 of this report refer to projects that have utilized specimens from the general biobank. The BCCHB has released specimens to a range of projects from antibody research, immunity and responses to infections, cancer and rheumatic diseases.

Pages 18 – 21 describe the extensive list of PI driven studies that the BCCHB has been able to support over the last two years.

Over the past year Dr. Vercauteren has formed a Pediatric Special Interest Group at the International Society of Biological and Environmental Repositories (ISBER). This is an international group which is leading discussions specifically about pediatric bioabnking.

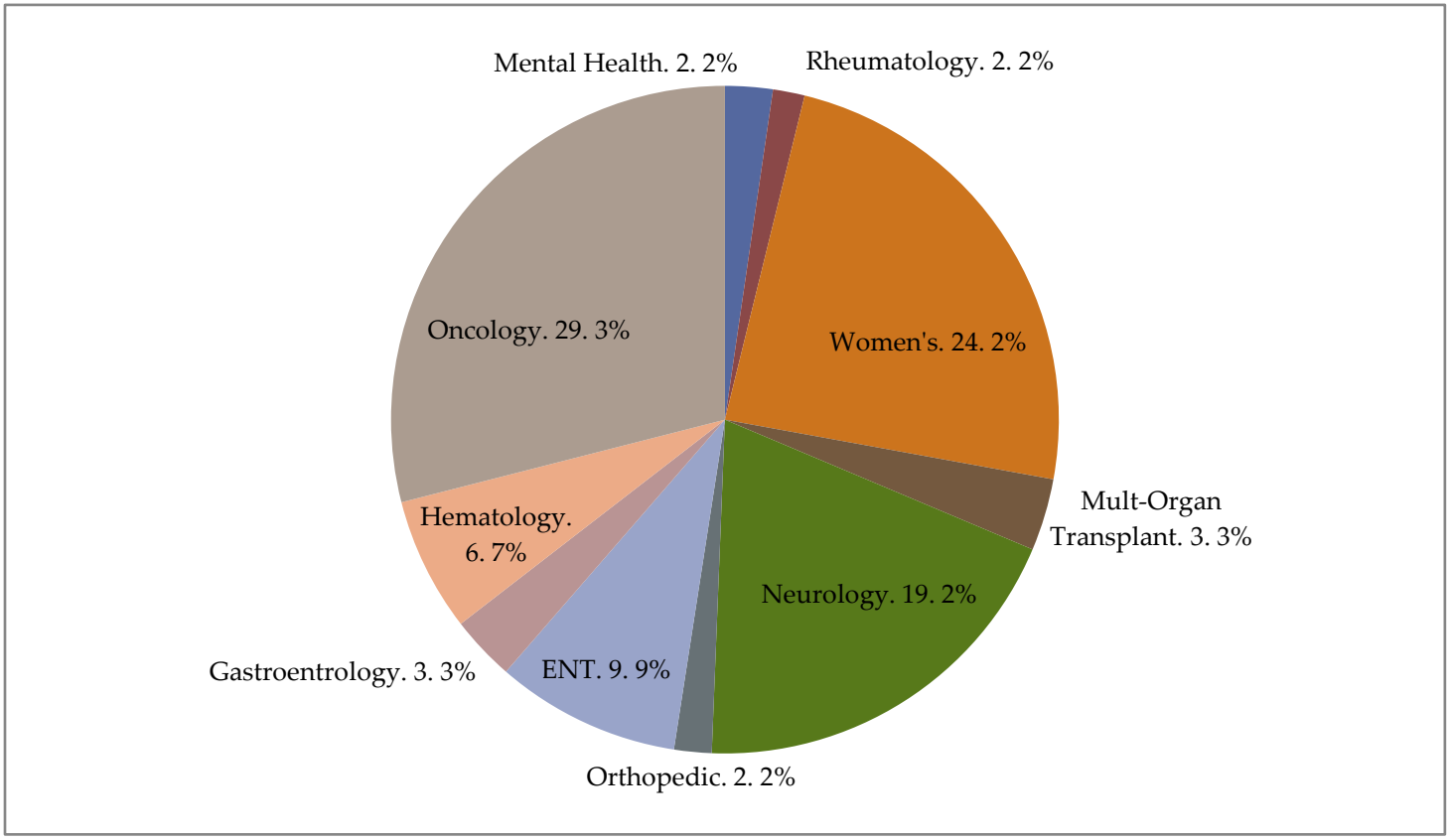
Below are data and other achievements from April 2017 – March 2018.

2.0 Participation Rate – General BioBank

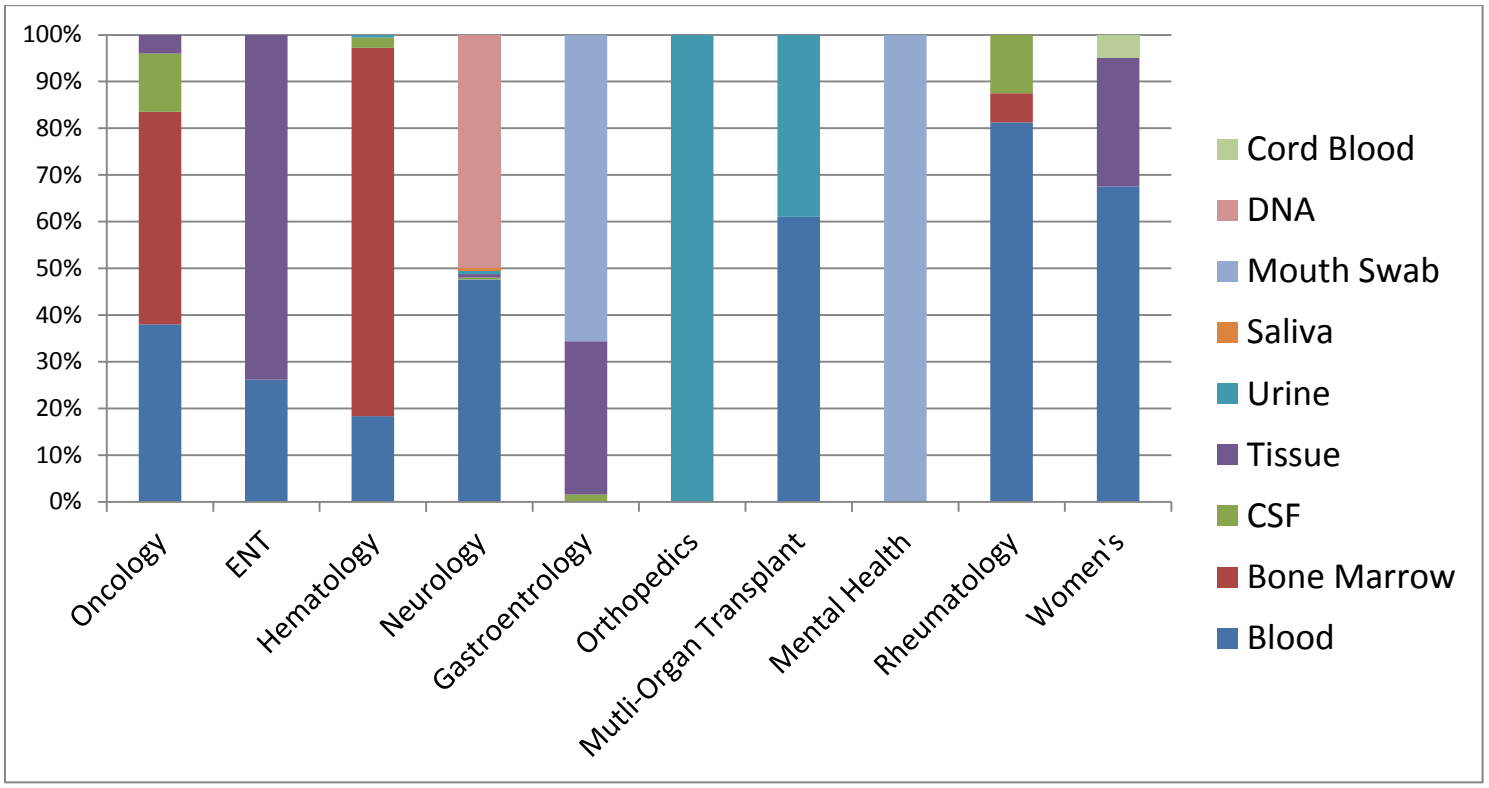
	BCCH	BCWH	Total (BCCH + BCWH)
Consent Obtained	328*	89**	417
Declined	9	3	12
Consent not completed	0	11	11
Withdrawn	0	0	0
Consent rate	97%	74%	94%

*58 more particpants than previous year
**29 more particpants than previous year

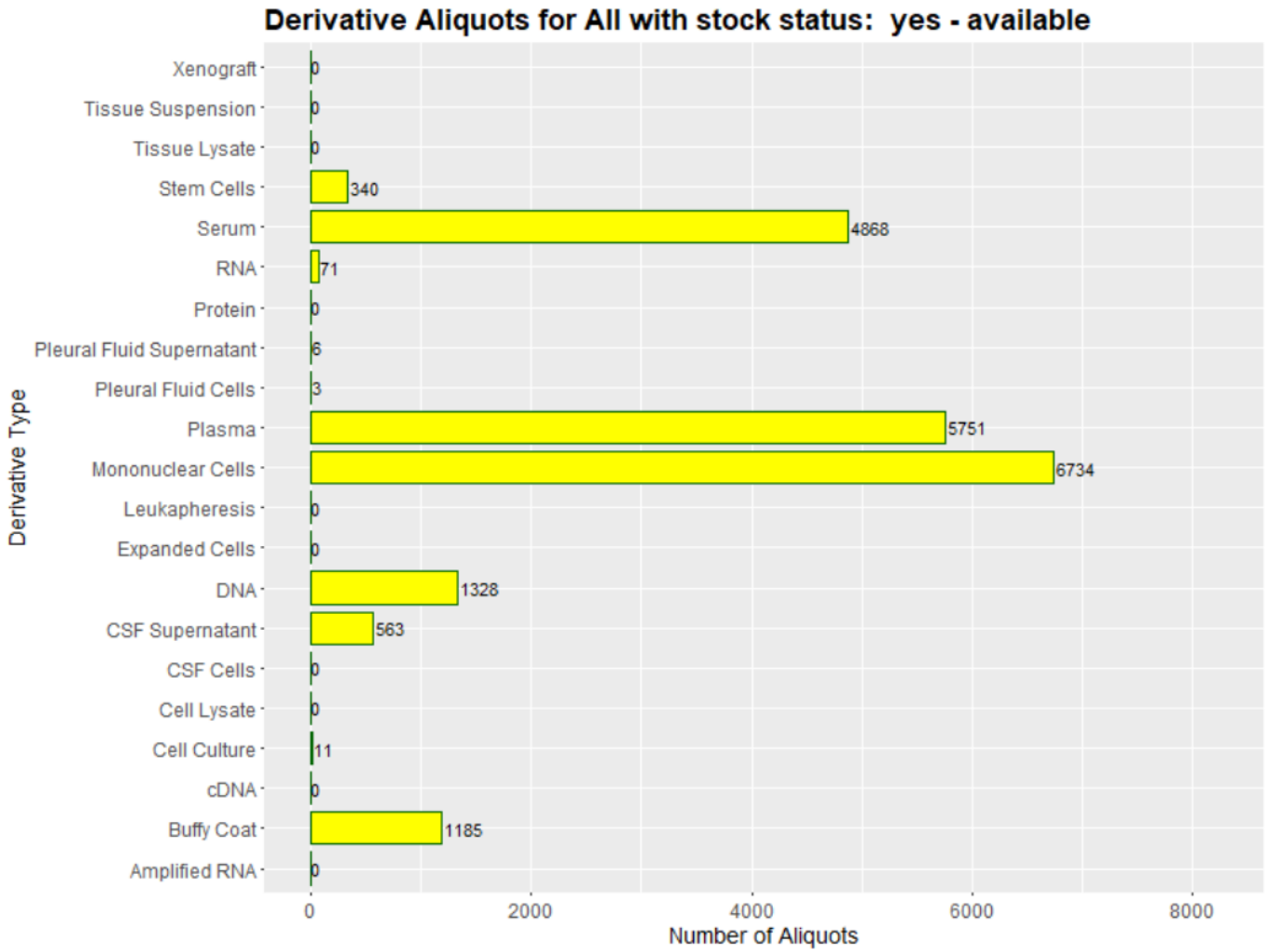
3.0 Clinic Representation – General BioBank



4.0 Specimen Distribution – General BioBank



5.0 Derivative Distribution – General BioBank



6.0 BioBank Oversight Committee (BOC)

Suzanne Vercauteren Chair of BOC	**Director of BCCH BioBank**
Mike Allard	Head of pathology and Laboratory Medicine, UBC
Kathryn Dewar	Senior Research Manager, WHRI
Julie Van Schalkwyk	Department of Obstetrics and Gynecology, UBC (BCWH Site Head)
Anne Junker	Representative for the Head of Pediatrics, UBC
Peter Watson	External Biobank Expert
Erik Skarsgard	Head of Department of Surgery at BCCH
Stuart Turvey	CFRI Director of Clinical Research
Mike Burgess	External Ethics Expert
Deborah McFadden	Head of Pathology and Laboratory Medicine at C&W
Anthony Bailey	Professor and Chair of Child and Adolescent Psychiatry, UBC
Tamsin Tarling	Administrative Manager, BCCH BioBank (ex-officio)

For the upcoming year :

Dr. Stuart Turvey will be replaced by Dr. Soren Gantt

7.0 BioBank Executive Committee (BEC)

Suzanne Vercauteren Chair of BEC	Director, BCCH BioBank
Caron Strahlendorf	Member of Research Ethics Board
Wendy Robinson	Member of CFRI
Sheila O'Donoghue	Representative from OBER
Anna Lee	Pediatric and Perinatal Pathologist, Anatomical Pathology, BCCH
Tanya Nelson	Member of Pathology and Laboratory Medicine at C&W
Paul Yong	Member of WHRI
Gregor Reid	Member of CFRI
Tamsin Tarling	Administrative Manager, BCCH BioBank (ex-officio)

8.0 BioBank Biospecimen Advisory Committee (BAC)

William Gibson (Chair of BAC)	Member of CFRI
Suzanne Vercauteren	Director, BCCH BioBank
David Cabral	Member of BCCH
Helene Cote	Member of UBC
Jacob Rozmus	Member of BCCH
Amanda Skoll	Member of BCWH
Clare Beasley	BC Mental Health and Addiction Services
Isabel Jordan	Founder of Rare Disease Foundation parent advocacy group
Jefferson Terry	Member of the Department of Pathology and Laboratory Medicine
Tamsin Tarling	Administrative Manager, BCCH BioBank (ex-officio)

For the upcoming year :
Dr. Amanda Skoll retiring and will be replaced.

9.0 Staff

Suzanne Vercauteren	Director
Tamsin Tarling	Administrative Manager
Nidhi Arora	Senior Laboratory Technician
Thyrza May Toledo	Masters Student (graduated December 2017)
Adam Velenosi	Research Assistant
Veronica Chow	Research Technician
Stephen Fung	Programmer/Analyst
Ashton Ellis	Research Coordinator
Heather Van Tassel	Co-op Research Assistant (until August 2017) Undergraduate Research Assistant September 2017 – May 2018)
Thomas Soroski	Work Learn Student
Mandy Suen	Undergraduate Laboratory Assistant (until August 2017)
Rumbidzai Chiwaya	Research Technician
Tram Pham	Graduate Research Assistant

10.0 Applications & Biospecimen Release

Between April 2017 and March 2018 the BCCH BioBank has received 12 applications for biospecimens. Applicants and their research project titles are displayed below.

1. BRAvE. Gregor Reid, Chris Maxwell, James Lim, Kirk Schultz and Philipp Lange (University of British Columbia, Vancouver, BC) – specimens granted. ***Mononuclear cells from bone marrow of 105 leukemia patients and 130 samples from solid tumour patients (snap frozen or FFPE).***
   Lay summary: Personalized treatments facilitated by genome sequencing, targeted proteomics and patient-derived xenograft studies have a significant potential to improve therapy options for pediatric cancers. The Michael Cuccione Childhood Cancer Research Program (MC3RP) established the BRAvE initiative (Better Responses through Avatomics Evidence) to provide a research-grade platform for the rapid molecular characterization of pediatric cancers. Initially this platform will be applied to hematologic cancers (B- and T- acute lymphoblastic leukemia and acute myeloid leukemia). Once we have the platform validated for hematologic cancers, we will determine if this platform is also amenable for rapid molecular characterization of pediatric solid tumors.

2. Chronic Childhood Vaculitis: Characterizing the Individual Rare Diseases to Improve Patient Outcomes. Dr. David Cabral (University of British Columbia, Vancouver, BC) – specimens granted. ***48-60 plasma samples from a range of ages of "healthy" children or children who are not exhibiting a rheumatological disease.***
   Lay Summary: Pediatric chronic primary vasculitis (CPV) describes a group of rare, life-threatening diseases. While these diseases are characterized by blood vessel inflammation, the size, location, and type of inflammation greatly varies. CPV affects both children and adults, the disease is substantially less common in children, affecting only ~23/100,000 children annually. To date, we have collected and analyzed genetic variants, gene expression signatures and sera proteins from over 200 children with vasculitis. Results of this work have lead to preliminary identification of biomarkers of disease activity and vasculitis subtype classification as well as identification and characterization of a new subtype of vasculitis, called deficiency of adenosine deaminase 2 (DADA2), in a subset of our patient cohort. Our aim now is to optimize methods for rapid analysis of these diagnostic and disease activity biomarkers in blood sera or plasma. As some of the biomarkers are known to have differential expression in children and adults (e.g. ADA2), and others have not been analyzed with respect to age, plasma obtained from the BCCH BioBank will be utilized to establish "healthy" baseline levels relative to age;

in this way we can age-match results obtained from children with vasculitis to these baselines, enabling more reliable interpretation of biomarker levels to inform clinical care.

3. Studies in support of a new vaccine to prevent invasive *Haemophilus influenzae* type a (Hia) disease in Canadian Indigenous communities. Dr Marina Ulanova (Lakehead University, Thunder Bay, Ontario) and Dr Manish Sadarangani (University of British Columbia, Vancouver, BC) – specimens granted. ***116 plasma samples from a range of ages of "healthy" children.***
Lay Summary: *Haemophilus influenzae* type a (Hia) has recently been recognized as an important cause of severe invasive disease in Canadian First Nations and Inuit, as well as in Alaskan Native populations, with the highest rates reported in young children. The reasons behind an increased susceptibility to this infection in certain populations groups are unknown. Immunocompetent adults, in contrast to children, do not typically develop invasive Hia disease. We have recently established that healthy First Nations adults possess naturally acquired functionally active antibodies specific to Hia capsular polysaccharide suggesting that certain level of natural immunity protects individuals against invasive Hia disease. It is critical to understand at what age children acquire protective antibody in order to develop specific policy for prevention of this infection, including immunization with a new vaccine under development. We hypothesize that antibodies against *Haemophilus influenz*ae type a (Hia) capsular polysaccharide which are part of the natural antibody repertoire develop in children with age partially due to exposure to the pathogen and/or certain cross-reactive antigens. The objective is to study plasma antibody concentrations in children of various ages.

4. Case study of a child with a rare autoinflammotory condition. Dr. Kelly Brown (University of British Columbia, Vancouver, BC) – specimens granted. ***Blood mononuclear cells from 4 "healthy" patients.***
Lay Summary: Requested samples will be used as normative measures of 'inflammasome' activation to which peripheral blood mononuclear cells collected from a child with a suspected inflammasome dysfunction will be compared. The patient has been followed for more than a decade in the Pediatric Rheumatology Clinic at BCCH. This child has a rare and unexplained autoinflammatory disease.

5. Optimizing ex vivo expansion of human CD56 bright regulatory NK cells (NKreg). Dr. Kirk Schultz (University of British Columbia, Vancouver, BC) – specimens granted. ***4 complete fresh tonsil tissues.***
Lay Summary: Blood and marrow transplantation (BMT) continues to be the only widely accepted immune therapy for hematopoietic malignancies. With increased safety, the outcomes of BMT have improved significantly but its success continues to be limited by the major lifetime morbidly and mortality caused by chronic graft-versus-host disease (cGvHD). cGvHD is mediated by rejection of the

donor immune system against host tissues. The use of a G-CSF stimulated peripheral blood (G-PB) as a donor source results in a higher frequency of cGvHD. Recent data from the Canadian BMT Group (CBMTG) from a prospective Phase III clinical trial entitled "A Randomized Multicentre Study Comparing G-CSF Mobilized Peripheral Blood and G-CSF Stimulated Bone Marrow in Patients Undergoing Matched Sibling Transplantation for Hematologic Malignancies (CBMTG 0601)" suggests that that low levels of $CD56^{bright}$ NK_{reg} cells are the reason for a the high rate of cGvHD in G-PB. We hypothesize that NK_{reg} cells play a major role in inhibiting GvHD after BMT and that an improved understanding of the characteristics of the population will allow for development of cellular therapies to minimize the occurrence of GvHD without inhibiting the graft-versus-leukemia effect. Presently, we have characterized these NK_{reg} cells as $CD56^{bright}$, $CD16^{-}$, and $NKp46^{+}$ (CD335). Thus, finding a propagation/culture system of this cell population is needed. This proposal will utilize the clinically well-characterized samples from the CBMTG0601 study in addition to healthy donor peripheral blood, cord blood and tonsil NK CD56bright cells for in vitro propagation. This will be a critical building block toward NK_{reg} therapy to minimize or prevent cGvHD in BMT. As there presently are no known NK_{reg} trials, this would proceed toward the first such trial in Canada and possibly worldwide.

6. CD56 bright CD335+ Regulatory NK cells in the Leukemia Microenvironment. Kirk Shcultz (University of British Columbia, Vancouver, BC) – specimens granted. ***8 slides of bone marrow biopsy material.*** Lay Summary: In spite of exciting advances in the development of chimeric antibody receptor modified T cells, allogeneic blood and marrow transplantation (BMT) remains the only cellular immune therapy to reproducibly induce a curative outcome. An estimated 22,000 North Americans are long-term pediatric BMT survivors. Each year, another 2200 allogeneic BMTs are performed in children and adolescents. While BMT is a life-saving procedure, it comes with a high risk of serious long-term complications. Most serious is chronic graft-vs-host disease (cGvHD) a condition in which the donor immune cells attack the recipient's tissues as foreign. One in four pediatric and 60% of adults BMT survivors experiences cGvHD, which causes chronic and often irreversible, organ damage and has a 10-25% mortality rate. We expect to: a) define a validated pediatric cGvHD algorithm for prognostic and diagnostic markers and good candidates for validation of risk and therapy markers and b) build a much better understanding of the differences seen between adult and pediatric patients. Ultimately, with biomarkers to define a patient's risk profile and predict treatment responses, we aim to eliminate cGvHD.

7. CAR-T regs and transplantation. Megan Levings (University of British Columbia, Vancouver, BC) – specimens granted. ***10 mononuclear cells from tonsil tissue.***

Lay Summary: Hypothesis: as a secondary lymphoid organ, the tonsil will contain regulatory T cells (Tregs) with a phenotype that is distinct from cells in the blood. Specifically we think there will be a higher proportion of follicular regulatory T cells (define by CXCR5
Aims: we aim to test the phenotype of Tregs in tonsils, focusing on the presence/absence of CXCR5 and ST2-expressing cells. If these cells are present, then we will carry out experiments to test their biological function. For example, we would isolate CXCR5-expressing Tregs and test their ability to control B cell responses. Alternatively, we would isolate ST2-expressing Tregs and test their ability to promote tissue repair. These experiments will help us to understand more about the biology of these types of Tregs and explore potential therapeutic applications.

8. Characterization of Ataxia-Telangiectasia Mutated (ATM) gene mutations in B-Cell Acute Lymphoblastic Leukemia (B-ALL). Philipp Lange (University of British Columbia, Vancouver, BC) – specimens granted. ***Mononuclear cells from the bone marrow of 50 leukemia patients, mononuclear cells from the tonsils of 50 tonsillectomy patients as well as slides cut from FFPE blocks. The exact number will be requested after preliminary work with cells.***
   Lay Summary: Acute lymphoblastic leukemia (ALL) is the most common malignancy in children and is characterized by excessive proliferation of immature lymphocytes in the bone marrow and their eventual dissemination to other organs. Understanding tumor formation and progression is an essential prerequisite to developing or selecting treatments for children with ALL. The aim of this study is to identify ataxia-telangiectasia mutated (ATM) mutations in B-cell ALL biopsies to better understand the role these mutations play in initiating cancer. ATM is a serine/threonine protein kinase involved in the DNA damage response pathway. The association of ATM mutations and leukemia are better understood in chronic lymphocytic leukemia (B-CLL), T prolymphocytic leukemia (T-PLL), and T acute lymphocytic leukemia (T-ALL). It has been shown that 14-20% of these cancers have mutations in the ATM gene. The implications of mutations in ATM are not yet well characterized for B-ALL. However, under the BRAvE (Better Responses through Avatomics Evidence) initiative, we sequenced three patients with B-ALL using a targeted sequencing panel and we found that 2 of the 3 patients had ATM mutations. Therefore, we hypothesized that there is a high frequency association of B-ALL with ATM gene mutation.

9. Proteolytic protein termini as a new strategy for cancer cell-specific therapy. Philipp Lange (University of British Columbia, Vancouver, BC) – specimens granted. ***Mononuclear cells from the bone marrow of 60 leukemia patients, mononuclear cells from the tonsils of 60 tonsillectomy patients, 4 aliquots of expanded called from leukemia patients/xenografts.***

Lay Summary: Acute lymphoblastic leukemia (ALL) is caused by excessive proliferation of immature lymphocytes in the bone marrow and their eventual dissemination to other organs. Standard treatments for ALL such as chemotherapy and radiation often causes long-term side effects in children, therefore there is an urgent need for safer targeted therapies. We hypothesized that we can identify cancer-specific proteolytic protein termini, which can be targeted with epitope specific antibodies as a new strategy for cancer diagnosis and treatment. The aims for this study are:
Aim 1: Identify cancer-specific proteolytic protein termini and deregulated proteases in pre-B ALL
Aim 2: Characterize underlying mechanisms and estimate risk of acquired resistance
Aim 3: Validate absence from healthy tissues and presence across subpopulations of cancer cells.

10. The Analysis and Characterization of Rare Primary Immunodeficiency Disorders. Stuart Turvey (University of British Columbia, Vancouver, BC) – specimens granted. ***Plasma samples from 5 "healthy" patients (children aged less than 12 years old).***
    Lay Summary: Primary immunodeficiencies (PIDs) represent a group of genetic disorders that predispose to a range of complications including infection, autoimmunity and cancer. Collectively, these conditions are common–affecting 1:2000 to 1:10 000 people. The fundamental cause of the immunodeficiency frequently remains elusive, delaying diagnosis and hindering treatment. Increasing use of high-throughput sequencing has rapidly expanded the number of identified genetic defects in previously uncharacterized PIDs. This project aims to characterize novel monogenic forms of PIDs. Specifically, this study will characterize a clinical condition characterized by severe invasive bacterial infections, low levels of the complement 4 (C4) immune protein, and mutations in the gene *RFT1*. This gene is known to be important in N-glycosylation, and has previously been characterized as leading to the clinical syndrome of a congenital disorder of glycosylation. Samples from the biobank will be used to compare the glycosylation of immune proteins in the serum of an affected patient to those of healthy controls obtained from the biobank.

11. **Defining the Role of a Novel *BCL11b* Variant in Atopy and Immune Dysregulation.** Stuart Turvey (University of British Columbia, Vancouver, BC) – specimens granted. ***Blood mononuclear cells from 5 "healthy patients" aged 9-13 years old.***
    Lay Summary: Monogenic immune disorders have played a critical role in improving our understanding of both the human immune system and the pathogenesis of allergic diseases. Many immune pathway genes such as *DOCK8, CARD11, PGM3,* and *STAT3* have been linked to atopy and hyper IgE syndromes. Recently, our group identified a child with intellectual disability, microcephaly,

atopy, eczema, alopecia totalis, and brittle nails. Whole exome sequencing revealed that she is the second reported case of a *de novo* heterozygous damaging variant in a gene called *B-cell lymphoma/leukemia 11B* or *BCL11b* (p.C826Y). Notably, this child presented quite differently from the first case who had multisystem anomalies including neurodevelopmental deficits and severe combined immunodeficiency. BCL11b is a zinc finger, which acts transcriptionally as both a suppressor and activator by binding directly to promoter regions or indirectly to promoter-bound transcription factors and has major roles in the development of the central nervous, integumentary, cardiac, and immune systems. In particular, it has been shown to have critical roles in T cell and type 2 innate lymphoid cell (ILC2) lineage commitment, development, differentiation, survival, and function. Since allergic diseases are largely mediated by T helper cells (Th2), ILC2s, and Th2 cytokine secretion (IL-4, IL-5, and IL-13), this *BCL11b* variant may impact immune cell numbers and cytokine secretion. *Requested samples from the Biobank will be used to compare to the BCL11b patient.*

12. Enhanced immune monitoring in pediatric kidney transplant recipients. Tom Blydt-Hansen (University of British Columbia, Vancouver, BC) – specimens granted. ***Blood mononuclear cells from 45 patients who have undergone a solid organ transplant and urine samples from patients who have undergone solid organ transplant and the urine is collected at various time point post transplant.***
Lay Summary: Urinary biomarkers such as CXCL10 have been validated for their ability to predict acute rejection, but not tested yet for clinical utility. Other markers, such as urinary metabolite score, show similar promise and are undergoing validation. These markers must improve on the existing framework for clinical decision-making to be useful as clinical tools. For the diagnosis of rejection, they must be superior to existing surveillance at indicating a need for biopsy, such that they may reduce the requirement for biopsy surveillance.

    To address the efficacy of urinary biomarkers, an adapted clinical trial design is required. The interpretation of a biomarker level will be made in the context of existing clinical information. The biopsy result will be used to determine the accuracy with which rejection is predicted.

    This clinical trial will determine the optimal threshold to indicate a biopsy, in particular to diagnose subclinical rejection. Prior to conducting a clinical trial, preliminary data is needed to guide trial design. We propose a pilot feasibility study to establish the groundwork for a definitive clinical trial in children with kidney transplantation to test the hypothesis that real-time, enhanced monitoring with urine biomarkers is superior to standard monitoring for identifying risk of rejection.

Over the period of April 2017 and March 2018, the following projects requested additional specimens for their studies which had previously been approved.

1. James Lim (BC Children's Hospital Research Institute, University of British Columbia, Vancouver, BC) – specimens granted ***(116 plasma aliquots from bone marrow of leukemia patients)***
Monitoring serum calreticulin in pediatric ALL as a marker for positive chemotherapeutic response
Lay summary: Calreticulin is a unique protein released by tumor cells that promotes the anti-tumor response by the body's own immune system. By analyzing calreticulin levels in the blood we hope we will be able to monitor a positive response to chemotherapy and have the potential to engage body's own anti-tumor activity.

2. Philipp Lange (BC Children's Hospital Research Institute, University of British Columbia, Vancouver, BC) – specimens granted ***(33 aliquots of primary and mouse expanded mononuclear cells from bone marrow of leukemia patients and 15 aliquots mononuclear cells from blood of healthy patients and 2 FFPE scrolls)***
Proteins and their modification in childhood cancer.
Lay summary: When they are uncoiled, proteins are a long chain of amino acids that have a start and an end, called the termini. A process called proteolysis can cut proteins apart, creating fragments that have different termini. We have shown that termini found in cancer differ from healthy cells. The patient biopsies collected by the BCCH BioBank enable us to identify truly unique termini on leukemia cells and other pediatric cancers. Ultimately we hope to develop better targeted therapies with fewer negative effects for our small patients now or later in life.

3. Gregor Reid (BC Children's Hospital Research Institute, University of British Columbia, Vancouver, BC) – specimens granted ***(12 aliquots of mononuclear cells from bone marrow)***
Prospective generation of pediatric leukemia relapse by xenotransplantation
Lay summary: Having leukemia cells in the bone marrow at the end of the first cycle of chemotherapy puts a patient at higher risk of the disease returning. As the BCCH BioBank has bone marrow samples from such children, we are attempting to grow the leukemia cells in order to determine what the potential relapse cells look like and what drugs they are sensitive to. This research could contribute to improving the outcome for children whose leukemia cells come back after treatment.

11.0 PI Driven Studies

#	Study Name	PI	Services Provided	Sample Processing	Storage
1	SLED	Dr. Dina Panagiotopolous & Dr. Megan Levings	Receiving, labeling, recording, & processing the specimen Long-term storage	Serum Plasma Buffy Coat PBMC	- 80°C Liquid Nitrogen
2	Adult SLED	Dr. Jan Dutz	Receiving, labeling, recording, and processing the specimen Long-term storage	Serum Plasma Buffy Coat PBMC	- 80°C Liquid Nitrogen
3	Epilepsy & Genomics (EpGen)	Dr. Michelle Demos & Dr. Mary Connolly	Receiving, labeling, recording, and aliquoting the specimen Long-term storage	DNA Extraction	- 80°C
4	CAUSES	Dr. Jan Friedman	Receiving, labeling, recording, and aliquoting the specimen Long-term storage	Storage of whole Blood	- 80°C
5	SWAVE-U (study closed)	Dr. Jefferson Terry	Consenting patients and delivering the placenta to Anatomical Pathology	None	Store in the BioBank box in AP
6	mTOR (study closed)	Dr. Rebecca Deyell	Receiving, labeling, recording, and processing the specimen	Protein Lysate (PBMC)	Temporary storage only (-80°C)
7	UST1D (study closed)	Dr. Jan Dutz	Receiving, labeling, recording, and processing the specimens Long-term storage	Serum Plasma PBMC Whole blood	- 80°C Liquid Nitrogen
8	Genome wide assessment of genetic alterations in pediatric acute leukemia (LBRWN)	Dr. Lindsay Brown	Consenting and data collection	None	None

#	Study Name	PI	Services Provided	Sample Processing	Storage
9	Understanding the risk of sudden death in families: cascade screening in CPVT (CARDIO)	Dr. Shubhayan Sanatani	Coordinating the collection of patient blood samples to FTA blood spot cards Long-term storage	Blood spot card	Room Temp.
10	TREASuRE (study closed)	Dr. Suzanne Vercauteren	Consenting	None	None
11	Vitamin B12 status in South-Asian and European pregnant women and their newborns (study closed)	Dr. Hilary Vallance	Labeling, recording, storage	None	- 80°C
12	Broady Lab	Dr. Raewyn Broady	Labeling, recording, storage	None	Liquid Nitrogen
13	Levings Lab (study closed)	Dr. Megan Levings	Labeling, recording, storage	None	Liquid Nitrogen
14	A randomized controlled pilot study to examine the effects of goal-directed fluid therapy on post-operative outcomes in children undergoing scoliosis repair (study closed)	Dr. Zoe Brown	Labeling, recording, storage	None	- 80°C
15	Kingella Kingae (study closed)	Dr. Ghada Al-Rawahi	Identifying eligible patients, deliver kits, consent patients	None	None
16	Overcoming the barriers to successful immune therapy for acute leukemia	Dr. Gregor Reid (Dr. Nina Rolf)	Consenting	None	None
17	PedVas	Dr Kelly Brown	Aliquoting, labeling, recording, Long-term storage	None	- 80°C Liquid Nitrogen Room Temp.

#	Study Name	PI	Services Provided	Sample Processing	Storage
18	AKI	Dr. Cherry Mammen	Processing, aliquoting, labeling, recording, storage	Urine (aliquoting)	- 80°C
19	EOE (study closed)	Dr. Edmond Chan	Labeling, recording, storage	Freezing Tissue	- 80°C
20	TED (study closed)	Dr. Linda Casey	Consenting and coordinating	None	None
21	POG cf DNA	Dr. Ryan Morin	Processing	Plasma Buffy Coat	- 80°C
22	BC-SICR	Dr. Srinivas Murthy	Labeling, recording, storage & processing	Whole blood aliquoting PBMC Plasma DNA	- 80°C Liquid Nitrogen
23	CAN-TBI Sub study	Dr. William Panenka	Labeling, recording & processing Long-term storage	Plasma PBMC	- 80°C Liquid Nitrogen
24	STRIDER	Dr. Kenneth Lim	Labeling, recording, and storage	None	- 80°C
25	CROPS	Dr. Jan Dutz and Dr. Kevan Jacobson	Labeling, recording, storage & processing	Serum Plasma PAX gene PBMC	- 80°C Liquid Nitrogen
26	iPSC	Dr. Francis Lynn	Labeling, recording, storage & processing	PBMC	Liquid Nitrogen
27	Rheumatology	Dr. David Cabral and Dr. Kelly Brown	Labeling, recording, storage & processing	Whole blood aliquot Plasma PBMC	- 80°C Liquid Nitrogen
28	ABLE-Glyconet	Dr. Kirk Schultz	Consenting and coordinating	None	None
29	Preeclampsia	Dr. Kenneth Lim	Consenting and coordinating	None	None

12.0 Key Performance Indicators (KPI)

	Key Performance Indicators	**Jan 1, 2015 – March 31, 2016**	**April 1, 2016 – March 31, 2017**	**April 1, 2017 – March 31, 2018**
1	# of participants recruited	402 per year and carried over from CCBR BioBank 27 per month	310 per year 26 per month	417 per year 35 per month
2	# of requests for specimens from general biobank	4 per year 0.2 per month	7 per year 0.6 per month	12 per year 1.2 per month
3	# of PI driven research projects supported (accumulative, because some studies continue to store samples despite being closed)	17	23	29
4	# of aliquots released from General BioBank (per year)	51	485	305
5	Sample QC (two methods) i) Mononuclear cells (post thawing) Recovery Viability ii) DNA A260/280 A260/230	 62% 75% 1.84 1.93	 90% 85% 1.86 2.20	 83.3% 96.3% 1.84 1.73
6	# of successful grants for BCCHB specific projects (per year)	1	4	1
7	# of successful grants/special award that proposed using BCCHB specimens/data (per year)	2	1	3
8	# of publications with BCCHB specimens/data (per year)	1	1	2
9	# of conference presentations/posters (per year)	7	4	1

13.0 BioBank Utilization

Clinic	# of Participants	Sample Type	Aliquots Total	Aliquots Available	Aliquots released	% utilization
**Mental Health*	33	Swab	74	74	0	
Total aliquots					**0**	**0**
**Multi-Organ Transplant*	50	Blood	2	2	0	
		Buffy coat	3	3	0	
		MC	60	60	0	
		Plasma	219	219	0	
		Urine	64	64	0	
		Urine Sup.	101	101	0	
Total aliquots			**449**		**0**	**0**
Orthopedics	26	Urine Sup.	**214**	214	**0**	
Total aliquots					**0**	**0**
**Rheumatology*	22	Blood	11	11	0	
		Buffy coat	1	1	0	
		Synovial Fluid	20	20	0	
		MC	21	21	0	
		Plasma	52	52	0	
		Tissue	2	2	0	
		Urine Sup.	2	2	0	
Total aliquots			**109**		**0**	**0**
Women's	344	MC	59	56	3	
		Blood	47	47	0	
		Blood MC	25	25	0	
		Blood Plasma	174	174	0	
		Serum	98	98	0	
		Cord MC	55	55	0	
		Cord Plasma	70	70	0	
		Tissue	143	143	0	
Total aliquots			**671**		**3**	**0.4**

Clinic	# of Participants	Sample Type	Aliquots Total	Aliquots Available	Aliquots released	% utilization
Neurology	276	Blood	144	144	0	
		DNA	771	771	0	
		Buffy coat	3	3	0	
		CSF	7	7	0	
		Plasma	61	58	3	
		MC	8	8	0	
		RNA	2	0	0	
Total aliquots			**1667**		**3**	**0.2**
ENT	128	Blood	20	15	5	
		Buffy coat	3	3	0	
		Blood DNA	6	6	0	
		Blood MC	116	51	65	
		Plasma	314	193	121	
		Serum	20	14	6	
		Tissue MC	1901	1521	380	
		Cell Culture	13	11	2	
		Tissue DNA	3	3	0	
		Tissue RNA	61	61	0	
		Tissue	643	563	80	
		CSF	8	8	0	
		BM MC	6	6	0	
		BMC Plasma	7	5	2	
Total aliquots			**3121**		**661**	**21**
Gastroentrology	45	Tissue	**29**	29	**0**	
Total aliquots					**0**	**0**
Hematology	93	Blood MC	60	23	0	
		Blood Plasma	44	37	7	
		Buffy coat	1	1	0	
		Serum	6	6	0	
		BM	258	253	5	
		BM MC	229	225	4	
		BM Plasma	25	15	2	
		Cell Pellet	1	1	0	
		CSF	25	25	0	
		Urine	3	3	0	
Total aliquots			**652**		**18**	**2.8**

Clinic	# of Participants	Sample Type	Aliquots Total	Aliquots Available	Aliquots released	% utilization
Oncology	415	Tissue - Tube	101	101	0	
		Tissue - Slide	17	5	12	
		Tissue - Block	3	3	0	
		Cell Pellet	5	4	1	
		BM Expanded Cells	257	188	69	
		BM MC	3519	3335	184	
		BM Plasma	411	383	28	
		BM Stem cells	70	70	0	
		Buffy coat	159	159	0	
		Cell Pellet	16	16	0	
		Blood MC	445	440	5	
		Blood Plasma	1611	1426	185	
		Serum	7	7	0	
		Blood Stem Cell	176	174	2	
		CSF (CCBR)	14	13	1	
		CSF Cells	7	6	1	
		CSF Supernatant	524	512	12	
		Pleural Fluid	5	5	0	
		PF Cells	3	3	0	
		PF Supernatant	5	5	0	
Total aliquots			**7355**		**500**	**7**

- Clinics marked with an * are new clinics and we would not anticipate utilization at this stage.

Publications

No new publications from the BCCHB this year.

Dr. Vercauteren is editor on a special pediatric edition of Biopreservation and Biobanking which is due to be published in the Fall of 2018. The BCCHB will have a number of papers in this journal and writing is in progress at this time.

Research Activities

The BCCHB has conducted a large number of focus groups and workshops as listed below as part Dr. Vercauteren' s public engagement interest.

CIHR-SPOR funded grant – Giving patients and health care providers a voice in pediatric bioabnking

- Focus group for patients and public (adults, adolescents and children aged 11-13 years): August 2017.
- Workshop 1 for public (adults, adolescents and children aged 11-13 years): November 2017
- Workshop 2 for patients (adults, adolescents and children aged 11-13 years): January 2018
- Workshop 3 for researchers, clinicians and health care providers: February 2018

Michael Smith Foundation for Health Research – World Café on integrating mental health research and clinical care

- Focus group 1 for patients, OCD outpatient (parents and adolescents): June 2017
- Focus group 2, P1 inpatient for parents: August 2017
- Focus group 3 for patients, mixed group, outpatient (parents and adolescents): August 2017
- Focus group 4,5 for staff (nurses and social workers, P1 inpatient): August 2017
- Focus group 6 for staff (nurses and social workers, CAPE inpatient): August 2017
- Focus group 7 for staff (nurses and social workers, P4 outpatient): October 2017
- Focus group 8 for researchers: February 2018
- Focus group 9 for clinicians: February 2018

Vancouver School Board Extended School Survey

Completed this ongoing project in May/June 2018 surveying high school students and their parents in 3 additional schools.

14.0 Grants (awarded in 2017/2018)

Operational

- Childhood Diseases Theme Platform Technology Grant (BC Children's Research), renewal of $40,000 for one year. *To increase utilization of the BioBank by CD theme members*

15.0 Presentations (2017/2018)

Oral presentations:
O'Donoghue S, Tarling T and Vercauteren S (2017). Public Education Workshop. International Society of Biological and Environmental Repositories (ISBER) conference, Toronto, Ontario, Canada.

O'Donoghue S, Tarling T and Vercauteren S (2018). Webinar: Public Education for bioabnking. International Society of Biological and Environmental Repositories (ISBER).

Local:

- BC Children's Hospital Grand Rounds, Vancouver, BC (Sept 2017)
- Discovery Days Workshop, Vancouver, BC (Dec 2017)
- Ethical Considerations for Biobanking at BC Children's Hospital and BC Women's Hospital, Vancouver, BC (April 2017)
- BC Children's Hospital Neonatal Intensive Care Unit (NICU) Rounds, Vancouver, BC (Oct 2017)
- BC Children's Hospital Research PITCH, Vancouver, BC (May 2017)
- BC Children's Hospital Research PITCH, Vancouver, BC (Feb 2017)
- BC Children's Hospital Psychiatry Grand Rounds, Vancouver, BC (Sept 2017)
- BC Children's Hospital Research TGIF, Vancouver, BC (Oct 2017)
- BC Children's Hospital BioBank presentation for supplementary NIH online teaching module (Jan 2018)
- BC Children's Hospital Research Lunch and Learn, Vancouver, BC (Jan 2018)

16.0 Communication

Over the past year the BioBank has conducted numerous focus groups and workshops to patients, public and health care providers to obtain stakeholder perception on how biobanks could be better integrated with health care. These events have been funded by two grants that were obtained last year from Michael Smith Foundation for Health Research and from CIHR.

Our YouTube video about the BCCHB has been viewed 1,806 times.

Website: www.bcchbiobank.ca
YouTube: https://www.youtube.com/channel/UCS1LxeGRJTRiejLRXw9heMw

BCCHB Newsletter: Spring 2017, Fall 2017

17.0 Financials

Income 2017/2018

Income from grants:	
CD theme*	40,000.00
Income from services:	117,966.52
Total:	**157,966.52**

**income due but not actually received*

Full financial details for financial year ending March 2017

	Q1	Q2	Q3	Q4	Total
Opening Balance ($)	547,136.02	448,986.58	344,967.62	237,356.49	
Funds Available ($)	547,136.02	448,986.58	344,967.62	237,356.49	
Total Salaries ($)	89,646.35	93,170.30	92,752.92	97,848.98 (78,953.53)	294,465.02
Total Operating Expenses ($)	8,503.09	10,848.66	14,858.21	(37,233.14)	(3,023.18)
Total Expenses ($)	98,149.44	104,018.96	107,611.13	60,615.84 (78,953.53)	291,441.84
Unexpended Balance ($)	448,986.58	344,967.62	237,356.49	176,740.65 +78,953.53	255,694.18
Balance of CD theme grant account ($)					65,083.15
Balance of income account ($)					256,938.00
Available funds 2017/2018 ($)					**577,715.33**

Comment on Financial status:

The BCCHB utilizes a salary account for payment of salaries. Funds are transferred to this account on a yearly basis. The current balance of the salary account is $104,130 and in the next month $148,000 will be transferred to this account to cover salaries for the coming year. These funds are accounted for above in the unexpended balance. It should be noted that once the $148,000 are transferred to the salary account the actual balance of the original Mining for Miracles account will be $3,564. This means that all operating costs (apart from salaries) will now need to be paid for from the UBC income account and the CD theme grant account.

A comparison of predicted and actual expenditure and income is shown below:

Expenditure

	FY2013/14	FY 2014/15	FY 2015/16	FY 2016/17	FY 2017/18	FY 2018/19	Total (up 2017/18)
Actual	142,172	818,846	474,664	680,428	291,442		2,407,552
Predicted	978,500	290,000	313,000	592,500	433,200	415,000	2,607,200

Income

	FY2013/14	FY 2014/15	FY 2015/16	FY 2016/17	FY 2017/18	FY 2018/19	Total (up 2017/18)
Actual	565	10,395	48,536	79,476	117,966		256,938
Predicted	0	16,000	35,000	70,000	100,000	140,000	221,000

18.0 Abbreviations

BCCH – BC Children's Hospital
BCWH – BC Women's Hospital
PHSA – Provincial Health Services Authority
UBC – University of British Columbia
WHRI – Women's Health Research Institute
REB – Research Ethics Board

19.0 Sign Off

Report compiled for the BCCH BioBank by:

Tamsin Tarling, BCCH BioBank Administrative Manager

Report reviewed by:

Suzanne Vercauteren, BCCH BioBank Director

Approved by:

BCCH BioBank Oversight Committee

Report signed off on behalf of the BCCH BioBank Oversight Committee by:

Suzanne Vercauteren, BCCH BioBank Director

Name

3 July 2018

Date