Canadian Blood Services

BLOOD
PLASMA
STEM CELLS
ORGANS
& TISSUES

Annual Report 2018–2019

Every Day

Lincoln
Plasma protein product recipient

On the cover:
Lincoln, born with a congenital immune deficiency disorder (BENTA disease), receives subcutaneous immune globulin replacement therapy — a product derived from plasma — on a weekly basis.

Here's how we put our strategy into action — every day — as we work to meet patients' needs while strengthening Canada's health system to meet the challenges of the future.

Patients

Gurjit Cheema
Kidney recipient

Helping people live longer, healthier lives

In the two decades since our founding, the focus of Canadian Blood Services has expanded beyond blood to encompass the life essentials for transfusion and transplantation, including plasma, stem cells, and organs and tissues. We work each day to provide effective, reliable products and services that meet the highest standards of safety and quality — and to deliver, alongside our health-care partners, the best possible treatment and care to patients.

"The last six years, they've been the best. We were able to get married, and I finished my degree in nursing. ... It's important that people see what a difference it's made. You get to breathe again."

When **Gurjit Cheema** needed a kidney transplant, her husband **Shak Pawar** was there for her, offering one of his kidneys to another patient as part of the virtuous circle of paired donation.

View their video story in our online annual report at blood.ca

1,183
kidney transplants

As of May 1, 2019, Canadian Blood Services had facilitated 1,183 kidney transplants over the previous decade, collaborating with our partners in organ and tissue donation and transplantation (OTDT) across the country. The Kidney Paired Donation program was responsible for 663 transplants; 520 were enabled by the Highly Sensitized Patient kidney program.

"As a South Asian, my chances of finding a suitable match were far lower than for a Caucasian."

A stem cell transplant has allowed **Daljit Sanders** to recover from leukemia and resume her career. She's also embraced a vital new mission: inspiring more donors to help increase ethnic diversity in Canadian Blood Services Stem Cell Registry.

"I received my initial cancer treatment in the U.S.," recalls Daljit Sanders, "because I was too ill to travel home to Vancouver. The chemo schedule was intense and I nearly died at one point when I got very sick in hospital. After about three months, the oncologist told me I was in remission. Then he referred me to a stem cell specialist who said, 'Unfortunately, without a transplant, I only give you six months.' I knew that because of my South Asian ethnicity, a transplant wasn't likely. I headed home to see what could be done."

Daljit was in the Detroit area when routine blood work for a suspected infection revealed that she had acute myeloid leukemia (AML), a cancer of the blood and bone marrow. The news came as a shock to the 28-year-old, who was already living with a health challenge: "I was diagnosed with secondary AML on January 7th, 2014 — seven years to the day after I learned I had multiple sclerosis. So, as you can imagine," she says with a laugh, "January 7th is not really my favourite day."

Back home in Canada, Daljit was referred to the Leukemia/Bone Marrow Transplant Program at Vancouver General Hospital. There her new oncologist, while more optimistic than the previous team about her immediate outlook, agreed that she couldn't hope to live very long without receiving healthy stem cells to repair the bone marrow damaged by her cancer. The challenge would be finding the right donor.

Transplant centres across Canada can search for potential donors using Canadian Blood Services Stem Cell Registry, which in turn can access other member registries of the World Marrow Donor Association. This means that national and international searches are performed for every patient in Canada in need of a stem cell transplant, improving their chances of finding the right donor match somewhere in the world.

"As a South Asian, my chances of finding a suitable match were far lower than for a Caucasian in my situation," Daljit says. "That was incredibly scary for me." Supported by her mother and nieces, she began reaching out to groups in the community who were trying to raise awareness and recruit donors. "South Asians in general can be more difficult to encourage to sign up because of language barriers and a lack of awareness about the issue. Plus, it was hard to help out when I was sick and trying to fight this thing. Then I connected via social media with the stem cell team at Canadian Blood Services, who introduced me to some people who were doing South Asian donor drives, and that gave me a lot of hope."

A unified stem cells strategy

Increasing ethnic diversity has long been a priority for Canadian Blood Services Stem Cell Registry. (Previously known as the OneMatch Stem Cell and Marrow Network, the program was renamed in 2019 to underline our strategic focus on stem cells alongside blood, plasma, and organs and tissues under the renewed Canadian Blood Services brand.) In our efforts to recruit healthy, committed donors — we keep a particular focus on young males whose stem cells have been shown to carry a lower risk of post-transplant complications — and on people with diverse ethnic backgrounds because we know that patients like Daljit have the best chance of finding ideal matches within their own ancestral ethnic groups.

As of the 2018–2019 year-end, there were over 447,000 adult registrants in Canadian Blood Services Stem Cell Registry, which is linked to an international registry network comprising more than 33 million potential donors worldwide. During the past year, we facilitated 402 transplants for Canadian patients, helping them receive stem cells from both domestic and international donors.

In addition to the national registry, which has collection and transplant centres in major cities across Canada, our unified Stem Cells for Life program includes two processing, testing and storage facilities, as well as Canadian Blood Services' Cord Blood Bank, which has been operating since 2014. Having collected umbilical cord blood from 27,000 mothers so far through hospitals in Ottawa, Brampton, Edmonton and Vancouver, the bank had 3,220 units at year-end. That inventory is integrated with banks around the world that together hold nearly 780,000 cord blood units, increasing the odds of a positive match for patients like Daljit.

The power of conviction

"Until it hits you personally, you don't think about it," Daljit says of her need for a stem cell transplant. "It's not that we don't want to help, but people are just so busy and caught up in their day-to-day lives. I'd love to see us get to a point where there's a donor drive every weekend at shopping malls, sporting events, fairs and festivals, and so on."

The now 33-year-old also urges more coordinated efforts to raise awareness: "This should be taught in schools and be part of the public conversation, including with people who are new to our country. And our health system should constantly remind people that they're eligible to be stem cell donors and help people of all ethnicities regain their health. We have one of the most multicultural societies in the world. We should be able to do better."

With her cancer in remission, Daljit has resumed her human resources consulting career and is earning a master's degree online in organizational development and change from Pennsylvania State University. "In the hospital, I noticed that I kind of have a knack for comforting other people who are going through similar experiences. I try to bring that to my work, as I help start-ups develop policies to ensure they're taking care of their most valuable asset: people. Because when organizations are able to harness all of that human energy, knowledge and experience, they create a better future not only for their employees, but for all stakeholders."

This blend of optimism and conviction has sustained Daljit as she has faced her various health challenges. And now, through her passionate advocacy on behalf of stem cell recipients, she's able to return the generosity of the anonymous donor who gave her a second chance.

402 stem cell transplants

Canadian Blood Services facilitated 402 stem cell transplants in 2018–2019, connecting Canadian patients to both domestic and international donors. At year-end, there were more than 447,000 searchable adult registrants in Canadian Blood Services Stem Cell Registry, and over 3,200 units available for transplant in Canadian Blood Services' Cord Blood Bank.

Donors

Myriam Osborn
Donor centre supervisor

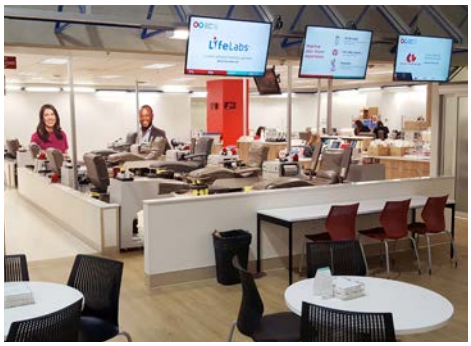
Making a rewarding experience even easier

A pillar of our five-year strategic plan is a commitment to *build and deepen relationships with the donors of the future.* That means delivering exceptional experiences to Canadians who donate blood or register to become stem cell or organ donors wherever they interact with us. And it requires gaining deeper insights into shifting demographics, social trends and cultural diversity as we evolve our donor base to reflect patients' changing needs.

"The entire process of donating blood has been made more efficient overall, and I think most people appreciate that.... Donating blood is a small thing you can do, in one way. But it's also a huge thing, because you are contributing to the health of the nation."

Long-time donor **Sandy Rennie** welcomes the convenience of booking online and checking in via the Donor Concierge. And with digital technology handling routine tasks, donor centre supervisor Myriam Osborn and her team can focus on keeping things flowing while maintaining the human touch.

View their video story in our online annual report at blood.ca



The Donor Centre of the Future

To mark World Blood Donor Day on June 14, 2019, we unveiled the first Donor Centre of the Future in Edmonton. The product of a year-long planning and redevelopment initiative, the new centre's design was based on extensive feedback from donors and Canadian Blood Services team members. Enhancements include a social and recovery zone where donors can interact with volunteers and staff before and after their donations. Other features include areas for education and refreshments, designed to further enrich and personalize the donor experience. This new design will be used as a blueprint for future construction.

"We've made great improvements in how we're collecting and analyzing donor feedback, and we're using those insights in more meaningful ways every day."

Data analytics and advanced technologies are helping Canadian Blood Services researcher **Karen Gilmore** and her colleagues better understand the preferences of donors — a critical step in securing the future of the blood system.

"In February 2019, we launched a new digital survey as part of our ongoing effort to continuously improve the donation experience," says Karen Gilmore, a research associate with the donor relations team at Canadian Blood Services. "The survey asks people who've recently visited a blood donor centre to provide feedback on the process and their interactions with our staff. It's been a huge success — we received more than 60,000 responses in the first six months. Donors appreciate having a quick, convenient way to share their perspective. And we gain a wealth of data showing what we're doing well and where we might do better."

In the past, feedback was collected via a quarterly email survey. The survey targeted a subset of blood donors, so the sample was relatively small and restrictive. In contrast, the new survey encompasses all donation types, including plasma and platelets, as well as successful and temporarily deferred donors. It is sent out automatically within two days of a donor centre visit, so the information gathered is more current. And the larger sample size means that Karen and her colleagues have a more robust and representative pool of data from which to gain insights, including at individual centres.

Judging by the tone

The donor feedback initiative is supported by customer experience management software that combines advanced analytics with artificial intelligence to enable detailed reporting on donor perceptions. In addition to capturing answers to close-ended questions, the system uses natural language processing to categorize open-ended comments and even gauge donors' sentiments from their choice of words. "The software automatically reads every response, puts it in a category — wait-times, say, or the performance of the donor centre team — and actually captures the tone of the comments," Karen explains. "It's very powerful and, of course, much faster than analyzing surveys manually."

Donors are asked to indicate, on a scale of zero to 10, how likely they would be to recommend Canadian Blood Services to a friend or colleague. A score of 6 or lower is considered a negative response and triggers a follow-up (with the donor's consent). "If we can't respond promptly to donors who raise concerns, it's a missed opportunity," Karen says. "Now the system flags survey responses that need attention. Someone from our National Contact Centre responds directly — or passes on comments to the most appropriate colleague within Canadian Blood Services — in order to get more details, help resolve any issues and encourage the donor to keep coming back."

The power of insights

Another major benefit of the new system is that donor feedback can be widely shared across the organization. Supervisors of both fixed and mobile donor centres automatically receive weekly reports by email. They can also log in anytime to the feedback system to see near-real-time data and review donors' comments, gaining insights they can share with their teams on what's working well and areas that may need attention. More senior managers can access high-level summaries and drill down for details by location, time and date, donation type and other criteria. (The system has undergone a rigorous privacy impact assessment, and all donor information is subject to appropriate data protection measures.)

Survey data has helped identify areas that need extra focus. For example, many donors said they'd like to be updated on how long their donation visit was expected to take; addressing this has become a national priority. At the local level, leaders in the donor centres can access easy-to-read reports and develop their own solutions, managing performance on a case-by-case basis. They can also use keyword searches to do deep dives into specific topics. "The real game changer is the level of detail in the data," says Karen, "and our ability to do more with that information than ever before."

Like all organizations being transformed by the digital economy, Canadian Blood Services is only beginning to leverage the power of sophisticated analytics and artificial intelligence. "It's early days and we're just scratching the surface of the technology's potential," Karen says. "But we've made great improvements in how we're collecting and analyzing donor feedback, and we're using those insights in more meaningful ways every day."

Salty snacks and more

Responding to recent research findings, in 2018–2019 we introduced new steps into the donation process designed to improve donors' overall experience — and, in particular, to reduce the likelihood of a vasovagal reaction, in which a donor feels light-headed or even faints. The new measures include:

- **Providing donors with fluids (500 mL of water) and a salty snack (containing 450 mg of sodium) before they give blood.**
- **Encouraging donors to perform muscle tension exercises while in the donation chair.**
- **Applying a specially designed pressure bandage after donation to help prevent rebleeding.**

Canadian Blood Services regularly reviews donor eligibility criteria and screening processes to be as minimally restrictive as possible while ensuring donors' well-being and the safety of the blood supply. These new steps will save donors time during both screening and recovery, getting them quickly on their way and reducing overall wait-times in our donor centres.

Quality

Dr. Katerina Pavenski
Head of transfusion medicine
St. Michael's Hospital

Continuously improving our supply chain

Everything we do at Canadian Blood Services is ultimately aimed at enhancing and saving the lives of patients. But from day to day, much of our collective energy is focused on collaborating with the institutions that actually deliver health care. We're continuously improving the many complex steps in our supply chain, ensuring the quality and safety of our products and services while working more efficiently to help our hospital customers get the right treatment to the right patients at the right time.

"Going down this continuous improvement journey, standardizing the work and making it easier, gives our staff comfort in knowing that the products they're creating are of the highest quality and will get to patients as soon as possible."

David Del Greco, production manager at our Brampton facility, helps to maintain and enhance quality at critical steps in the blood supply chain while Dr. Katerina Pavenski, head of transfusion medicine at St. Michael's Hospital in Toronto, works to ensure blood products are used in ways that deliver the best possible patient outcomes.

View their video story in our online annual report at blood.ca

Top marks from Canada's hospitals

In January 2019, we conducted an online survey to assess how Canadian Blood Services is viewed by our main customers for blood and blood products. We reached out to more than 350 hospitals and health-care centres of various sizes across Canada (except Quebec). Of the 208 institutions that responded, 98 per cent said they trust our organization to act in the best interest of the public. We maintained similarly high marks in other key performance areas, including responsible management of public funds (96 per cent), helping health systems achieve more together (95 per cent) and playing an essential role in improving patient outcomes (99 per cent).

"Our organization is completely focused on ensuring quality and minimizing risk."

Katy Bennett and her colleagues examine adverse events associated with the transfusion of blood and blood components. It's one more way we're working every day to maintain a safe, consistent and reliable blood system.

"While some patients do experience adverse reactions to transfusions, those that end up being classified as 'product-related' are extremely rare," says Katy Bennett, a medical services registered nurse with Canadian Blood Services in Ottawa. If a patient has an adverse response, such as a severe allergic reaction, and medical professionals believe it may be related to the transfused blood product, the hospital must alert Canadian Blood Services. That's where Katy's team comes in, taking quick action to investigate.

Any reported case results in the immediate quarantine of other related blood products obtained from the same donor and in their assessment for possible retrieval. This could include components in the Canadian Blood Services inventory, at the reporting hospital or at other hospitals across the country. "It means going through clinical histories, figuring out timelines, determining exactly how patients reacted," Katy explains. "It's a bit like detective work."

Built-in vigilance

If an investigation finds a link between the adverse reaction and the administered product, Katy and the rest of the medical services team will take additional steps to mitigate risk and prevent recurrences. The donor may be informed if it affects their eligibility to donate in future. The team will also work with Canadian Blood Services colleagues in quality assurance and regulatory affairs to report the event, where applicable, to Health Canada.

During the past year, we supplied nearly one million units of blood and blood products to hospitals throughout Canada. Red blood cells comprised three-quarters of total shipments (726,548 units); the rest were about evenly split between platelets (115,046 units) and plasma for transfusion (118,231 units).

Across the country, hundreds of thousands of patients annually receive blood or blood products. However, in 2018–2019, we reported only 51 adverse reactions to Health Canada — representing 0.005 per cent of all blood units distributed — many of which turned out to be unrelated to the transfusion process.

Analyzing the nuances

"We start by assessing the information received from the hospital to ensure we have all the details we need," Katy says. "One challenge is that patients who receive transfusions are often very ill, so it's not always clear whether their response is actually linked to the blood products. I'll work with the reporting facility to get more details on the nature of the reaction, how long after the transfusion it occurred — as many nuances as possible. Every story is complex, with a lot of moving parts, so this isn't always an exact science. But with the combined expertise of our medical teams and their hospital counterparts, we're able to conduct a thorough assessment and determine the best course of action to ensure the ongoing safety of the blood supply."

Of the 51 adverse events reported to Health Canada during the past year, just four were flagged as definitely related to transfusion products; another 10 were judged to be probable, while 15 were deemed possible. The rest were found to be doubtful (8) or indeterminate (2), or were ruled out entirely (12). The most common causes of adverse events during this period were definite or probable/possible allergic and anaphylactic responses. Generally speaking, suspected bacterial infections are more unusual, though they prompt an additional check of the original donation sample or a request to the hospital for additional results of tests performed on patients. Also relatively rare — albeit frequently investigated and ruled out — is transfusion-related acute lung injury (TRALI), a serious complication involving the sudden onset of pulmonary edema.

"We investigated 15 suspected cases of TRALI in the past year," Katy says, "consulting with our working group of TRALI experts. A dozen cases were ruled out, two were considered possible, and one couldn't be determined from the evidence."

Further reducing a remote risk

For any case where there is a potential connection to a transfused product, Katy and her colleagues, as noted above, immediately take action. They identify additional components linked to the donor of the unit associated with the reaction and then manage their retrieval. They may also arrange for further patient or product testing. And they investigate the donor history as well. "We can trace each event back to the specific donor of the product involved," she explains. "With patients who are treated using more than one product, or who receive pooled platelets — units containing platelets from more than one donor — we may have to investigate several donors. We check whether any donor is flagged in our records as having been associated with a previous adverse reaction. And, of course, if we feel there's any risk, we'll recommend that the donor be deferred from future donation."

In parallel with this focused investigative work, Canadian Blood Services has been collaborating with hospitals and health-care professionals to promote more effective reporting of adverse reactions. "Our organization is completely focused on ensuring quality and minimizing risk," Katy says. "So, our role in investigating reports of adverse reactions is to determine the cause, manage any risks and prevent recurrences. At the end of day, it's all about the patients and what's best for them."

New Calgary facility nears completion

Construction of our new Calgary operations facility proceeded well over the past year. After taking possession of the building in June 2019, we began the rigorous process of validating systems and equipment. Our goal is to secure all required approvals from Health Canada by the spring of 2020, then phase in logistics, production and testing through the summer and fall — at which point, production activities in Edmonton will shift to the new Calgary hub.

As the western centrepiece of our National Facilities Redevelopment Program, this advanced manufacturing facility will process about a quarter of the whole blood we collect across Canada, enabling Canadian Blood Services to achieve the highest standards for quality, service and productivity, as well as employee engagement and workplace safety. The facility is on track for gold-level LEED (Leadership in Energy and Environmental Design) certification and its rooftop solar-panel array — Calgary's largest to date — is expected to meet up to meet up to 25 per cent of electrical energy needs.

Innovation

Dr. Heyu Ni
Senior scientist

Leveraging the power of research

One of the founding principles of Canadian Blood Services is a commitment to leading and fostering research. Our Centre for Innovation focuses on three areas: discovery research; knowledge mobilization and strategic alliances; and product and process development. This last area is a priority of our strategic plan, as our researchers work with scientific and medical partners to bring products and services from the laboratory bench to patients' bedsides.

"We're combining practical research, innovative development and valuable knowledge sharing."

For **Dr. Chantale Pambrun**, director of the Centre for Innovation at Canadian Blood Services, supporting collaborative investigation is critical to ensuring the effectiveness of Canada's health systems and delivering superior patient care. We asked her to describe the centre's goals and impact.

What is the vision behind the Centre for Innovation?

Our role within Canadian Blood Services is to gain deeper insights along what we call the life-to-life continuum: the interconnected steps that lead from donors, through the various aspects of collection, production and distribution — to the patients who need our products and services to sustain and improve their lives. All of the work done by the network of researchers we support is aimed at informing and optimizing Canada's biological lifeline. We're constantly shining a light along that continuum, making sure there's not one dark spot, to support the progressive, sustainable operation of our public health-care systems.

Where does the centre focus its efforts?

We have three functional areas, all aligned to patient needs and designed to keep Canadian Blood Services at the forefront of medicine.

One area provides new insights through discovery research — work driven by investigators who are trying to answer important scientific and medical questions as they focus on transfusion practices and the potential uses of blood-forming stem cells. It's mostly the kind of research people picture when they think of scientists working in labs.

This is not just about pursuing knowledge for its own sake. Our researchers address practical challenges like ensuring that blood products are used appropriately and efficiently; optimizing quality while maintaining adequate supply; minimizing the potential adverse effects of transfusion; and improving or replacing current products with new therapies and technologies. Our teams publish their findings in peer-reviewed journals and share them directly with the health-care community to ensure that valuable insights travel quickly across our network "from bench to bedside," where new knowledge can have a positive impact on patient care.

Do you create any new products in your labs?

Yes, that's another unique functional area of the centre — product and process development. Many investigators on our diverse team are looking at ways to improve established products and the processes used to manufacture them. Others are developing superior next-generation alternatives to what's currently available.

During the past fiscal year, our development labs completed 68 production improvement projects. To give you just a couple of recent examples … One team supported the quality assessment of new processing equipment that's used to produce the more than 100,000 platelet units Canadian Blood Services distributes annually. Another project developed a better-quality control testing process to ensure that our systems were operating safely and effectively and also to make more products available for patient care.

So, these are the kinds of projects we're tackling every day. We also test new products and processes rigorously before introducing them to patients, pushing the limits within the safety of our labs to avoid any compromise of our supply chain. Similarly, before any new technology comes online, we put the equipment through its paces and tweak it for optimum performance. And we have a team working on specialized development projects at our small-scale collection and production facility in Vancouver, which focuses exclusively on research.

How is all of this work shared with the health-care community?

That's the last of our three functional areas — knowledge mobilization and strategic alliances. We support Canada's health systems and also connect with the global health-care community by building a network of people, knowledge and resources — all with the goal of translating new insights into action. We run competitive funding programs for research that address the priorities of transfusion and transplantation science and medicine. And we fund and deliver education and training programs to support professional development in the medical and scientific communities. By gathering and synthesizing the evidence-based knowledge within our networks, we're helping to shape policy, define best clinical practices and guide future research.

How many people work at the Centre for Innovation?

You may be surprised to know that we have 85 people on staff. Most work on research teams — comprised of primary investigators and their assistants and students — in our seven research and four development labs. The knowledge mobilization group is smaller, accounting for about 10 per cent of our annual budget; however, during the last year alone, more than 3,750 professionals benefited from more than 400 learning opportunities. And then we have many individuals who are part of our wider innovation community.

We invest around 30 per cent of our funding in competitive research programs; in 2018, we supported 60 investigators financially and supplied another 41 researchers with blood products allocated for research. And we also use the centre's digital channels to provide instant access to timely information — our website doubled its page views over the past year.

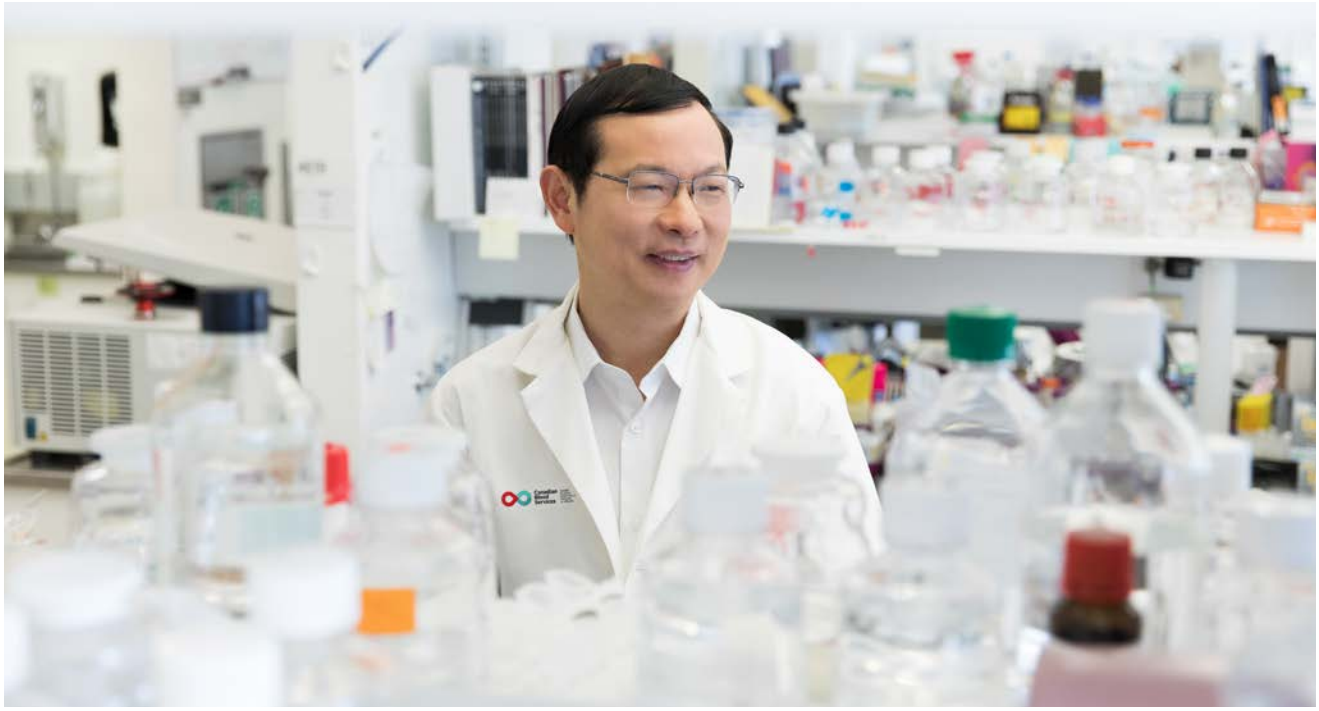
So, the ultimate goal is to maximize the centre's impact?

That's right — which, of course, reinforces the overall purpose of Canadian Blood Services: ensuring that Canada has a safe, effective and responsive system for delivering blood and related biological products to patients in need. The Centre for Innovation plays a key role internally, helping maintain the highest standards of safety and quality all along the supply chain — our life-to-life continuum. The research efforts that we guide and support also have a wider impact, helping to equip Canada's health systems with the advanced products and tools, as well as the proven practice guidelines, that are necessary to bridge current gaps and meet the needs of the future. Those needs are evolving faster than ever. And that's what brings us to work each morning, knowing that we're combining practical research, innovative development and valuable knowledge-sharing to help deliver the best possible patient care.

Sharing vital knowledge

During 2018–2019, the Centre for Innovation's network produced 246 knowledge products — including 163 peer-reviewed publications — all focused on enhancing our understanding of the products and services we provide, as well as the patient populations we serve in Canada's health systems.

"We want to create better outcomes for patients while also ensuring the best use of resources in a health system that's under pressure."



Dr. Heyu Ni, a senior scientist with Canadian Blood Services, leads breakthrough research that's pointing the way to more effective therapies and helping set new standards of treatment and care.

"When I graduated from medical school in China," recalls Dr. Heyu Ni, "I began working as a physician at a hospital, where I saw patients losing their lives to diseases. I wanted to understand why there were so many difficulties in finding cures or alternative treatments. That's the main reason I changed careers to become a medical researcher."

Today Heyu, a highly regarded immunologist and hematologist, leads a team based at the Keenan Research Centre for Biomedical Science at St. Michael's Hospital in Toronto. His studies of platelets and their role in blood clot formation have yielded breakthrough insights into the treatment of bleeding disorders, immunological diseases and thrombosis. The growing impact of his work was recognized in 2018 with a Canadian Institutes of Health Research Foundation Grant, which provides $2.4 million in funding to St. Michael's Hospital over seven years.

Three main areas of focus

As Heyu and his team investigate various aspects of platelet function, their collaborations focus on three principal areas:

Thrombosis and hemostasis diet

The natural clotting action of platelets stops bleeding in damaged vessels, but it can also critically block blood flow, leading to thrombotic events such as heart attacks and strokes. Heyu and his colleagues try to understand exactly how these events occur with the hope of developing a drug to control or prevent bleeding and thrombotic disorders. They also see opportunities to better maintain the quality of platelets during storage in a blood bank.

In 2018, they published a study in the journal *Nature Communications* that, for the first time, linked a plasma protein called ApoA-IV with platelet clotting. Their research shows that ApoA-IV blocks platelet aggregation, suggesting it could help protect against thrombotic disorders such as heart attack and stroke.

The discovery revealed an important new connection between diet and cardiovascular health that sparked media attention around the globe. Scientists already recognized that the digestion process causes increased platelet activity in the blood, heightening the chances that clots may form. Heyu's study found that ApoA-IV levels also increase, particularly during digestion of foods high in unsaturated fats.

"This is the first study linking ApoA-IV with platelets and thrombosis," Heyu says. "We've been able to show that high levels of ApoA-IV help to reduce atherosclerosis, the buildup of plaque in blood vessels. We've also found that foods, such as olive oil, can decrease platelet hyperactivity, preventing cardiovascular disease from escalating." As this groundbreaking work continues, Heyu and his team are exploring potential treatments for a range of conditions related to platelet clotting and inflammation — and, again, the potential impact on platelet quality during storage.

Immune thrombocytopenic purpura (ITP)

In patients with the bleeding disorder ITP, the immune system destroys platelets, compromising the body's ability to protect itself from injury through natural clot formation.

In the past, ITP was treated with platelet transfusions and, in some cases, removal of the spleen, which can help increase platelet levels in the blood. More recently, therapies using steroids and intravenous immune globulin (IVIg) have shown promising results. But for some patients, none of these remedies are effective.

Heyu and his colleagues probed deeper into the underlying causes of ITP. One key insight was that the destruction of platelets by certain antibodies seemed to be occurring in the liver; this has prompted further investigation by the team and others in the field. Perhaps even more significant was the discovery that many ITP patients respond well to the antiviral drug oseltamivir (better known by the brand name Tamiflu), which is used to treat and prevent influenza but also appears to inhibit a harmful immune response in ITP patients' livers.

The news that such a commonly prescribed drug could be used to treat ITP has been welcomed by health systems seeking therapies that are both effective and cost-efficient. And as Heyu points out, it promises to reduce some of the growing demand for IVIg and the resulting strain on plasma supplies: "If IVIg is not effective in treating a disorder, why use this limited resource? We should save it for other therapies."

Immune disorders in pregnant women

Another major project in Heyu's lab focuses on fetal and neonatal alloimmune thrombocytopenia (FNAIT), in which a pregnant mother's antibodies attack the platelets of her unborn or newborn child. "This can cause severe bleeding in the baby's brain and even lead to miscarriage," he says. "We're exploring both the 'why' of this rare disorder and the 'how' of potential treatment."

Although IVIg-based therapies seem to be helpful for some, Heyu and his team want concrete evidence that the treatments work, as they search for alternatives that may be even better. "Much of our research looks at patients' differing sensitivities to IVIg and tries to find alternative treatments, such as blocking a mother's antibodies from crossing the placenta," he says. "We want to create better outcomes for people with platelet disorders while also ensuring the best use of resources in a health system that's under pressure."

Sharing insights and inspiring others

Like all researchers working within the Centre for Innovation at Canadian Blood Services, Heyu is committed to knowledge mobilization. In the past year alone, he and his team published 11 peer-reviewed papers and two book chapters. Their work has also received international media attention, helping a wider audience appreciate how lab-based research translates into therapies that improve and save lives. And he travels the world, sharing his insights with peers and learning from the related work they're doing.

Above all, Heyu embraces every opportunity to educate and inspire younger researchers. A professor at the University of Toronto, he has supervised more than 120 undergraduate, graduate and postgraduate students to date. "I've trained many excellent students who are using their skills to advance medical science and patient care. This is another contribution I can make — preparing the next generation of researchers."

Engagement

Aiden Beattie
Analyst, IT Strategy and Execution, Program Management

Bringing our purpose to life

Canadian Blood Services has a clear set of strategic goals, and our success in achieving them depends on the people who work hard each day to put our purpose into action. This is why a key pillar of our strategic plan is *to create an engaging and empowering employee experience.* We know that fostering a collaborative, inclusive, values-based culture in which people feel encouraged to realize their full potential not only makes our organization stronger but also benefits the millions of patients and multiple health systems who count on our vital support.

"It's way more than a paycheque — there's a greater purpose to everything we do."

For **Tony Abed**, a senior program manager at Canadian Blood Services in Ottawa, helping to maintain and enhance a national registry that links patients on wait-lists with actual organ donors is an opportunity to make a genuine difference in people's lives.

"I look forward to coming to work every morning," says Tony Abed, "because I'm part of a great team. We know we're working toward something that's really having an impact. And when we all put our heads in the same direction, we achieve way more than we could as individuals."

Tony and his colleagues help to connect transplant patients with donors through the Canadian Transplant Registry, a platform developed by Canadian Blood Services to facilitate interprovincial organ sharing. As senior program manager, Tony draws on his background in engineering and IT project management to maintain and enhance the registry in response to constantly evolving needs. Within Canadian Blood Services, he supports the teams responsible for managing essential programs; those teams in turn work with hospitals, labs and other health-care organizations to support patients' needs. He also interacts directly with donor and recipient coordinators at organ donation organizations and transplant centres.

"We're here to help with everything from system access or password problems to adding new filters for sorting information within the database," Tony explains. "In total, we support about 600 unique users across the country — people who are working every day to match patients on waiting lists with the generous organ donors who can help them regain their health."

Unifying efforts nationwide

To ensure equitable access to organs for all Canadians, the role of Canadian Blood Services is to facilitate interprovincial organ sharing. This collaborative work relies on the Canadian Transplant Registry, a web-based data platform that currently supports three main programs:

- The Kidney Paired Donation program, which links living donors to compatible patients, often helping to create "domino chains" of multiple paired-exchange transplant surgeries coordinated by provincial health systems.

- The Highly Sensitized Patient kidney program, also a collaborative effort with our provincial partners, which finds matches for immune-sensitive patients who have a higher risk of rejecting new organs.
- The National Organ Waitlist, a real-time data source listing non-renal patients throughout Canada who are critically in need of transplants.

The Canadian Transplant Registry supports all of these initiatives, providing real-time access to data on recent activities, as well as for use in higher-level analytics and reporting. The platform gives health systems quicker, easier access to information connecting organ donors, both living and deceased, with potential recipients. More generally, the registry enables provincial programs to achieve together what can be harder to do on their own, and the result is better transplant outcomes for patients.

Doing work that matters

Moving forward, Tony and his teammates will be adding new dimensions to the platform as Canadian Blood Services helps to advance organ sharing among the provinces — focusing initially on hearts required by patients who are either hard to match or have medically urgent conditions.

For Tony, it's one more example of how Canadian Blood Services is constantly evolving to meet the needs of patients. "Most people don't realize the important role we play in organ and tissue donation and transplantation," he says. "That's why I was happy to become part of our brand ambassador program — to help get the message out about all the services we provide under one unified umbrella. These are exciting times for the organization."

Like many of his colleagues, Tony also knows firsthand why the work he does matters. A decade ago, one of his relatives received a kidney from another family member. Unfortunately, the new organ ultimately failed and the recipient has been back on dialysis for the past three years, waiting for another match. And, as Tony knows too well, even though more transplants are performed across Canada each year, the number of patients who face similar challenges remains far too high.

"I feel driven to work here," he says. "It's way more than a paycheque — there's a greater purpose to everything we do and you feel you've accomplished something at the end of the day. Plus, we have a phenomenal team, probably the best I've ever worked with. This is a busy area, but everyone works so well together you don't feel the stress. And I know we all feel proud to be doing work that has such a positive impact for Canadians."

$3.4

million for organ and tissue donation and transplantation

In 2018–2019, Canadian Blood Services received an additional $3.4 million over two years from Health Canada to support further improvement of the OTDT system. This will enable more effective matching of donors and recipients, helping to ensure that Canadians have timely access to transplant care.

Joanne Ross
Development assistant, Centre for Innovation

Janrene Savellano
Cord blood collections specialist

Everad Tilokee
Manager, research and training programs

Engaged and proud

We regularly ask Canadian Blood Services team members for their perspective on the work we do together. In 2018–2019, eight out of 10 took part in our annual survey — a record response and a high number for any organization. Two key results stand out:

- **Overall engagement is 77 per cent, up two points from 2016–2017 and our highest score ever. This key indicator of employees' emotional and intellectual connection is directly linked to superior performance and innovation.**
- **An even higher number of respondents — a record 90 per cent — say they're proud of what Canadian Blood Services does and their contribution to the organization.**

This positive feedback was echoed in our survey on the core values we identified during our brand renewal process: Integrity, Collaboration Adaptability, Respect and Excellence (I CARE). More than 90 per cent of team members say they consistently apply these values at work, noting the alignment with their own personal values.

"Everything we do is about getting the balance right — and the new conversations we're fostering around diversity in the workplace are very much a part of that."

As a founding member of the LGBTQ+ employee resource group, **Aiden Beattie** is helping to put our robust diversity and inclusion strategy into action — within Canadian Blood Services and across our stakeholder community.

"I spend a lot of my workday simplifying communications about complex issues," says Aiden Beattie, an analyst with the IT team at Canadian Blood Services. "Part of my job is to translate what can sound like technobabble into clear explanations of our technology strategy for senior executives, board members and business partners. But when it comes to talking with colleagues about my life outside work — or explaining to friends in the LGBTQ+ community how our organization sets blood donation policy — sometimes the conversations aren't so easy. Being part of the new LGBTQ+ employee resource group is helping to change that."

After nearly a decade with Canadian Blood Services, Aiden, who identifies as gay, feels that the workplace culture is generally welcoming and supportive of diversity. But there are still challenges — for instance, when he encounters people who don't realize they're making insensitive comments.

"When this occasionally happens, someone needs to point out that it's just not right to talk like that," Aiden says. Fortunately, such comments are becoming less common. But even with colleagues who are more sophisticated, discussing his personal life can nevertheless feel awkward. "If you're working with a new business unit and don't know people well, there's a discomfort to overcome in sharing that part of you — in saying something like 'I went out with my boyfriend.' Each new situation is a kind of coming out, and that takes trust. So it's validating to share stories within our new group and hear I'm not the only one who's been having these experiences."

Inclusive — inside and out

The LGBTQ+ employee resource group, which held its inaugural meeting in May 2019, is the first of several such groups that began forming at Canadian Blood Services over the past year. They reflect the robust commitment to diversity and inclusion that is a key component of our new five-year strategic plan and a cornerstone of our broader efforts to cultivate a safe, healthy and respectful workplace where all employees feel included and supported.

Internally, we're working to ensure that all employees feel equally accepted, free to express themselves and empowered to pursue rewarding opportunities. As people across the organization voluntarily self-identify with various aspects of diversity, we're gaining a deeper understanding of their unique priorities, concerns and aspirations. Over the past year, we've introduced new training programs to raise awareness about issues such as accessibility, unconscious bias and workplace harassment, and to illuminate the perspectives of specific groups — notably the LGBTQ+ communities.

At the same time, we're also directing our diversity and inclusion efforts outward to ensure that Canadian Blood Services appropriately represents our various stakeholder communities. In the fall of 2018, we hosted a session called Diverse Donor Syntegration, bringing together nearly 50 external and internal stakeholders to share insights and recommendations aimed at increasing donations from diverse communities, better meeting the needs of diverse patients and more accurately reflecting Canada's population in our donor base.

Cool heads and warm hearts

For Aiden, the employee resource group likewise spans the internal and external dimensions of diversity and inclusion. It provides support not only at work but also in his interactions with other members of the LGBTQ+ community — some of whom have been highly critical of Canadian Blood Services for our policies on blood donation eligibility for men who have sex with men (MSM). Even as the ineligibility period has been further reduced from one year to three months (see "MSM eligibility: three months"), there's still a great deal of impatience over the incremental pace of caution.

"It can sometimes be challenging for those of us with friends in the community to help people understand the logic behind the policy," Aiden says. "You can't explain all the reasons why we do what we do through small talk. But I approach those conversations with empathy, because I know when someone is angry about our MSM policy, that anger is not necessarily focused on scientific facts. It's about their accumulated experiences, the feeling that they're facing one more slammed door after already being hurt so many times. Any perceived slight can cause a lot of anger, so it's helpful to look at the big picture."

Talking to colleagues who struggle with similar conversations has helped Aiden shape a clearer response — one that's grounded in the fundamental values of our organization. "As Canadian Blood Services has renewed its sense of purpose over the past year, we've talked about balancing a cool head with a warm heart. The cool head says we've got to be rigorous on safety because people's lives depend on us getting it right every time. There's a process that needs to unfold, and in just five years, we've moved the marker significantly. At the same time, the warm heart is focused on engaging *all* Canadians who want to help patients through our work. To me, everything we do is about getting the balance right — and the new conversations we're fostering around diversity in the workplace are very much a part of that."

MSM eligibility: three months

To be eligible to give blood, men who have sex with men (MSM) have to wait for a certain period of time after their last sexual intercourse with another man. In December 2018, Canadian Blood Services and Héma-Québec formally requested that Health Canada further reduce this period from one year to three months.

This proposed change was based on scientific evidence and supported by extensive stakeholder input. The submission was approved and the new eligibility standard became effective in June 2019. Meanwhile, Canadian Blood Services and Héma-Québec, with funding from Health Canada, are supporting 15 evidenced-based research projects investigating alternative screening approaches for blood and plasma donors — the findings from which could help to further evolve MSM eligibility criteria.

65% women leaders

Gender equality is a key dimension of any commitment to diversity and inclusion — and it's an area where Canadian Blood Services is proud to be seen as a leader. In 2018–2019, 65 per cent of all people manager roles across our organization were held by women. This includes directors, associate directors, managers, assistant managers and supervisors. Overall, about three-quarters of our team members are women.

Value

Dr. Sylvain Grenier
Director, plasma protein products formulary

Our balanced approach to meeting patients' needs

Working closely with health systems across the country, Canadian Blood Services delivers value in three ways: by improving patient outcomes, by enhancing system performance and by optimizing cost-efficiency. In everything we do — every plan we create, every product and service we develop, every partnership we forge — we strive for an ideal balance among these three dimensions to best meet the expectations of our diverse stakeholders.

"We have to make sure the right products are available while also making limited dollars go further to keep the system sustainable."

For clinical pharmacist **Dr. Sylvain Grenier**, director of our plasma protein products (PPPs) formulary, managing this national program is an intricate balancing act with one guiding purpose; to ensure access to the consistent, effective, appropriate care that patients need.

You've taken on this new role at a time when the use of PPPs continues to grow dramatically. How is the Canadian Blood Services formulary evolving to keep pace?

In the past, when there were relatively few products available, the formulary focused mainly on managing supply. As new drugs were approved by the provincial and territorial (P/T) health ministries, we would list them, ensure they got to the patients who needed them and, of course, negotiate the best possible contracts.

In recent years, though, we've seen a significant increase in the number and complexity of products used to treat conditions resulting from plasma protein deficiencies, so there's a need for more clinical oversight of the formulary. Often a condition can be treated with multiple products, each with its pros and cons. For example, a product may be more beneficial for treating an illness in a subset of patients but not as effective for others. The challenge is determining which products best meet patients' needs. And because the formulary is publicly funded, we also have to make sure that any product we recommend listing in our formulary is considered from the perspectives of cost and sustainability.

How has this evolution affected day-to-day management of the formulary?

Like the provincial drug plans, we're developing a more robust product selection process that will include more patient consultation. For one thing, we're gathering more information on how products are actually used after they leave hospital blood banks; this kind of clinical insight will be vital to our decision-making. We're also introducing the concept — again, like many drug plans — of limited use, in which access to some products is restricted to those patients who will benefit the most.

Can you outline the product selection process?

The current process has two main stages. The first is a medical-scientific review, which looks at all aspects of efficacy and safety. If a product doesn't meet our standards in those areas, obviously it's not going to be listed.

A product that passes the initial evaluation moves on to a pharmacoeconomic review. This second stage is in collaboration with the Canadian Agency for Drugs and Technologies in Health (CADTH). We determine, first of all, whether any other products are currently being used to treat the same condition. If so, does the new product represent a more cost-effective alternative? It's not as simple as just saying the cheapest one wins. If a higher-priced product, for instance, requires less resources when it's administered, it may be more economical for hospitals to use — and more desirable from a patient perspective — so that has to be factored into the assessment.

If it's a brand-new product for a condition that previously had no treatment available, the pharmacoeconomic review examines the impact on patients in terms of quality of life and whether it may help them live longer. Once again, the decision to list involves balancing efficacy against cost, as with any drug in the Canadian marketplace.

As part of our continuous improvement effort, we're increasing our collaborative work with CADTH to share more of our respective expertise. We are seeking to develop a new process that also includes a critical consultative step with patients, which is similar to the process now used to evaluate drugs coming into the Canadian market for coverage by drug plans.

Once the review process is complete, how is the listing decision made?

We forward the results to the P/T health ministries, along with our assessment of patient and clinician preferences, as well as the potential impact on existing drug contracts and inventories. Officials from the various governments then confer and arrive at a decision. If a product is listed, we move quickly to get it in stock and set up distribution.

How do you arrive at pricing agreements with drug providers?

Canadian Blood Services issues requests for proposal (RFP) every few years which invite competitive bids from providers. If new categories of drugs or new therapies become available between the RFP cycles, vendors submit financial information to CADTH as part of the pharmacoeconomic review. If certain products aren't found to be cost-effective, there are opportunities for Canadian Blood Services to negotiate with providers for better pricing.

The RFP process applies to entire categories of drugs in which there are multiple products available. Efficacy and safety have been established; now we're focused on balancing patient and clinician preferences against getting the best possible price. Still, the evaluation must take other key considerations into account. For example, we look at how a product would impact patients and clinicians and how easy it is to transition between drugs. When these kinds of factors are part of the calculation, a product with a higher cost may nevertheless deliver better overall value.

So, there are a lot of moving parts to every decision and they change over time.

What determines the quantity of specific products in the formulary?

We make forecasts based on the best current data, but because there are so many variables, it can be difficult. For example, during the past year, we had a shortage of some subcutaneous Ig (SCIg) drugs, which patients can inject themselves (see Cayleigh's story on page 34). The intravenous versions of these products were available, so no patient was without Ig. But supplies were shrinking fast as demand rose much higher than predicted.

One factor affecting this situation was an increase in the number of patients receiving Ig drugs for neurological disorders. This is a promising new area of treatment, but doses are about three times higher than for patients with immune deficiency. Another issue was that many hospitals prioritize medical day-care spots for patients requiring procedures that can only be performed on site. With subcutaneous Ig, patients can administer their own treatments at home. That option isn't necessarily cheaper, but by freeing up these spots, hospitals are able treat other patients and reduce wait-times.

The reason we were able to ensure that no patients went without Ig products is because we manage a national formulary, collaborating with provincial and territorial governments, as well as patient and clinician groups. From my perspective as a practicing pharmacist, drug shortages occur on a regular basis. There are close to 2,000 shortages in Canada as we speak, and in some cases patients have to go without. It was gratifying to see that during the SCIg shortage, patient care was not interrupted, thanks to coordinated management with our providers and other key players.

How do you ensure overall security of supply?

Some of the disorders treated with PPPs affect a relatively small number of patients, so we don't have to keep a large supply on hand. And in the event of a disruption, there are typically several other multinational providers we can turn to for additional supplies. For products that we need in larger quantities, we'll consider having contracts with more than one provider, but we have to weigh that against the advantage of being able to negotiate a lower unit cost from a single vendor. Also, if we do stock two similar drugs, there's still the challenge of predicting whether one may turn out to be preferred by more patients or their doctors.

So all these factors make it hard to predict the future. It isn't just a matter of doing a cost comparison between two options. Increasingly, the P/T health systems are considering the medical, scientific, economic and social aspects in a more holistic analysis.

What role do patients play in managing the formulary?

Clearly patients understand better than anyone what it's like to live with their conditions, so what they feel is important must be seriously considered in our decision-making. We're incorporating more patient consultations into the product selection process. And in our RFP evaluations, representatives of patient groups have a place at the table alongside physicians, health-care leaders and our own medical, financial and supply chain experts.

Moving forward, we expect the formulary will have even more input from patients and other stakeholders. As demand for PPPs continues to grow, we have to ensure that the right products are available while also making limited dollars go further and keeping the system sustainable. It's a big challenge and one that we'll only meet if we're all working together:

As part of our continuous improvement effort, we're increasing our collaborative work with CADTH (Canadian Agency for Drugs and Technologies in Health) to share more of our respective expertise.

"My job isn't just about working with numbers — it's about helping improve the system."

For analyst **Shane Smith**, ensuring better patient outcomes starts with measuring and analyzing performance at every step in the Canadian Blood Services supply chain.

"I tend to get stereotyped as a data guy," says Shane Smith, "but I don't just spend my days looking at spreadsheets. I provide information from our system data to help move along initiatives that are tightening up processes and allowing the whole supply chain to operate at a higher level. A key goal is to reduce 'waste' — our term for blood and blood products that don't reach the patients who need them. And one area where we focus a lot of attention is the number of blood units that, for various reasons, have to be discarded along the way."

A certain amount of product loss is expected in any biological manufacturing environment; zero waste is simply unachievable. However, when Shane joined the newly formed supply chain process management team in 2014, the discard rate had been rising for several years — not dramatically but enough to cause concern. One of the team's first tasks was to analyze the underlying reasons why and then propose concrete actions to bring the rate down. A key area of initial focus was the donation process.

Getting the most out of every donation

"Sometimes there are problems during collection, as we're getting blood from a donor's arm into a bag," Shane explains. "Some bags can end up underweight, with little or no usable blood in them. Or they may be what we call 'low-weight,' containing insufficient red blood cells but maybe some usable plasma. Underweight and low-weight bags represent the single biggest contributor to the discard rate. When we started looking into the issue, they accounted for half of all discards — 4.1 per cent within an overall discard rate of 8.2 per cent in 2013–2014."

To address this challenge, Canadian Blood Services began by focusing on the phlebotomy practices by which blood is collected from donors. Teams worked closely with donor centre staff to identify best practices and training protocols in blood collection and, where warranted, arranged for additional training. Phlebotomists were also given a new tool that makes it easier to find donors' veins. A missed vein or partial insertion can make it difficult to ensure the blood bag will be filled to the required level. It can also lead to an unpleasant donation experience, discouraging some donors from returning in the future and compounding the negative impact on collection yields.

"This initiative has really helped us reduce the discard rate," Shane says. "In 2018–2019, underweight and low-weight discards were down a full percentage point compared to five years earlier. That's nearly 8,000 more units of whole blood available to the health system each year."

Securing every link in the chain

There are many other reasons why a unit of blood may have to be discarded as it proceeds along the supply chain from collection, initial storage and transport; through testing, production and warehousing at a Canadian Blood Services facility; and delivery via our distribution network to a hospital blood bank. Among the chief contributing factors:

- When blood held in inventory has reached its maximum storage time of 42 days and must be removed from production. Our inventory planning team works with regional sites to judiciously move blood around the country. Following improvements to this process, the number of discards due to expiration has been cut by more than half in recent years.
- Production discards resulting from issues such as incomplete filtering or hemolyzed components (when red cells have ruptured, releasing their contents into the surrounding plasma). Process management and field staff have closely examined production steps, aiming to minimize these kinds of losses. As a result, the production discard rate fell to about 1.5 per cent in 2018–2019 from more than 2 per cent five years earlier.
- Logistics-related and other miscellaneous discards, often caused by exceptional events, which can result in a batch of units being lost. This is more likely to occur during extreme weather or when temperatures fluctuate beyond acceptable parameters, typically because of refrigeration equipment problems at donor centres or in transport trucks. Regions monitor these events and respond accordingly by investigating issues and providing additional training to minimize future events.

Steadily improving the system

"Anytime a unit must be discarded, it's not just about the unfortunate loss of blood," Shane says. "There's also the loss of donors' valuable time, plus the cost in terms of our operations, which is ultimately paid by the people of Canada. So we're highly motivated to keep pushing that discard rate down to meet our own productivity targets and, more importantly, to ensure that the blood system is performing well for both patients and donors."

The total number of discards has fallen steadily as the work of the process management team continues to gain traction. The adjusted rate for 2018–2019 was 6.1 per cent, down from a high of 8.2 per cent five years earlier. While this is good progress, representing annual savings of about $2.5 million, Shane and his teammates remain focused on finding further opportunities for improvement. And they're gratified to see that their work is helping colleagues across the organization do the same.

"More people are asking to access the key metrics and other information we're gathering," Shane says, "so they can direct that knowledge toward activities in their regions or at particular donor centres and production facilities. Change is happening, thanks to the everyday work and commitment of local supply chain teams. That's how we'll keep reducing the discard rate and keep more blood in the system — if everyone's committed to working more effectively, finding ways to improve performance, introducing extra training where necessary, and generally taking what we've been doing and driving it locally."

It's this sense of shared purpose that Shane finds most rewarding about his role at Canadian Blood Services. "I've worked in other areas of health care, but this place is more aligned with my personal values. My job isn't just about working with numbers; it's about helping improve the system. I feel I have more of a direct impact on patients' lives."

Measuring our quality mindset

In March 2019, we launched a quality mindset survey at Canadian Blood Services to gauge team members' awareness of the key drivers of a quality-focused culture. We asked for feedback on people's sense of ownership in the quality management process, as well their perspectives on the involvement of peers and the impact of leaders' guidance and messaging. Overall, the responses placed us in the top 20 per cent of companies that have conducted the survey, and in the same position compared to our peers in the pharmaceutical sector. Learning that we rank in the top fifth among organizations striving to instill a quality mindset is gratifying. It also puts a concrete metric against our efforts to do even better, as our continuous improvement journey continues.

Tomorrow

Cayleigh Kearns
Plasma protein product recipient

Helping create a healthier future for Canadians

Among the challenges that define the future of Canada's health systems, one of the most critical will be ensuring plasma sufficiency. This is a core responsibility of Canadian Blood Services and a pillar of our strategic plan. As the medical applications of immune globulin (Ig) continue to grow, we're seeing a steady rise in the volume of plasma needed to manufacture Ig drugs. In taking concrete steps to safeguard Canada's plasma supply, we're working with prescribers, patient groups and health ministries on a coordinated response to this global challenge.

"I'm proud to be part of creating the first dedicated donor centres in support of our national plasma strategy."

For **Ishneet Singh**, ensuring a secure supply of plasma for patients who depend on immune globulin (Ig) is not an abstract challenge — it's the job she tackles every day.

"The declining plasma supply has been on our radar for a long time," says Ishneet Singh. "Right now, Canada's sufficiency level is 13.5 per cent. This means that only 13.5 per cent of Canada's need for Ig products is being met with Ig made by manufacturers of pharmaceutical products for Canadian Blood Services from plasma collected by us from volunteer donors in Canada. We meet the rest of the country's Ig needs (85 per cent) by purchasing Ig drugs on the global market. These drugs are made largely by pharmaceutical companies from plasma they collect from paid donors in the U.S. We know we must increase Canada's sufficiency level by collecting more plasma in Canada and reducing our reliance on the U.S market."

In March 2019, after extensive consultations with Canadian Blood Services provincial and territorial health ministries approved a proof-of-concept program establishing three stand-alone plasma collection sites that will serve as models for a Canada-wide solution. It was a vital step forward after many months of analysis and planning. Now work is well underway to get donor centres up and running in Sudbury, Ontario; Lethbridge, Alberta; and Kelowna, British Columbia — three geographically diverse communities that met our rigorous selection criteria.

The 360-degree view

As the team's project coordinator, Ishneet helps to organize and advance every aspect of the complex initiative — identifying optimum locations based on current donation patterns; evaluating staffing needs; identifying more efficient processes; developing donor recruitment plans for each potential catchment area; and the list goes on. Then there are the countless practical details of negotiating leases, arranging IT and other infrastructure, and working with designers to create environments that are both efficient and welcoming.

"We face a lot of tight deadlines and logistical challenges," Ishneet says, "along with the inevitable curveballs you get with any program. Plus, there are people collaborating from many different areas of the organization. This is what keeps my job exciting. You can never focus on just one item. You have to constantly be getting a 360-degree view."

Applying lessons learned

Ishneet benefits from her previous experience working on the Large-Volume Source Plasma Project, which introduced source plasma donation at mixed-collections sites in London, Ontario, and Calgary, Alberta — and yielded about 37 per cent more plasma per donor visit. By the end of the fiscal year, more than 2,000 litres of additional source plasma had been collected at the two sites for fractionation into Ig and other plasma protein products. It was a modest but important step in leveraging our current network of donor centres to optimize plasma collection.

Armed with key insights from this project, the plasma operations team is consulting with industry experts and other blood operators, including Héma-Québec and the national services in countries such as Australia and the Netherlands. These discussions will help guide development of our dedicated plasma donor centres and identify best practices for achieving operational efficiency and effective donor engagement.

Protecting against risk

The initial proof-of-concept site is slated to open in the summer of 2020. To make that goal a reality, the team remains intently focused on the task at hand — and on an urgent health-care challenge that touches all Canadians. For Ishneet, this shared commitment is reinforced by a strong personal motivation. When her daughter was diagnosed a few years ago with Kawasaki disease, an inflammatory illness that affects young children, the risk of more severe complications was successfully averted with an Ig drug.

Ishneet points to the value of a similar intervention at the system level: "By taking steps now to secure Canada's future plasma sufficiency, we'll reduce the risk to our supply chain and ultimately protect the health of patients. That's why I'm proud to be part of creating the first dedicated donor centres in support of our national plasma strategy."

13.5%

plasma sufficiency

Demand for immune globulin (Ig), a life-saving medicine derived from blood plasma, has been growing rapidly around the world. Over the past decade, usage of Ig in Canada has more than doubled — to the point where only 13.5 per cent of the plasma currently required for our Ig needs is collected from Canadian donors. Ensuring a secure domestic plasma supply is a key.

“I don’t have to worry about being sick all the time.”

Thanks to an advanced immune globulin (Ig) drug, **Cayleigh Kearns** is able to attend college and pursue a career. Her story shows the power of plasma-derived therapies to change lives — and puts a human face on the rising demand that challenges health systems worldwide.

“Growing up, I was always getting infections,” Cayleigh Kearns says. “Kidney, sinus, respiratory — I had pneumonia every few months. Then when I was 18, my pediatrician did some tests and found my immune levels were basically rock bottom. So I went to an immunologist, who diagnosed me with common variable immune deficiency, or CVID. I’d known something was up, but I was still shocked. This was not a one-time thing — it’s forever.”

In addition to being highly susceptible to many kinds of infections, people with CVID have an increased risk of developing chronic diseases of the lungs and other organs, as well as certain types of cancer. For Cayleigh, who lives with her parents in London, Ontario, that daunting outlook is only magnified by the immediate impact of frequently being too ill to get out of bed. Her high school marks had suffered, she’d missed out on many aspects of teenage life, and her regimen of antibiotics and steroids caused unwelcome side effects. So, naturally she was relieved when her doctors told her about recently developed Ig drugs that had proven effective in treating patients with CVID.

Unfortunately, the first two drugs Cayleigh tried brought their own physical challenges, including painful inflammation and severe digestive problems. But in early 2019 she switched to a new product that has so far shown promising results. And the advantage of all these drugs is that she can administer them herself through subcutaneous infusion.

“A nurse practitioner came to our house and taught me how to self-inject,” Cayleigh recalls. “At first I was so nervous — my blood pressure went up to something like 190 over 120. But I’ve gotten used to doing it: two pokes, twice a week. I still have moments when I don’t want to do it anymore. But then I see how much more energy I have, going to school or just playing with my little nephews, and I realize what an amazing difference it’s made. I’m so grateful to all the people who donate plasma to help me live a healthy life.”

Systems under pressure

Stories like Cayleigh's unfold in a challenging health-care environment. On the one hand, advances in medical research are yielding targeted, highly effective treatments for a wide range of diseases. At the same time, health systems must balance a commitment to help as many patients as possible with the need to establish priorities within finite budgets that are often stretched to the limit.

As demand for Ig drugs steadily rises — fuelling efforts to ensure Canada's plasma sufficiency — the use of subcutaneous Ig drugs is expanding even more dramatically than forecast, putting added stress on supply and pushing up prices. Adding to the pressure, many of these drugs are more expensive to produce, and in some cases, self-injection requires larger doses, further increasing costs. On the other hand, when patients can administer drugs at home, they avoid costly and time-consuming hospital visits.

In short, gauging where to invest within a constant array of promising new Ig drugs is one of the most complex global health challenges of the next decade and beyond. To help meet it, Canadian Blood Services will continue collaborating with clinicians and patient groups to better understand what drives demand and ensure that no patient goes without therapy — while also working with health-system leaders to set responsible and sustainable goals.

"The best I've ever been"

For Cayleigh, one priority is clear: "There must be greater awareness among doctors and the general public about the increased need for plasma products. If more of us who rely on these drugs get out there and tell our stories, hopefully more people will want to donate."

Meanwhile, the 20-year-old has taken advantage of better health to pursue a college diploma in child and youth care. She's earning top marks and has started her first placement in an elementary school, helping children with emotional and physical needs.

"I still get sick more often than a 'normal' person," Cayleigh says, "but this is definitely the best I've ever been. Without these drugs, I would probably die from a severe infection within the next 10 years. So I'm thankful to have a life. And I'm definitely up to the task of working with kids now that I don't have to worry about being sick all the time."

368

million units provided for patient care

Patients who depend on immune globulin and other plasma protein products (PPPs) receive them from the national formulary managed by Canadian Blood Services. We bulk-purchase products on behalf of the provincial and territorial health systems and distribute them to more than 460 hospitals and health-care centres across Canada. We also monitor medical and scientific advances, as well as industry trends, so we can make informed recommendations to health ministries on the optimal product mix for the formulary. In 2018–2019, we distributed more than 368 million units of PPPs for the treatment and care of Canadian patients.

A message from our chair

On behalf of the board of directors of Canadian Blood Services, I am pleased to present this 2018–2019 annual report to Canadians.

It was a year marked by significant achievements, both within our organization and across the many dimensions of Canadian health care where we have an impact. What our various programs and initiatives share in common is a fundamental concern for patients –the people who depend on our products and services to sustain and improve their lives. Ensuring their health and wellness is the ultimate goal of everything we do.

This commitment to enabling better patient outcomes is a cornerstone of *Keeping the Promise*, our 2019–2024 strategic plan, which we shared with Canadians during the past year. It is the product of extensive consultations with many of our stakeholders, as well as in-depth research into the forces and trends that will shape our operating environment in the years ahead. The board was closely engaged in the development of this strategic framework, collaborating with senior management to identify key goals and the priorities we must pursue to reach them. With a comprehensive new strategy in place, we believe that Canadian Blood Services is well positioned to address emerging health-care challenges while remaining responsive to patients' needs and expectations.

Implementing our plasma strategy

A crucial area of focus for the next five years and beyond is ensuring a secure supply of Canadian plasma for patients who depend on immune globulin (Ig) and other plasma-derived products. The potential for shortages and dramatic price increases driven by rising global demand presents a significant risk to Canada's health systems.

As a first step in addressing this, in 2019 we negotiated an agreement with the provincial and territorial governments that provides funding for three proof-of-concept plasma donor centres. Operating within our voluntary, non-remunerated donation model, these initial sites will pave the way for a national collection network designed to increase domestic capacity and reduce our dependence on U.S. plasma providers, who are struggling to keep up with demand. This is a vital step forward for Canadian patients.

Responding to the needs of donors

Another focus of our five-year strategy is to deepen relationships with donors, building engagement while reinforcing our commitment to diversity and inclusion. Whether we're reaching out to recent immigrants or Indigenous peoples, or to refugees with unique health challenges or to ethnic communities that are under-represented in our stem cell registry, we work to strengthen trust by being sensitive to differences in values, expectations and points of view.

One area of donor engagement where we saw progress during the past year was the ongoing discussion around blood donation eligibility for men who have sex with men (MSM). In May 2019 we announced that Health Canada had approved our request to reduce the waiting period for MSM donors from one year to three months.

It is important to see this latest adjustment of a sometimes-controversial policy in its larger context. To meet Canadian patients' transfusion and transplantation needs, we depend first and foremost on people who generously give blood. And because there is significant annual turnover in the pool of donors, we try as much as possible to keep restrictions to a minimum. However, our number 1 priority remains ensuring the safety of the blood supply. Therefore, any proposed revision of eligibility criteria – whether in dialogue with MSM blood donors or, more recently, with the transgender and nonbinary-gender communities or, indeed, with any potential donors – must be supported by rigorous scientific evidence. It also must be acceptable to groups representing patients who rely on blood and blood products. And it must meet the regulatory requirements of Health Canada.

A message from our chair

This latest change in MSM eligibility, having met those three tests, is the next available step in the evolution of our donation criteria. It will not be the last.

As Canada's population grows and changes, our systems and practices will keep on evolving to ensure that all Canadians can be potential beneficiaries of our work. By the same token, we know that every Canadian is also a potential contributor. That side of the equation may not be as widely appreciated, perhaps because the blood system, like many successful systems, tends to be taken for granted. But paradoxically, to maintain that success, we must regularly remind Canadians of the vital role they play — as donors, registrants and volunteers — in making our work possible.

Honouring our founding principles

Canadian Blood Services has a clearly defined vision: *To help every patient, to match every need, to serve every Canadian.* This simple statement of purpose was an outcome of our brand-renewal initiative, another noteworthy achievement of the past year. As Graham Sher, our chief executive officer, underlines in his message in this annual report, a brand is far more than a logo. It is the distillation of who we are, the values we embrace and the goals we are working to achieve on behalf of Canadians. The rebrand project was an opportunity to remind stakeholders of our leadership in maintaining "Canada's lifeline," and to highlight the fact that our scope of responsibility has evolved beyond whole blood collection to encompass plasma, stem cells, and organs and tissues.

The Canadian Blood Services brand has been revitalized, but it rests on the bedrock that has supported our organization for more than 20 years: the principles outlined by Justice Horace Krever, whose Royal Commission of Inquiry on the Blood System in Canada led to our founding. Those guiding principles were restated in the memorandum of understanding and ministerial guidelines we have operated under since 1998. And now they have been updated in a new National Accountability Agreement, which formally establishes the governance framework for Canadian Blood Services and the provincial and territorial governments that fund our operations. We expect that the draft agreement, having been approved by all parties, will be formally adopted in the coming year.

The key achievements I have touched on here are described in greater detail in the annual report, along with many other initiatives of 2018–2019. The progress we are seeing on multiple fronts is a testament to the continued strong leadership of the executive team and to the talent and dedication of Canadian Blood Services employees, who work every day to translate strategy into action. As board members and as Canadians, we are proud to be part of this collaborative effort, helping to ensure that health systems across the country receive safe, effective products and services – and that patients receive the best possible treatment and care.

Mel Cappe
Chair, Board of Directors

A message from our chief executive officer

In 2018–2019, Canadian Blood Services achieved two significant milestones that helped frame our activities throughout the year and more clearly defined our path forward.

The first was the renewal of our corporate brand. On September 28, 2018, after months of collaborative effort across the organization, we hosted a webcast event at our Ottawa headquarters and eight other locations nationwide. Donors, recipients, volunteers and employees shared their personal perspectives on the sense of purpose embodied in our reinvented brand — how our refreshed vision, mission and values help to strengthen the infinite connections by which we're meeting the needs of Canadian patients for blood, plasma, stem cells, and organs and tissues.

In subsequent marketing and communications campaigns, we've showcased our redesigned logo and a new tagline: *Together, we are Canada's lifeline*. The response from Canadians has been emphatically positive. But our brand is far more than a logo and a tagline. It's what sets us apart. It's an expression of who we are and what we believe in, as individuals and as an organization. And it signals how we'll work with our diverse community of partners and stakeholders to deliver on our promise to Canadians.

Sharing our five-year strategy

The other key milestone of the past year was the publication of *Keeping the Promise: 2019–2024 Strategic Plan.* Building on the foundation of our existing strategy, this roadmap for the future sets out operational priorities in five areas:

- Meet changing patient needs by providing lifesaving products and services.
- Build and deepen relationships with the donors of the future.
- Ensure a secure supply of Canadian plasma for immune globulin (Ig).
- Create an engaging and empowering employee experience.
- Achieve organizational excellence.

Guided by this strategic framework and the sense of purpose captured in our brand, Canadian Blood Services is more focused than ever, as the theme of this year's annual report suggests, on the decisions and actions we must take every day to turn our promise into reality.

Exceeding performance targets

Those efforts are yielding tangible results. In 2018–2019, we exceeded our target for whole blood collection, which enabled us to maintain robust inventories while responding promptly and effectively to hospitals' evolving needs. We also achieved productivity metrics above the annual indicators established for donor recruitment, blood testing and production. And not coincidentally, we saw our survey scores for both employee engagement and public trust — which have always been consistently strong — rise to the highest levels in our history.

Ensuring Canada's plasma sufficiency

In sharpening our focus on securing Canada's plasma supply, we were pleased to receive, in March 2019, approval from provincial and territorial governments for three stand-alone, proof-of-concept plasma sites. With these sites, we aim to ensure our plasma collections can be cost-effective and sustainable, as we begin to grow Canada's plasma sufficiency to meet the needs of Canadian patients into the future. As this report goes to press, development is proceeding on sites in three communities that match our selection criteria and provide necessary geographic diversity — Sudbury, Ontario; Lethbridge, Alberta; and Kelowna, British Columbia. The first site is scheduled to open in the summer 2020.

A message from our chief executive officer

We were pleased to receive a green light for this program, which takes advantage of our deep blood donation expertise and existing infrastructure. However, as the use of (Ig) therapies continues to rise, Canada's plasma sufficiency is now estimated at less than 13.5 per cent. If current trends continue, it will fall below 10 per cent within the next five years, leaving more than 90 per cent of Canadians who require Ig drugs totally dependent on plasma supplied from other countries. Meanwhile, growing demand will increase pressure on prices worldwide and, in some cases, availability could be threatened.

With work well underway on our initial three donor centres, we're now taking the critical first steps toward increasing Canada's domestic plasma supply. But to raise the sufficiency level while appropriately balancing risk and cost, all stakeholders recognize that there's much more work to be done. As we make clear in our strategic plan, increasing our capacity to collect more plasma as well as our ability to recruit more plasma donors are top priorities for the next five years and beyond.

Balancing stakeholders' expectations

Another vital aspect of the role Canadian Blood Services plays in this area is our management of the national formulary for plasma protein products (PPPs). In 2018–2019, Canada's health systems invested nearly $700 million to provide these drugs to patients with a variety of immune disorders, bleeding disorders and other diseases requiring plasma protein replacement therapy. We've used our leverage as a major bulk purchaser to negotiate multi-year contracts with PPP providers, yielding significant cost savings and avoidance since 2014.

However, as clinicians continue to find new applications for existing products — and as researchers discover additional, highly specialized Ig therapies for a wide range of conditions — rising demand is outpacing both the rigorous forecasts prepared by our formulary and the budget projections of provincial and territorial health ministries.

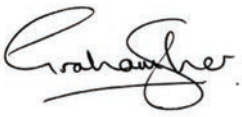
We're responding to this challenge by conducting, in partnership with the Canadian Agency for Drugs and Technologies in Health (CADTH), a thorough reassessment of the product selection process for PPPs. As detailed in this annual report, we want a new process that looks at the complete scientific, medical, social and economic factors that must be weighed in all decision-making, including, crucially, the preferences and concerns of patients.

This is an important initiative and we've made good progress. But it's not work that can be localized within the purview of the PPP formulary. Our insights must inform a larger conversation about how we can balance the needs of stakeholders with the realities of prudent fiscal management. This is the challenge being tackled by health ministries and public drug plans around the world, which includes Canada's federal government as it explores the possibility of national pharmacare.

Meeting tomorrow's needs — every day

Managing diverse expectations, finding opportunities to continuously improve, meeting new and often disruptive challenges — this is what the employees and stakeholders of Canadian Blood Services are doing every day. The stories in this report highlight our collective efforts to help patients live longer, healthier lives; to continuously improve the quality of products and services; to transform the donor experience in a world reshaped by technology; to share breakthrough research and leading clinical practices; and to strengthen employee engagement by fostering a dynamic, inclusive and mutually supportive culture.

As our brand renewal and strategy initiatives show, Canadian Blood Services is constantly modernizing in response to an environment that never stops changing. After more than 20 years, our organization has matured to the point where we're able to execute against today's most pressing priorities while at the same time innovating to meet the needs of tomorrow. And we're doing it every day.



Dr. Graham D. Sher
Chief Executive Office

Management analysis

This management analysis outlines Canadian Blood Services' financial results for the year ended March 31, 2019. It should be read in conjunction with Canadian Blood Services' audited consolidated financial statements and accompanying notes for the year ended March 31, 2019. The financial statements have been prepared in accordance with Canadian accounting standards for not-for-profit organizations. This management analysis should also be read together with the complete annual report, which provides context on the programs and operations of Canadian Blood Services. The information in this analysis is current to June 21, 2019, unless otherwise indicated.

Readers are cautioned that this management analysis includes forward-looking information and statements. By their nature, forward-looking statements require management to make assumptions and are subject to important known and unknown risks and uncertainties that may cause actual results to differ materially from those disclosed here. Although we consider our assumptions to be reasonable and appropriate, on the basis of current information, actual results may vary from those predicted in the forward-looking information and statements.

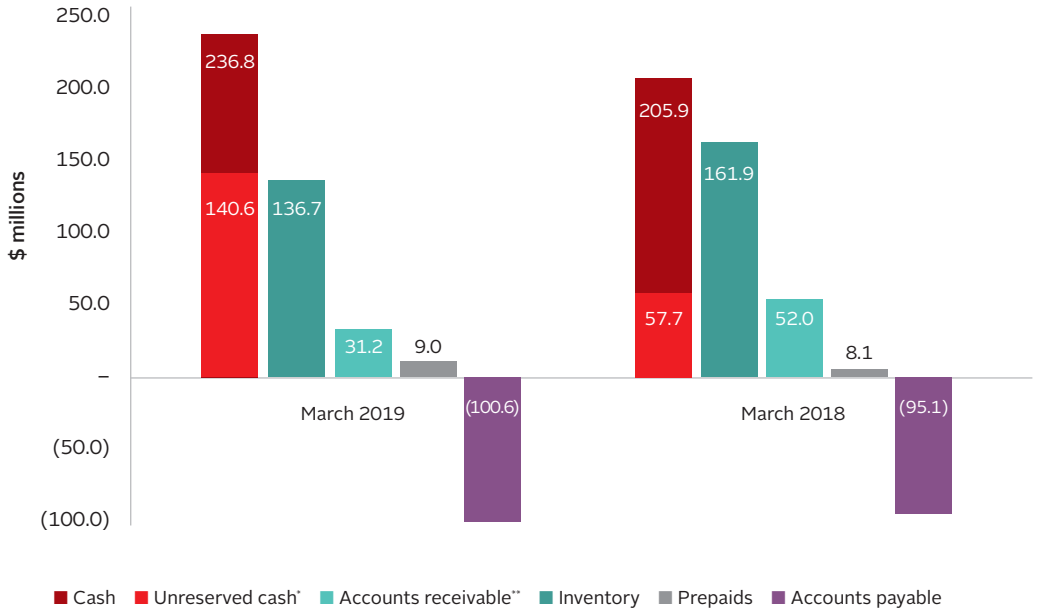
Our blood, plasma, stem cells, and organs and tissues programs are block funded by the participating provinces and territories, whereas our procurement and distribution of plasma protein products to hospitals and the diagnostic services we offer health systems are funded on the basis of products issued and services rendered.

We receive federal funding for our role in organ and tissue donation and transplantation (OTDT), which includes management of national registries for interprovincial organ sharing, development of leading national practices, and professional education, public awareness and system performance activities. Federal funding also supports research and development activities aimed at improving patient outcomes and the health and safety of donors. For both OTDT and research and development activities, the federal funding we receive complements funding received for related activities from the provincial and territorial members.

ANALYSIS OF FINANCIAL RESULTS – FINANCIAL POSITION

Current assets and liabilities

The following chart provides a summary of the most significant current assets and current liabilities as at March 31, 2019, and March 31, 2018.



*Unreserved cash represents cash ($236.8 million at March 31, 2019; $205.9 million at March 31, 2018) less internally reserved cash balances relating to certain deferrals reserved for future expenses ($56.8 million at March 31, 2019; $93.7 million at March 31, 2018), other retirement and post-employment benefit liabilities ($39.4 million at March 31, 2019; $40.5 million at March 31, 2018) and bank indebtedness (nil at March 31, 2019; $14 million at March 31, 2018).

**Accounts receivable represents members' contributions receivable ($19.6 million at March 31, 2019; $33.7 million at March 31, 2018) and other amounts receivable ($11.6 million at March 31, 2019; $18.3 million at March 31, 2018).

The provincial and territorial ministers of health (except the health minister of Quebec) serve as members of the corporation under the *Canada Not-for-profit Corporations Act.* Canadian Blood Services' liquidity is largely influenced by the timing of receipt of funds from members, the volume of inventory held, fluctuations in foreign exchange, the demand for plasma protein products, the amount of deferred contributions and the number of large capital-intensive projects, such as those included in the National Facilities Redevelopment Program (NFRP). As the operator of a national system, Canadian Blood Services is also exposed to varying payment terms on balances owed to and owed by the organization within each jurisdiction.

Cash has increased by $30.9 million to $236.8 million at March 31, 2019, whereas unreserved cash increased by $82.9 million to $140.6 million. For both total cash and unreserved cash, $17.5 million of the increase relates to an increase in advances received by members, which are included in deferred contributions. The unreserved cash represents cash available for day-to-day operations and excludes cash reserved for specific future purposes and projects. The number of days of unreserved cash on hand was 42.8 days at March 31, 2019, which represents a substantial improvement from 16.8 days at March 31, 2018.

Accounts receivables decreased by $20.9 million to $31.2 million, mainly driven by a decrease in members' contributions receivable. The province of Ontario's contribution receivable, representing 96 per cent of the balance, was substantially improved from March 31, 2018.

Inventory decreased by $25.2 million to $136.7 million, mainly because of a $29.6 million reduction in plasma protein products inventory, which was partly offset by an increase of $5.3 million in fresh blood inventory, reflecting strong collections at the end of 2018–2019. The reduction in plasma protein products inventory reflects lower volumes, a lower cost per unit and a lower foreign exchange rate (approximately 1.25 in 2018–2019 compared with 1.33 in 2017–2018). The lower cost per unit is attributable to positive negotiations resulting in new contracts executed at the beginning of 2018–2019. The new contracts have achieved brand diversity and product choices while driving an estimated $455 million in cumulative cost reduction and cost avoidance over their three-year term, from April 1, 2018, to March 31, 2021. Weeks on hand inventory has decreased to 6.9 weeks at March 31, 2019, from 8.1 weeks at March 31, 2018. This decrease is a result of final product transition activities under the new contracts. Weeks on hand inventory continues to normalize now that the first year of product transition activities has been completed.

Captive insurance program — investments and provision for future claims

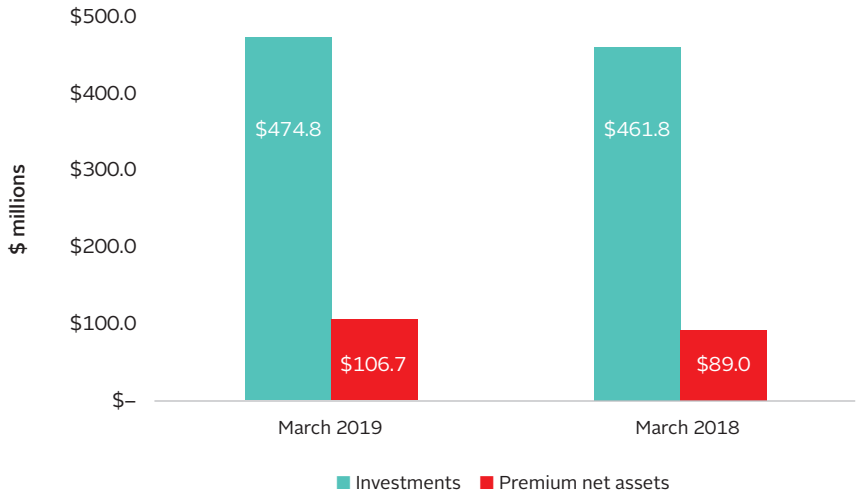
Canadian Blood Services has two wholly owned captive insurance corporations: CBS Insurance Company Limited (CBSI) and Canadian Blood Services Captive Insurance Company Limited (CBSE). Together, these captive insurance companies provide Canadian Blood Services with comprehensive blood risk insurance covering losses up to $1.0 billion. The primary policy held by CBSI has provided coverage up to $250.0 million, with the secondary policy held by CBSE providing coverage up to $750.0 million. Effective April 1, 2019, the primary policy coverage was increased to $300.0 million, with a corresponding reduction in the secondary policy to $700.0 million. The policy held by CBSI is fully funded through investment assets, whereas the policy held by CBSE is covered by an indemnification from the provincial and territorial governments (except Quebec). CBSI also provides coverage to Canadian Blood Services for transit risks, consequential loss to blood inventory, certain contingent risks in the event of an emergency event related to the safety of the blood supply, and cyber damage and expense.

The investments have increased by $13.1 million over the previous year, which can be attributed to a return on investment of 2.8 per cent. Net income earned on investments restricted for captive insurance was $12.4 million for 2018–2019, compared with $14.8 million for 2017–2018, because of a downturn in the market during the third quarter. The change in fair value of investments measured at fair value was $1.0 million for 2018–2019, compared with $6.9 million for 2017–2018.

Captive investments

CBSI tracks premium net assets, which is the asset balance remaining after the deduction of reserves for the blood risk liability policy, the contingent risk indemnification policy, the stock throughput policy, the cyber damage and expense policy, the statutory reserve and the market volatility reserve. At March 31, 2019, the premium net assets amounted to $106.7[1] million ($89.0 million at March 31, 2018).

Canadian Blood Services records a reserve for the estimated future catastrophic and normal blood liability exposure for CBSI. At March 31, 2019, the provision for future claims was $250.0 million ($250.0 million at March 31, 2018). Effective April 1, 2019, the primary policy coverage was increased to $300.0 million, which will result in a $50 million increase in the provision for future claims and a $57.5 million reduction in the premium net assets. The $57.5 million decrease in the premium net assets reflects the $50 million increase in the primary policy coverage which in turn resulted in a $7.5 million increase in the statutory reserve.[1]



Capital assets

Capital and intangible assets increased by $34.0 million to $281.4 million, mainly because of capital additions of $54.3 million, which were partially offset by depreciation and amortization of $20.0 million. The most significant capital additions were related to construction of the new Calgary operations building (as part of the NFRP) for $35.5 million, the information technology (IT) data centre for $5.6 million, production equipment for $3.2 million and investment in our vehicle fleet for $1.6 million.

The new Calgary operations facility.

[1] Premium net assets comprise net current assets (primarily investments) held by CBSI, measured in accordance with International Financial Reporting Standards ($484.5 million at March 31, 2019), less the aggregate limits of insurance policies held by CBSI ($290.0 million at March 31, 2019) less statutory reserve ($37.5 million at March 31, 2019) and market volatility reserve ($50.3 million at March 31, 2019). The statutory reserve is calculated at 15 per cent of the aggregate limits of the insurance policies, and the market volatility reserve is determined in consultation with a third-party investment advisor.

Employee future benefits

Canadian Blood Services sponsors two defined benefit pension plans, one for employees and the other for executive employees. We also maintain a defined contribution pension plan and provide other non-pension post-retirement and post-employment benefits to eligible employees. The board of directors, the pension board of trustees, the pension advisory committees, and the finance and audit committee of the board are responsible for governance of the pension plans.

Canadian Blood Services' independent actuary calculates each defined benefit plans' net position for accounting purposes as at March 31 of each year. The net position fluctuates annually due to a combination of variables, including the discount rate, inflation rate, expected average rate of salary increases, expected average remaining life expectancies, returns on plan assets and contributions. The $8.7 million increase in the net liability for employee future benefits, to $92.7 million, was the result of an increase in the pension plan liability of $9.7 million, partially offset by a decrease in the post-employment and post-retirement liability of $1.0 million. The pension liability increased primarily because of a decrease of 30 basis points in the discount rate. The post-employment and post-retirement liability decreased because of a reduction in the long-term disability cost assumption, partially offset by a decrease in the discount rate.

Our independent actuary reviews the funded position of the defined benefit pension plans to inform the board of directors, pension board of trustees, the pension advisory committees, and the finance and audit committee of the board of how these plans are performing. Funding valuations for the defined benefit pension plan for employees and the defined benefit pension plan for executives were completed as at December 31, 2017, and January 1, 2017, respectively. The valuations revealed that the pension plans were funded at 105 per cent and 99 per cent, respectively, on a going-concern basis, and 88 per cent and 84 per cent, respectively, on a solvency basis.

Forward currency contracts

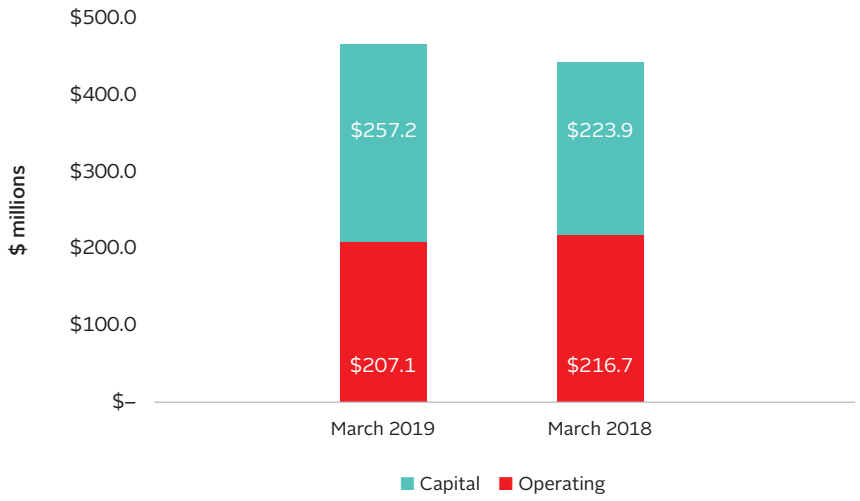
Canadian Blood Services enters into forward currency contracts to mitigate foreign exchange exposure on a substantial portion of our U.S. dollar purchases of plasma protein products. In recent years, Canadian Blood Services designated 70 per cent of the forward currency contracts as being in a hedging relationship with the equivalent forecasted purchases of plasma protein products. Accordingly, hedge accounting was applied, and these transactions were recorded in the cost of plasma protein products only upon maturity. The remaining 30 per cent non-designated forward currency contracts were recorded at fair value at the end of each period. When these contracts matured, the realized gain or loss was recorded as foreign exchange gain or loss.

In September 2018, Canadian Blood Services entered into forward currency contracts for 2019–2020 with a notional value of $392.0 million and an average exchange rate of $1.29. At March 31, 2019, the outstanding forward currency contracts — not designated as hedges — were in a favourable position relative to the U.S. dollar exchange rate, resulting in a financial asset of $4.5 million, consistent with the prior year at $4.3 million. The remaining outstanding forward currency contract — to which hedge accounting was applied — was also in a favourable position, with a fair value of $11.0 million, and this unrealized gain is disclosed and not recorded in the financial statements.

Deferred contributions

Deferred contributions related to expenses of future periods (operating) consist of funds received in advance for future projects, members' funding received in advance and funds reserved for specific purposes. The balance decreased by $9.6 million to $207.1 million at March 31, 2019. Significant deferred funds used in the construction of facilities (as part of the NFRP) amounted to $30.1 million, partly offset by an increase in members' funding received in advance of $17.5 million and an increase in fresh blood and medical supplies inventory of $4.4 million.

Deferred contributions related to capital assets represent contributions invested in capital assets. The balance increased by $33.3 million to $257.2 million at March 31, 2019. This change resulted from capital additions of $54.3 million — consisting of NFRP construction, the IT data centre, production equipment and investment in our vehicle fleet — offset by the recognition of $20.0 million revenue equal to amortization.

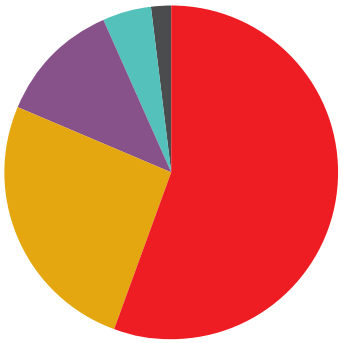


ANALYSIS OF FINANCIAL RESULTS – OPERATIONS

Total consolidated costs

Total consolidated costs by expenditure type

In millions of dollars



	2018–2019	2017–2018	Var $	Var %
Cost of plasma protein products	656	728	(72)	-10%
Staff costs	301	306	(5)	-2%
General and administrative	140	136	4	3%
Medical supplies	58	63	(5)	-8%
Depreciation and amortization	20	18	2	10%
Foreign exchange (gain) loss	(7)	6	(13)	-214%
	1,168	1,257	(89)	
Change in fair value of forward currency contracts	–	6	(6)	-100%
Change in fair value of investments measured at fair value	1	7	(6)	-85%
	1,167	**1,244**	**(77)**	**-6%**

Chart is based on 2018–2019 costs, excluding foreign exchange (gain) loss.

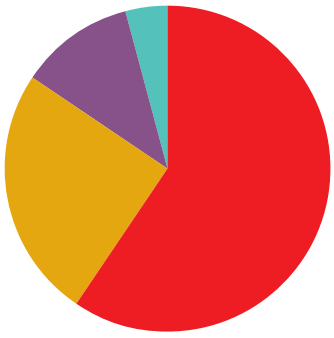
Plasma protein products continued to represent our largest cost in 2018–2019; however, because of successful contract negotiations, we have decreased the cost by $72 million, or 10 per cent. The key variables that influence these costs are product demand, product mix, the per-unit cost of the products and foreign exchange. Staff costs incurred to deliver our products and services are our second-largest cost. Our remaining costs are for general and administrative expenses, depreciation and medical supplies (e.g., blood bags used in collection). Details of the expenses by product line follow in the individual program sections.

Fresh blood products and the national facilities redevelopment program

We collect, test, manufacture and distribute blood and blood products, including red blood cells, platelets and plasma. We also conduct research, which yields new knowledge, processes and technologies for the manufacturing environment while helping to improve quality and efficiency in the blood supply chain and across our entire scope of operations.

Cost breakdown for fresh blood products and NFRP

In millions of dollars



	2018–2019	2017–2018	Var $	Var %
Staff costs	272	274	(2)	-1%
General and administrative	114	107	7	7%
Medical supplies	52	56	(4)	-7%
Foreign exchange (gain) loss	–	–	–	-%
Depreciation and amortization	19	18	1	6%
Transfer of recovered plasma costs	(26)	(26)	–	-%
	431	**429**	**2**	**0%**

Chart is based on 2018–2019 costs, excluding transfer of recovered plasma costs.

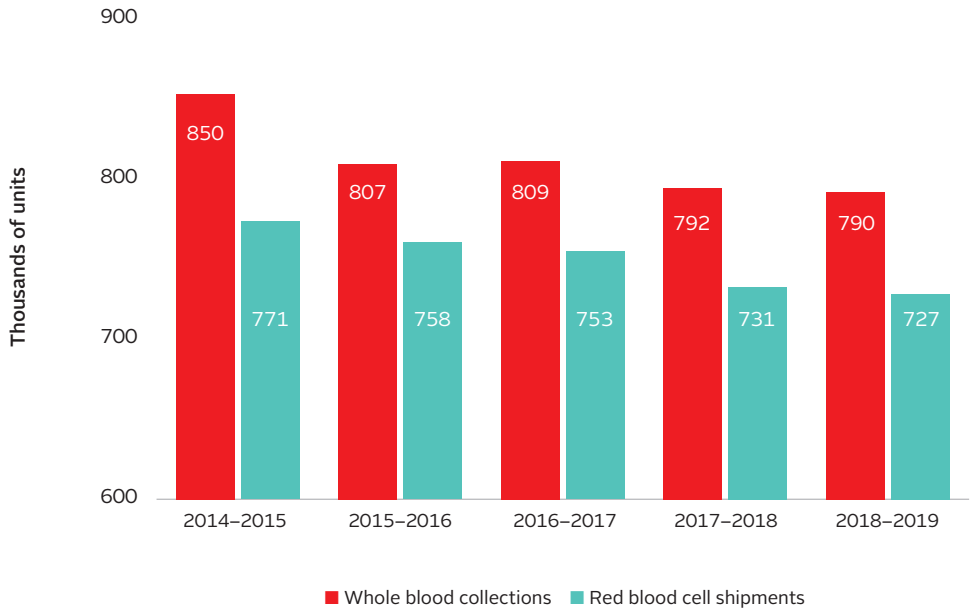
Demand for red blood cells, platelets and plasma and the associated number of whole blood collections have the greatest influence on activities associated with fresh blood products. The main factors affecting costs are labour and materials needed to recruit donors and to collect, produce, test and ship each unit of product. Staff costs and medical supplies account for more than 75 per cent of the total cost of fresh blood products. Additional expenses, such as fuel, utilities, IT, facilities and support functions, also influence these costs.

The decline in demand for red blood cells continued in 2018-2019; however, the rate of decline is diminishing. Although patient blood management activities and restrictive transfusion policies continue to be implemented across the country, the greatest decreases in demand may already have been achieved, particularly in larger hospitals. The number of red blood cell units routinely required as part of massive transfusion protocols is also lower. Additionally, we expect the increased transfusion requirements of the growing aging population to contribute to a flattening of the declining demand trend over time.

Staff costs have declined with the slight reduction in demand and also because of corporate initiatives in recent years aimed at enhancing processes and realizing efficiencies — from the automation of our supply chain to our continuous improvement initiatives.

General and administrative expenses increased because of incremental marketing costs, equipment maintenance costs related to our data centre migration projects and incremental property expenses.

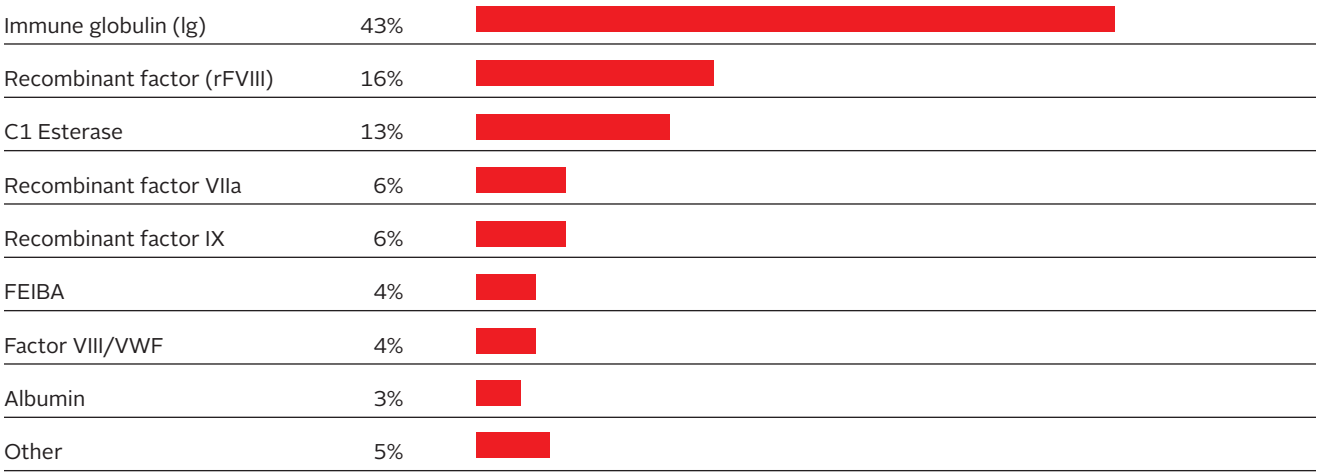
Costs for medical supplies have declined, in part because the request for proposal for donor testing medical supplies resulted in better negotiated prices in effect for 2018–2019 and as a result of reduced collections due to declining red blood cell demand. Overall, the impact of reduced collections accounted for approximately $0.4 million of the total reduction in the cost of medical supplies for the fresh blood program from 2017–2018 to 2018–2019.



Plasma protein products

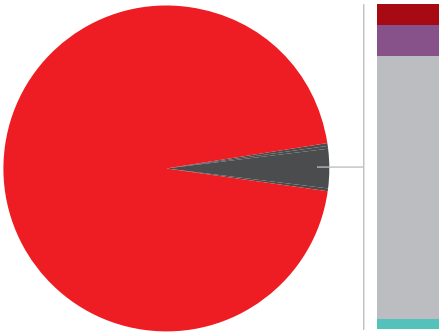
We collect plasma from unpaid volunteer donors in Canada. We retain some of this plasma to meet the transfusion needs of Canadian patients, but most of it is shipped to contract manufacturers of plasma protein products. We then distribute approved plasma protein products — those derived from our own plasma, as well as products that we purchase from manufacturers — to hospitals in Canada (excluding Quebec) for treatment of immune disorders and diseases such as hemophilia.

Canadian Blood Services is the only purchaser, contract manufacturer and distributor of plasma protein products in Canada (excluding Quebec). The program formulary comprises plasma protein products, including their recombinant and substitute products, and is managed for patients on behalf of the funding governments. Canadian Blood Services ensures that these products are safe and that they are provided to Canadians when and where they need them and in sufficient quantities. More than 45 brands of products, procured from Canadian and international suppliers, are currently being managed on the formulary. The formulary also manages products available under Health Canada's Special Access Programme.



Cost breakdown of the plasma protein products program

In millions of dollars



	2018–2019	2017–2018	Var $	Var %
Cost of plasma protein products	656	728	(72)	-10%
Staff costs	2	2	–	-%
General and administrative	3	4	(1)	-25%
Transfer of recovered plasma costs	26	26	–	-%
Medical supplies	1	1	–	-%
Foreign exchange (gain) loss	(7)	7	(14)	-200%
	681	**768**	**(87)**	**-11%**

Chart is based on 2018–2019 costs, excluding foreign exchange (gain) loss.

The principal drivers influencing the overall cost of the plasma protein products program are:
- product demand
- product cost per unit
- foreign exchange rate
- brand mix within a product category

In 2018–2019, the total cost of the plasma protein products program decreased by $86.9 million to $681.0 million. In the immune globulin (Ig) and recombinant factor VIII categories, more than $110 million in savings were realized as a result of the favourable pricing obtained through the request for proposal conducted in the fall of 2017 and the new contracts executed in early 2018–2019. These savings were offset by increased product utilization, especially in the Ig, inhibitors and C1 categories. Demand for plasma protein products continues to increase year over year, offsetting contractual savings.

The figure below shows total volume and price per cent changes between fiscal year 2013–2014 and 2018–2019.

Product	Volume change between 2013–2014 and 2018–2019	Cost per unit 2013–2014 and 2018–2019
Ig	Up 50 per cent	Down 9 per cent
rFVIII	Up 27 per cent	Down 21 per cent
Inflation	Not applicable	Up 8.5 per cent

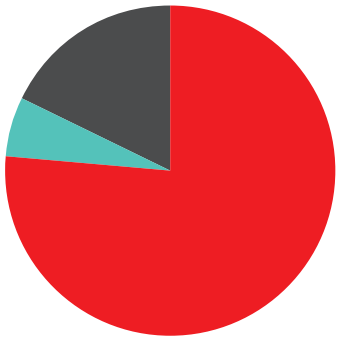
Ig (immune globulin); rFVIII (recombinant factor VIII)

The transfer of recovered plasma costs represents the cost of plasma recovered from whole blood donations (known as recovered plasma) and some source plasma that is subsequently transferred from the fresh blood products program to the plasma protein products program. These transfer costs represent the approximate cost of plasma recovered from Canadian donors and subsequently shipped to commercial fractionators in the United States for processing into products for redistribution back to Canada.

Diagnostic services

Cost breakdown of diagnostic services program

In millions of dollars



	2018–2019	2017–2018	Var $	Var %
Staff costs	13	13	–	-%
General and administrative	1	1	–	-%
Medical supplies	3	3	–	-%
	17	**17**	**–**	**-%**

Chart is based on 2018–2019 costs.

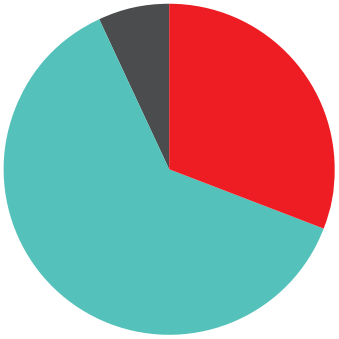
Canadian Blood Services provides diagnostic services for patients and hospitals across western Canada and in some parts of Ontario. These services include prenatal testing, reference red blood cell serology (antibody investigations), human platelet antigen testing, and pre-transfusion and compatibility testing. These services are billable to the respective provincial and territorial governments according to usage.

Demand for diagnostic services is variable, depending on the jurisdiction where the services are offered. During 2018-2019, overall demand for these services has remained relatively flat compared with the previous year.

Stem cells

Cost breakdown of stem cells program

In millions of dollars



	2018–2019	2017–2018	Var $	Var %
Staff costs	9	11	(2)	-18%
General and administrative	18	20	(2)	-10%
Medical supplies	2	3	(1)	-33%
Foreign exchange gain	–	–	–	-%
	29	**34**	**(5)**	**-15%**

Chart is based on 2018–2019 costs.

Canadian Blood Services Stem Cell Registry is the only pan-Canadian program (excluding Quebec) for patients in need of a stem cell transplant from an unrelated donor. The program provides high-quality stem cell products to meet patients' needs across Canada and around the world. We do this by providing services in donor human leukocyte antigen (HLA) typing, donor and recipient matching, facilitation of adult stem cell donation and provision of frozen cord blood units, as well as provision of frozen autologous and allogeneic stem cell products.

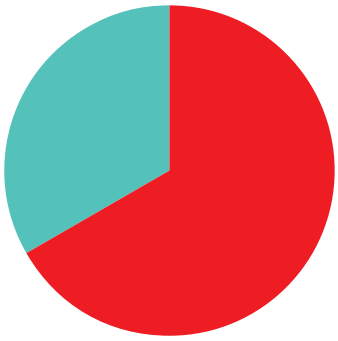
The cord blood banking industry and stem cell transplantation practices have been changing over the past several years. Overall, there has been growth in both autologous and allogeneic stem cell transplants[2] and a sharp increase in haploidentical[3] donors as a source of stem cells, with a consequent decline in the use of cord blood as a source. For the first time, the industry is now seeing a plateau in the use of unrelated donor stem cells – that is, stem cells collected from adult registrants. Recent data suggest that the trend toward increased use of haploidentical donors rather than cord blood and unrelated donors may be prolonged. However, there continues to be a need for all stem cell sources.

In response to decreased international demand for cord blood units and a stabilization in the demand for unrelated donor stem cells, many banks and registries have shifted their strategy. In the cord blood industry, these shifts include moving toward higher-quality units, consolidation of cord blood banks, reduction in collection facilities or hours, and reduced pricing. Canadian Blood Services' Cord Blood Bank has similarly shifted its strategy by reducing collection facilities, collection hours and manufacturing facilities. Canadian Blood Services has specifically aimed to build an ethnically diverse cord blood bank, with quality units. For the year ended March 31, 2019, as a result of this eduction and consolidation in collection and manufacturing facilities and hours of operation, overall costs declined by $5.2 million within the overall stem cell program.

Organs and tissues

Cost breakdown of organs and tissues program

In millions of dollars



	2018–2019	2017–2018	Var $	Var %
Staff costs	6	6	–	-%
General and administrative	3	2	1	50%
	9	**8**	**1**	**13%**

Chart is based on 2018–2019 costs.

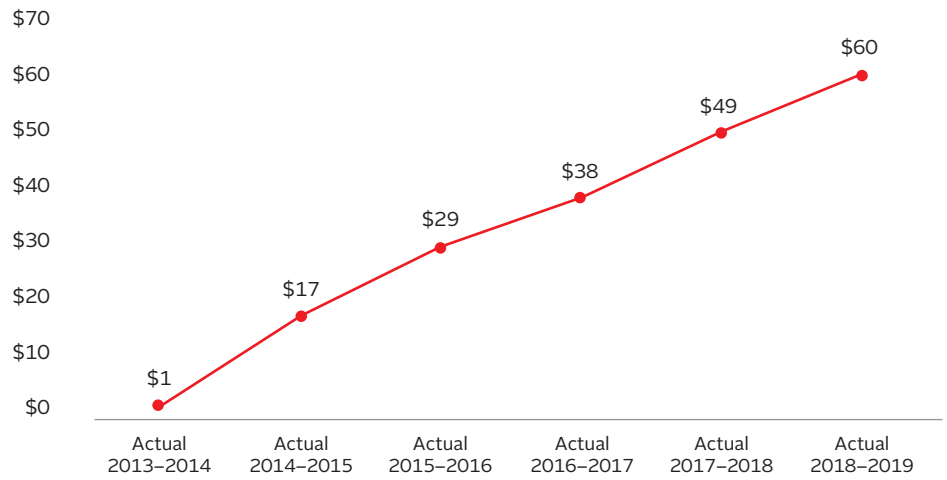
We manage a national transplant registry for interprovincial organ sharing and related programs for organ donation and transplantation. Working with partners across the organ and tissue donation and transplantation (OTDT) community, we develop and share leading practices, provide educational resources and collaborate on new ways to share data on the performance of the OTDT system in Canada.

Overall spending in the program increased slightly as a result of additional 2018–2019 mid-year funding provided by Health Canada. The funding was awarded after reports released in 2017 indicated ongoing challenges within the OTDT system in Canada, highlighting in particular the persistent shortfall that exists between the demand for organs and the available supply, and the high variability across jurisdictions and challenges in OTDT system performance. Additional funding for 2018–2019 and 2019–2020 is aimed at public education and awareness, professional education and leading practices.

[2] Stem cell transplants associated with high doses of chemotherapy and radiation treatment.
[3] Stem cell transplants that are a half match from a family member. A biologic parent or child is always a half match to the patient.

Optimizing cost-efficiency

Efficiencies realized from fiscal year 2013–2014 to 2018–2019



As a partner in health care, Canadian Blood Services has an obligation to ensure that every dollar entrusted to us by Canadians is managed efficiently and effectively. Although our first priority is to safeguard the processes, practices and systems that help us to ensure the quality, safety and sufficiency of our products and services, we constantly look for opportunities to become more productive and maximize the impact of our investments.

We manage this effort through the Productivity and Efficiency Program, which has been in place since 2008, leveraging continuous improvement concepts, operational consolidation, organizational redesign and the implementation of technology, as well as shifting to digital interactions and successful procurement practices to drive value, improve efficiencies and manage costs.

Through two focused waves, Canadian Blood Services is targeting $170 million in total efficiencies, largely through our fresh blood function. The first wave saw $70 million in cost savings achieved between fiscal years 2008–2009 and 2011–2012, confirmed by the independent performance review of our operations undertaken by EY in 2013. The second wave, which is ongoing, targets an additional $100 million in efficiencies, of which $60 million has been realized so far. To date, the cumulative savings over the two waves are $130 million of the $170 million targeted.

Beyond efficiencies for fresh blood, our members have benefited in recent years (and continue to benefit) from product choice and favourable pricing obtained through Canadian Blood Services' value-based procurement activities related to plasma protein products.

- After negotiating contracts that took effect in 2013–2014, we delivered more than $600 million in cumulative cost reductions and cost avoidance over the five-year contract term.
- We executed contracts for recombinant factor VIII and IX products, which resulted in both a significant decrease in the cost per unit (approximately $90 million in cost reduction and cost avoidance over fiscal years 2016–2017 and 2017–2018) and the successful conversion, where it made financial sense, of payment currency to Canadian dollars.
- New contracts, which went into effect in 2018–2019, have achieved brand diversity and product choices while also driving an estimated $455 million[4] in cumulative cost reduction and cost avoidance over their three-year term.

[4] The forecasted savings and cost avoidances are subject to utilization and product mix trends. In addition, if switching occurs at a slower rate than anticipated, savings related to new contract pricing may be reduced.

Governance

Canadian Blood Services is a not-for-profit charitable organization that operates independently of government and is regulated by Health Canada through the federal *Food and Drugs Act*. It was created through a memorandum of understanding among the federal, provincial and territorial governments. In 2018–2019, Canadian Blood Services and the provincial and territorial governments, as corporate members, negotiated terms for a National Accountability Agreement (NAA). The NAA, which sets out the accountability relationship among the parties, is consistent with and complementary to the 1998 memorandum of understanding. A draft has been completed and is now undergoing review; it is expected that the NAA will be signed and executed in 2019–2020.

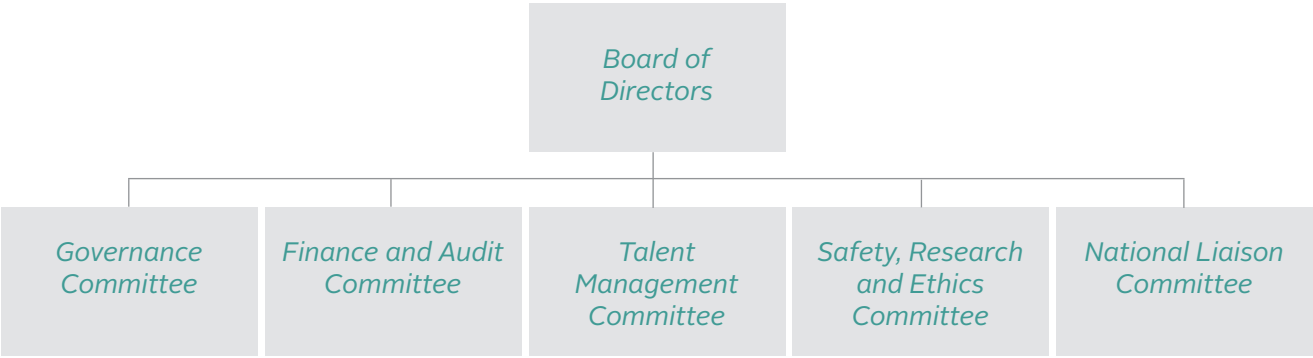
Members

Under the *Canada Not-for-profit Corporations Act*, the provincial and territorial ministers of health (except Quebec) serve as members of the corporation and appoint our board of directors. The board of directors is accountable to the members.

The ministers also collectively approve Canadian Blood Services' three-year corporate plan and annual budget. A lead province is designated every two years, Effective April 1, 2019, Prince Edward Island assumed this role, replacing Saskatchewan.

Board of directors and committees

Our board consists of 13 directors, who are appointed by the corporate members (except in Quebec). The board's role is broad oversight of Canadian Blood Services' management and direction.



Number of board of directors and committee meetings during 2018–2019

Board	6
Talent Management Committee	6
Finance and Audit Committee	6
Governance Committee	4
Safety, Research and Ethics Committee	4
National Liaison Committee	1

Board attendance and compensation paid during 2018–2019

Director	Chair	Number of board meetings attended	Number of committee meetings attended	Honorariums paid
Melvin Cappe	Board	6/6	12/12	$64,750
Judy Steele	Finance and audit committee	5/6	9/13	$16,625
Glenda Yeates	Board Vice-Chair	6/6	12/12	$28,375
Dr. Brian Postl		1/1	2/2	$7,500
Lorraine Muskwa		1/1	2/3	$6,750
Robert Adkins		1/1	2/2	$6,750
Kelly Butt	Governance committee	6/6	7/7	$35,500
Victor Young		1/1	1/3	$6,000
Craig Knight	Talent management committee	6/6	11/11	$30,938
David Lehberg		6/6	11/13	$11,125
Anne McFarlane	Safety, research and ethics committee	6/6	8/8	$20,875
Dunbar Russel		6/6	9/10	$28,250
Dr. Jeff Scott		6/6	11/11	$23,500
R. Wayne Gladstone		5/5	7/7	$27,750
Dr. Kevin W. Glasgow		5/5	8/8	$20,750
Suromitra Sanatani		3/4	5/5	$16,875
Mike Shaw		4/4	5/5	$15,500

There were a number of changes to the board of directors during 2018–2019. Board member Judy Steele started her term effective March 12, 2018, replacing Elizabeth A. Martin. Board members Dr. Brian Postl, Lorraine Muskwa, Robert Adkins and Victor Young joined effective January 7, 2019. They replaced R. Wayne Gladstone, Dr. Kevin W. Glasgow, Suromitra Sanatani and Mike Shaw.

Board of directors' retainer and honorariums

Canadian Blood Services' bylaws provide that directors be remunerated for attendance at and participation in meetings of the board of directors and committees, as set by the members. The chair receives an annual retainer, other directors receive meeting honorariums, and all directors are reimbursed for their travel expenses. Directors are also entitled to per diems when they are required to conduct business on behalf of the board.

The table below shows the structure of honorariums paid to the directors of the board.

Board of directors' retainer and honorariums

Annual retainer for the chair	$15,000 per annum
Meeting honorarium	$750 per diem
Meeting preparation honorarium	One day for directors @ $750 per day Up to two additional days for chair and vice-chair @ $750 per day Up to one additional day for committee chairs @ $750 per day
Travel to meetings	Up to two days (depending on origin and destination) per meeting @ $500 per day
Days on business honorarium	$750 per diem (for events such as meetings on behalf of Canadian Blood Services)
Travel	Travel costs according to Canadian Blood Services' expense policy. Details of these travel costs can be found on our website at https://blood.ca/en/about-us/our-board-directors.

Board education

The board of directors' education program has three components:	
Board orientation	This training is provided to new directors upon joining the board. It provides the essential information they need about Canadian Blood Services, so they can become engaged in the board's work as quickly as possible.
Board education, sector-focused (blood, plasma, organs, stem cells)	This ongoing training is provided to all directors. It is a continuing education program intended to give directors a deeper understanding of the activities of Canadian Blood Services within the Canadian health-care sector. An educational session is provided at each in-person board meeting. Additional recorded sessions are available for directors to access as their schedules permit.
Board education, director development–focused	This ongoing training is provided to all directors. It is a continuing education program intended to enhance directors' skills and knowledge related to the business of Canadian Blood Services, board business and directors' functions on the board. It takes the form of external educational programs, conferences and seminars.

Executive management team compensation

Canadian Blood Services is founded on the principles of safety, openness and transparency — traits deeply rooted in our culture. The manner in which we compensate executives reflects these principles. As such, Canadian Blood Services has a comprehensive and rigorous executive performance management and compensation program, following best-practice principles in corporate governance.

The CEO, who reports to the board of directors, oversees the vice-presidents and our internal auditor. Each year, the performance of members of the executive management team, including the CEO, is measured through the use of executive performance agreements. These agreements contain goals linked directly to achieving collective corporate performance goals, as well as specific and measurable individual goals. Performance against these goals is used to derive the specific calculations for either merit increases or performance awards.

The CEO's performance is the responsibility of the full board, with the process being largely overseen and managed by the Talent Management Committee. The CEO is subject to two performance reviews each year: an interim review in the second quarter and a full review at the end of each fiscal year. This full board review tracks in detail the CEO's performance against measurable and specific performance goals. Any compensation adjustments flow from this review, after deliberation by the board, and these adjustments are solely at the board's discretion.

Every two years, the Talent Management Committee also commissions an independent study to gather comparative compensation data for the CEO. Every third year, the committee independently commissions outside expertise to lead a 360° performance review of the CEO.

Members of the executive management team are reviewed through a similar process. The CEO meets with all of the executive management team members and reviews their performance based on the corporate performance indicators contained in their respective performance agreements. The CEO's recommendations for compensation adjustments are presented to the Talent Management Committee of the board for approval.

Components of the compensation program

The compensation program for executives comprises several elements, referred to as "total compensation." Total compensation includes:

- base salary
- annual pay at risk
- pension plan
- benefits and perquisites

Canadian Blood Services aims to align our total compensation for executives with the market median for comparator groups.

Total compensation for executives

	Fiscal Year	Base salary	Compensation at risk as a percentage of base salary
Dr. Graham D. Sher Chief Executive Officer	2018–2019 2017–2018	$606,000 $591,220	30% 30%
Jean-Paul Bédard Vice-President, Plasma Operations	2018–2019 2017–2018	$296,499 $290,685	22.5% 22.5%
Judie Leach Bennett Vice-President, General Counsel and Corporate Secretary	2018–2019 2017–2018	$260,000 $230,000	22.5% 22.5%
Dr. Christian Choquet Vice-President, Quality and Regulatory Affairs	2018–2019 2017–2018	$276,932 $270,177	22.5% 22.5%
Dr. Isra Levy Vice-President, Medical Affairs and Innovation	2018–2019[1] 2017–2018	$455,000 $455,000	22.5% 22.5%
Ralph Michaelis Chief Information Officer	2018–2019 2017–2018	$245,193 $239,212	22.5% 22.5%
Andrew Pateman Vice-President, People, Culture and Performance	2018–2019 2017–2018	$328,625 $319,054	22.5% 22.5%
Pauline Port Chief Financial Officer and Vice-President, Corporate Services	2018–2019 2017–2018	$378,684 $369,448	25% 25%
Rick Prinzen Chief Supply Chain Officer and Vice President, Donor Relations	2018–2019 2017–2018	$332,252 $288,915	25% 25%
Ron Vezina Vice-President, Public Affairs	2018–2019[2]	$220,000	22.5%

[1] Dr. Isra Levy started in this position effective January 22, 2018. He was not eligible for a base salary increase effective April 1, 2018.
[2] Ron Vezina started in this position effective August 7, 2018. His base salary and annual allowance were prorated and paid out starting on this date.

Compensation also includes:

- a $10,000 annual vehicle allowance, with the exception of the CEO who receives an annual allowance of $18,000
- vacation entitlement: Year 1, four weeks; Year 2, five weeks; Year 3, six weeks; and for the CEO, Year 20, seven weeks
- Standard benefits package: executive benefit package covering health, dental, life insurance, long-term disability, defined benefit pension and health-care spending account

Consolidated Financial Statements of

And Independent Auditors' Report thereon

Year ended March 31, 2019

KPMG LLP
150 Elgin Street, Suite 1800
Ottawa ON K2P 2P8
Canada
Telephone 613-212-5764
Fax 613-212-2896

INDEPENDENT AUDITORS' REPORT

To the Members of Canadian Blood Services

Opinion

We have audited the consolidated financial statements of the Canadian Blood Services (the "Entity"), which comprise:

- the consolidated statement of financial position as at March 31, 2019;
- the consolidated statement of operations for the year then ended;
- the consolidated statement of changes in net assets for the year then ended;
- the consolidated statement of cash flows for the year then ended; and
- notes to the consolidated financial statements, including a summary of significant accounting policies.

(Hereinafter referred to as the "consolidated financial statements").

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Entity as at March 31, 2019, and its consolidated results of operations and its consolidated cash flows for the year then ended in accordance with Canadian Accounting standards for not-for-profit organizations.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the "***Auditors' Responsibilities for the Audit of the Consolidated Financial Statements***" section of our auditors' report.

We are independent of the Entity in accordance with the ethical requirements that are relevant to our audit of the consolidated financial statements in Canada and we have fulfilled our other ethical responsibilities in accordance with these requirements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and Those Charged with Governance for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, management is responsible for assessing the Entity's ability to continue as a going concern, disclosing as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Entity or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Entity's financial reporting process.

Auditors' Responsibilities for the Audit of the Consolidated Financial Statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists.

Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the consolidated financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit.

We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion.

  The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Entity's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Entity's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors' report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditors' report. However, future events or conditions may cause the Entity to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group Entity to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

KPMG LLP

Chartered Professional Accountants, Licensed Public Accountants

Ottawa, Canada

June 21, 2019

Canadian Blood Services
BLOOD PLASMA STEM CELLS ORGANS & TISSUES

Consolidated Statement of Financial Position

As at March 31, 2019, with comparative information for 2018
(In thousands of dollars)

	2019	2018
Assets		
Current assets:		
Cash and cash equivalents (note 3)	$ 236,806	$ 205,856
Members' contributions receivable	19,595	33,681
Other amounts receivable	11,561	18,336
Inventory (note 4)	136,720	161,948
Forward currency contracts (note 15)	4,549	4,252
Prepaid expenses	9,011	8,138
	418,242	432,211
Investments, captive insurance operations (note 5)	474,812	461,754
Capital assets (note 6)	281,405	247,383
	$ 1,174,459	$ 1,141,348
Liabilities, Deferred Contributions and Net Assets		
Current liabilities:		
Bank indebtedness (note 9)	$ –	$ 14,000
Accounts payable and accrued liabilities (note 7)	100,586	95,058
Current portion of obligations under capital leases	411	397
	100,997	109,455
Provision for future claims (note 16)	250,000	250,000
Employee future benefit liabilities (note 8)	92,679	83,994
Obligations under capital leases	272	749
Deferred contributions (note 10)	464,331	440,592
Net assets (note 11):		
Invested in capital assets	24,171	24,171
Restricted for fair value of forward currency contracts	4,549	4,252
Restricted for captive insurance purposes	225,971	211,718
Unrestricted net accumulated surplus	11,489	16,417
	266,180	256,558
Guarantees and contingencies (note 17)		
Commitments (note 18)		
	$ 1,174,459	$ 1,141,348

See accompanying notes to the consolidated financial statements.

On behalf of the Board

Mel Cappe, Director and Chair

Judy Steele, Director

Canadian Blood Services
BLOOD PLASMA STEM CELLS ORGANS & TISSUES

Consolidated Statement of Operations

Year ended March 31, 2019, with comparative information for 2018
(In thousands of dollars)

	2019	2018
Revenue:		
Members' contributions	$ 1,154,611	$ 1,272,406
Federal contributions	10,448	9,830
Less amounts deferred	(47,374)	(75,869)
	1,117,685	1,206,367
Amortization of previously deferred contributions:		
Relating to capital assets	20,267	18,379
Relating to operations	7,656	12,350
Total contributions recognized as revenue	1,145,608	1,237,096
Stem cells revenue	15,585	15,387
Net investment income (note 12)	15,693	16,437
Other income	1,783	1,888
Total revenue	**1,178,669**	**1,270,808**
Expenses:		
Cost of plasma protein products	655,604	728,086
Staff costs	301,008	306,161
General and administrative (note 19)	140,518	135,892
Medical supplies	57,594	63,086
Depreciation and amortization	19,994	18,232
Foreign exchange (gain) loss	(6,904)	6,146
Total expenses	**1,167,814**	**1,257,603**
Excess of revenue over expenses before the undernoted	**10,855**	**13,205**
Change in fair value of forward currency contracts	297	5,860
Change in fair value of investments measured at fair value	977	6,860
Excess of revenue over expenses	**$ 12,129**	**$ 25,925**

See accompanying notes to the consolidated financial statements.

Canadian Blood Services
BLOOD PLASMA STEM CELLS ORGANS & TISSUES

Consolidated Statements of Changes in Net Assets

Year ended March 31, 2019, with comparative information for 2018
(In thousands of dollars)

March 31, 2019	Invested in capital assets	Restricted for fair value of forward currency contracts	Restricted for captive insurance	Unrestricted	Total
Balance, beginning of year (note 11)	$ 24,171	$ 4,252	$ 211,718	$ 16,417	$ 256,558
Reclassification (note 23)	–	–	2,421	(2,421)	–
Excess of revenue over expenses	–	–	11,832	297	12,129
Remeasurements and other items related to employee future benefits	–	–	–	(2,507)	(2,507)
Release of net asset restriction for realized gain	–	(6,894)	–	6,894	–
Change in fair value of forward currency contracts	–	7,191	–	(7,191)	–
Balance, end of year (note 11)	$ 24,171	$ 4,549	$ 225,971	$ 11,489	$ 266,180

March 31, 2018	Invested in capital assets	Restricted for fair value of forward currency contracts	Restricted for captive insurance	Unrestricted	Total
Balance, beginning of year (note 11)	$ 24,171	$ (1,608)	$ 191,653	$ 10,177	$ 224,393
Excess of revenue over expenses	–	–	20,065	5,860	25,925
Remeasurements and other items related to employee future benefits	–	–	–	6,240	6,240
Release of net asset restriction for realized loss	–	6,268	–	(6,268)	–
Change in fair value of forward currency contracts	–	(408)	–	408	–
Balance, end of year (note 11)	$ 24,171	$ 4,252	$ 211,718	$ 16,417	$ 256,558

See accompanying notes to the consolidated financial statements.

Canadian Blood Services
BLOOD PLASMA STEM CELLS ORGANS & TISSUES

Consolidated Statement of Cash Flows

Year ended March 31, 2019, with comparative information for 2018
(In thousands of dollars)

	2019	2018
Cash and cash equivalents provided by (used for):		
Operating activities:		
Excess of revenue over expenses	$ 12,129	$ 25,925
Items not involving cash and cash equivalents:		
Depreciation and amortization of capital assets	19,994	18,232
Amortization of deferred contributions	(27,923)	(30,729)
Gain on sale of capital assets	113	5
Net realized gains on sales of investments, captive insurance operations	(1,404)	(1,497)
Change in fair value of equity investments, captive insurance operations	(977)	(6,860)
Interest amortization of bonds, captive insurance operations	(18)	(1,790)
Employee future benefit expenses in excess of cash payments	6,178	7,467
Change in fair value of forward currency contracts	(297)	(5,860)
	7,795	4,893
Change in non-cash operating working capital:		
Decrease in Members' contributions receivable	14,086	28,927
Decrease in other amounts receivable	6,775	448
Decrease (increase) in inventory	25,228	(3,833)
(Increase) decrease in prepaid expenses	(873)	1,770
Increase in accounts payable and accrued liabilities	3,251	14,958
(Decrease) increase deferred contributions received for expenses of future periods	(1,940)	47,365
Total operating activities	54,322	94,528
Investing activities:		
Proceeds on sale of investments, captive insurance operations	163,206	165,244
Purchases of investments, captive insurance operations	(173,865)	(175,432)
Proceeds on sale of capital assets	160	142
Purchases of capital assets	(52,012)	(27,206)
Total investing activities	(62,511)	(37,252)
Financing activities:		
Repayment of bank indebtedness	(14,000)	(10,000)
Deferred contributions received related to capital assets	53,602	31,542
Repayment of obligations under capital leases	(463)	(351)
Total financing activities	39,139	21,191
Increase in cash and cash equivalents	30,950	78,467
Cash and cash equivalents, beginning of year	205,856	127,389
Cash and cash equivalents, end of year	$ 236,806	$ 205,856
Cash and cash equivalents are comprised of:		
Cash on deposit	$ 236,618	$ 205,670
HSBC Money Market Pooled Fund	188	186
	$ 236,806	$ 205,856

See accompanying notes to the consolidated financial statements.

1. Nature of the organization and operations:

Canadian Blood Services/Société canadienne du sang (the Corporation) owns and operates the national blood supply system for Canada, except Québec, and is responsible for the collection, testing, processing and distribution of blood and blood products, including red blood cells, platelets, plasma and cord blood, , as well as the recruitment and management of donors. In addition, the Corporation provides the following services: (ii) developing and managing donor registries for stem cells, cord blood stem cells and organs, (iii) providing diagnostic services for patients and hospitals across Western Canada and some parts of Ontario, (iv) supporting policy and leading practice development, professional education and public awareness over transfusion practices and organ and tissue donation and transplantation, and (v) conducting and supporting research in transfusion science, medicine, cellular therapies and organ and tissue transplantations.

The Corporation was incorporated on February 16, 1998, under Part II of the Canada Corporations Act. Effective May 7, 2014, the Corporation transitioned its incorporation to the Canada Not-for-Profit Corporations Act. It is a corporation without share capital and qualifies for tax-exempt status as a registered charity under the Income Tax Act (Canada). The Members of the Corporation are the Ministers of Health of the Provinces and Territories of Canada, except Québec. The Members, as well as the Federal and Quebec governments provide contributions to fund the operations of the Corporation. The Corporation operates in a regulated environment, pursuant to the requirements of Health Canada.

The Corporation has established two wholly-owned captive insurance corporations; CBS Insurance Company Limited (CBSI) and Canadian Blood Services Captive Insurance Company Limited/Compagnie d'assurance captive de la société canadienne du sang limitée (CBSE). CBSI was incorporated under the laws of Bermuda on September 15, 1998 and is licensed as a Class 3 reinsurer under the Insurance Act, 1978 of Bermuda and related regulations. CBSE was incorporated under the laws of British Columbia on May 4, 2006 and is registered under the Insurance (Captive Company) Act of British Columbia.

2. Basis of presentation and significant accounting policies:

Significant accounting policies:

The consolidated financial statements have been prepared by management in accordance with Canadian accounting standards for not-for-profit organizations in Part III of the CPA Canada Handbook – Accounting.

2. Basis of presentation and significant accounting policies (continued):

Significant accounting policies (continued):

A summary of the significant accounting policies used in these consolidated financial statements are set out below. The accounting policies have been applied consistently to all periods presented.

(a) Consolidation:

The consolidated financial statements include the results of the operations of Canadian Blood Services and the accounts of its wholly-owned captive insurance subsidiaries.

(b) Use of estimates:

The preparation of the consolidated financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue and expenses in the consolidated financial statements. Estimates and assumptions may also affect disclosure of contingent assets and liabilities at the date of the consolidated financial statements. Actual results could differ from these estimates. Significant estimates include assumptions used in measuring pension and other post-employment benefits and the provision for future insurance claims, which are described in more detail in notes 8 and 16, respectively.

(c) Revenue recognition:

The Corporation follows the deferral method of accounting for contributions for not-for-profit organizations.

Members' and Federal contributions are recorded as revenue in the period to which they relate. Amounts approved but not received by the end of an accounting period are accrued. Where a portion of a contribution relates to a future period, it is deferred and recognized in the subsequent period.

Externally restricted contributions are recognized as revenue in the year in which the related expenses are recognized. Contributions restricted for the purchase of capital assets other than land are initially deferred and then amortized to revenue on a straight-line basis, at a rate corresponding with the depreciation rate for the related capital asset. Contributions restricted for the purchase of land are recognized as direct increases in net assets invested in capital assets.

Unrestricted funding is recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

Restricted investment income is recognized as revenue in the year in which the related expenses are recognized. Unrestricted investment income is recognized as revenue when earned.

Revenue from fees and contracts is recognized when the services are provided, or the goods are distributed.

2. Basis of presentation and significant accounting policies (continued):

Significant accounting policies (continued):

(c) Revenue recognition (continued):

Restricted donations are recognized as revenue in the year in which the related expenses are recognized. Unrestricted donations are recognized as revenue in the year received.

(d) Donated goods and services:

The Corporation does not pay donors for whole blood, plasma, platelets or cord donations. Additionally, a substantial number of volunteers contribute a significant amount of time each year in support of the activities of the Corporation. The value of such contributed goods and services is not quantified in the financial statements.

(e) Inventory:

Inventory of the Corporation consists of plasma protein products, fresh blood components, cord blood and supplies related to the collection, manufacturing and testing of fresh blood components.

Inventory is measured at the lower of cost and current replacement cost. Cost for plasma protein products and supplies inventories is measured at average cost. Cost for fresh blood components and cord blood inventory includes an appropriate portion of direct costs and overhead incurred in the collection, manufacturing, testing and distribution processes.

Plasma protein products, cord blood and fresh blood components inventory is charged to the statement of operations upon distribution to hospitals.

Management regularly performs reviews and when necessary, writes off slow moving or obsolete inventory.

(f) Capital assets:

Purchased capital assets are recorded at cost. Contributed capital assets are recorded at fair value at the date of contribution. Assets acquired under capital leases are amortized over the estimated life of the assets or over the lease term, as appropriate. Repairs and maintenance costs are expensed. Betterments, which extend the estimated life of an asset, are capitalized. When capital assets no longer contribute to the Corporation’s ability to provide services, their carrying amount is written down to their residual value.

2. Basis of presentation and significant accounting policies (continued):

Significant accounting policies (continued):

(f) Capital assets (continued):

Capital assets are reviewed for impairment whenever events or changes in circumstances indicate that the asset no longer has any long-term service potential to the Corporation. In this event, recoverability of assets held and used is measured by reviewing the estimated residual value of the asset. If the carrying amount of an asset exceeds its estimated residual value, an impairment charge is recognized by the amount by which the carrying amount of the asset exceeds the residual value of the asset. When a capital asset is written down, the corresponding amount of any unamortized deferred contributions related to the capital asset would be recognized as revenue, provided that the Corporation is in compliance with all restrictions.

Depreciation is recorded on a straight-line basis over the estimated useful lives of the assets at the rates indicated below:

Asset	Useful life
Buildings	40 to 65 years
Machinery and equipment	8 to 25 years
Furniture and office equipment	5 to 10 years
Motor vehicles	8 years
Computer equipment	3 years
Computer software	2 to 5 years

Leasehold improvements are depreciated on a straight-line basis over the shorter of the lease term or their estimated useful lives. Assets under construction are not depreciated until they are available for use by the Corporation.

The right to the blood supply system represents the excess of the purchase price of the system over the fair value of the tangible net assets acquired in 1998 and is being amortized on a straight-line basis over 40 years.

The Corporation has future obligations associated with the disposal of certain equipment in an environmentally responsible manner, and the restoration of leased premises to an agreed upon standard at the end of the lease. Where there is a legal obligation associated with the retirement of equipment or restoration of leases premises, the Corporation recognizes an accrual and the costs are capitalized as part of the carrying amount of the related asset and depreciated over the asset's estimated useful life.

2. Basis of presentation and significant accounting policies (continued):

Significant accounting policies (continued):

(g) Foreign currency transactions:

Foreign currency transactions of the Corporation are translated using the temporal method. Under this method, transactions are initially recorded at the rate of exchange prevailing at the date of the transaction. Thereafter, monetary assets and liabilities are adjusted to reflect the exchange rates in effect at the consolidated statement of financial position date. Gains and losses resulting from the adjustment are included in the consolidated statement of operations.

(h) Employee future benefits:

The Corporation sponsors two defined benefit plans, one for employees and the other for executives. In addition, the Corporation sponsors a defined contribution pension plan and provides other retirement and post-employment benefits to eligible employees. Benefits provided under the defined benefit pension plans are based on a member's term of service and average earnings over a member's five highest consecutive annualized earnings.

The Corporation accrues its obligations under employee benefit plans as the employees render the services necessary to earn pension and other retirement and post-employment benefits.

The defined benefit obligations for pensions and other retirement and post-employment benefits earned by employees is measured using an actuarial valuation prepared for accounting purposes. The obligation is actuarially determined using the projected benefit method pro-rated on service and management's best estimate assumptions including discount rate, inflation rate, salary escalation, retirement ages and expected health care costs. The measurement date of the plan assets and defined benefit obligation coincides with the Corporation's fiscal year. The most recent actuarial valuations for the employees and executives benefit pension plans for funding purposes were as of December 31, 2017 and January 1, 2017, respectively. The next required valuation for the employee benefit plan will be as of December 31, 2020. The next required valuation for the executives will be as of January 1, 2020. The most recent actuarial valuation of the other retirement and post-employment benefits was as of April 1, 2018 and the next valuation will be as of April 1, 2021.

Plan assets are measured at fair value as at year end.

The defined benefit pension plan for employees is jointly sponsored by the employer and participating unions. To reflect the risk-sharing provisions of this plan, the Corporation recognizes the 50 percent of the defined benefit liability or asset that accrues to the employer.

The Corporation also has a defined contribution plan providing pension benefits. The cost of the defined contribution plan is recognized based on the contributions required to be made during each period.

2. Basis of presentation and significant accounting policies (continued):

Significant accounting policies (continued):

(h) Employee future benefits (continued):

Termination benefits result from either the Corporation's decision to terminate employment or an employee's decision to accept the Corporation's offer of benefits in exchange for termination of employment. The Corporation recognizes contractual termination benefits when it is probable that employees will be entitled to benefits and the amount can be reasonably estimated. Special termination benefits for voluntary terminations are recognized when employees accept the offer and the amount be reasonably estimated. Special termination benefits for involuntary terminations are recognized when management commits to a detailed plan that establishes the termination benefits, it is communicated in sufficient detail to employees, and the plan will be executed in a reasonable time such that significant changes are not likely.

(i) Financial Instruments:

Upon initial recognition, financial instruments are measured at their fair value. Financial assets and financial liabilities are recognized initially on the trade date, which is the date that the Corporation becomes a party to the contractual provisions of the instrument.

Fixed income securities and short-term notes are measured on the consolidated statement of financial position at amortized cost. Interest income is recognized on the accrual basis and includes the amortization of premiums or discounts on fixed interest securities purchased at amounts different from their par value.

Mortgage funds and pooled funds are measured at fair value with changes in fair value recorded directly in the consolidated statement of operations. Dividends and distributions are recorded as income when declared.

Forward currency contracts not in a qualifying hedging relationship are measured at fair value with changes in fair value recorded directly in the consolidated statement of operations. A forward currency contract designated in a hedging relationship is not recognized until the earlier of the date it matures and the date of the anticipated transaction (the hedged item). The hedged item is recognized initially at the amount of consideration payable based on the prevailing foreign exchange rate on the date of goods or service receipts. At this time, any gain or loss on the forward currency contract is recognized as an adjustment of the carrying value amount of the hedged item when the anticipated transaction results in the recognition of an asset or a liability. When the hedged items are recognized directly in the consolidated statement of operations, the gain or loss on the forward currency contract is included in the same expense or revenue category.

All other financial instruments are subsequently measured at cost or amortized cost.

2. Basis of presentation and significant accounting policies (continued):

Significant accounting policies (continued):

(i) Financial Instruments (continued):

Transaction costs incurred on the acquisition of financial instruments measured subsequently at fair value are expensed as incurred. All other financial instruments are adjusted by transaction costs incurred on acquisition and financing cost, which are amortized using the effective interest rate method.

Transaction costs are comprised primarily of legal, accounting, underwriters' fees and other costs directly attributable to the acquisition, issuance or disposal of a financial asset or financial liability.

Financial assets measured at cost or amortized cost are assessed for indicators of impairment on an annual basis at the end of the fiscal year. If there is an indicator of impairment, the Corporation determines if there is a significant adverse change in the expected amount or timing of future cash flows from the financial asset. If there is a significant adverse change in the expected cash flows, the carrying value of the financial asset is reduced to the higher of the present value of the expected cash flows, the amount that could be realized from selling the financial asset or the amount the Corporation expects to realize by exercising its right to any collateral. If events and circumstances reverse in a future period, an impairment loss will be reversed to the extent of the improvement, not exceeding the initial carrying value.

3. Cash and cash equivalents:

Cash and cash equivalents include deposits with financial institutions that can be withdrawn without prior notice or penalty and units held in money market funds.

Cash and cash equivalents include $536 (2018 - $361) that is restricted for captive insurance operations. Cash and cash equivalents also include Members' contributions received in advance for expenses of future periods (note 10(a)).

4. Inventory:

Inventory consists of raw materials, work in process and finished goods. Raw materials include supplies available for use in the collection, manufacturing and testing of fresh blood components. Work in process consists of plasma for fractionation. Finished goods include plasma protein products, red blood cells, platelets and plasma for transfusion and cord blood inventory that are available for distribution to hospitals. Work in process and finished goods inventories include direct costs and overhead incurred in the collection, manufacturing, testing and distribution process.

(In thousands of dollars)

4. Inventory (continued):

Inventory comprises:

	2019	2018
Raw materials	$ 5,239	$ 6,122
Work-in-process	24,173	20,352
Finished goods	107,308	135,474
	$ 136,720	$ 161,948

5. Investments, captive insurance operations:

All investments are restricted for captive insurance operations. The amortized cost and fair value of investments are as follows:

	2019	2018
Measured at amortized cost:		
Short-term notes	$ 5,772	$ 1,921
Fixed income securities	273,924	263,548
Measured at fair value:		
Mortgage funds	29,706	28,602
Pooled funds	165,410	167,683
	$ 474,812	$ 461,754

(In thousands of dollars)

6. Capital assets:

	Cost	Accumulated depreciation	2019 Net book value	2018 Net book value
Land, buildings, software and equipment				
Buildings	$ 182,266	$ 58,410	$ 123,856	$ 127,063
Machinery and equipment	104,168	77,506	26,662	24,175
Land	24,171	–	24,171	24,171
Furniture and office equipment	28,985	21,864	7,121	7,947
Leasehold improvements	27,164	19,841	7,323	8,491
Computer equipment	57,323	49,474	7,849	4,362
Motor vehicles	18,165	11,064	7,101	7,341
Computer software	37,730	35,437	2,293	1,811
Equipment under capital leases	5,090	4,096	994	1,300
Assets under construction	56,873	–	56,873	22,680
	541,935	277,692	264,243	229,341
Right to the blood supply system	35,203	18,041	17,162	18,042
	$ 577,138	$ 295,733	$ 281,405	$ 247,383

During the current year, cash payments of $52,012 (2018 - $27,206) were made to acquire capital assets and capital assets no longer in use with cost of $7,851 and accumulated amortization of $7,580 were written off.

Cost and accumulated amortization of capital assets at March 31, 2018 amounted to $530,700 and $283,317, respectively.

7. Accounts payable and accrued liabilities:

Included in accounts payable and accrued liabilities are government remittances payable of $3,088 (2018 - $3,296) which include amounts payable for sales and payroll taxes.

8. Employee future benefits:

The Corporation sponsors two defined benefit pension plans, one for employees and the other for executives. In addition, the Corporation sponsors a defined contribution pension plan and provides other retirement and post-employment benefits to eligible employees.

(In thousands of dollars)

8. Employee future benefits (continued):

The Corporation's defined benefit liabilities included in the consolidated statement of financial position are comprised of the following:

	2019	2018
Defined benefit pension plans	$ 53,234	$ 43,509
Other retirement and post-employment benefit plans	39,445	40,485
Employee future benefit liability	$ 92,679	$ 83,994

(a) Defined benefit pension plans:

Information about the Corporation's defined benefit plans are combined and summarized as follows:

	2019	2018
Defined benefit obligation	$ 541,788	$ 500,735
Fair value of plan assets	438,279	417,056
Defined benefit liability before adjustment for risk sharing provisions	103,509	83,679
Adjustment for risk sharing provisions	50,275	40,170
Defined benefit liability	$ 53,234	$ 43,509

The significant actuarial assumptions adopted in measuring the Corporation's defined benefit plans, defined benefit obligation and benefit cost are summarized as follows:

	2019	2018
Defined benefit obligation:		
Discount rate	3.30%	3.60%
Inflation rate	2.00%	2.00%
Rate of compensation increases	2.00% - 3.25%	2.00% - 3.25%
Mortality Table	CPM 2014-B CPM 2014Publ-B	CPM 2014-B CPM 2014Publ-B
Benefit cost:		
Discount rate	3.60%	3.80%
Rate of compensation increases	2.00% - 3.25%	2.00% - 3. 50%

(In thousands of dollars)

8. Employee future benefits (continued):

(a) Defined benefit pension plans (continued):

Other information about the Corporation's defined benefit plans is combined and summarized as follows:

	2019	2018
Employer contributions	$ 14,654	$ 13,091
Employee contributions	9,006	8,341
Benefits paid	15,894	16,062
Net expense	18,207	17,986
Remeasurement loss (gain)	6,002	(7,403)

(b) Defined contribution pension plan:

The expense for the Corporation's defined contribution pension plan was $4,110 (2018 - $4,048).

(c) Other retirement and post-employment benefits:

Information about the Corporation's other retirement and post-employment benefits is as follows:

	2019	2018
Benefits paid	$ 1,757	$ 1,471
Net expense	4,212	4,043
Remeasurement (gain) loss	(3,399)	1,562
Past service credit	(96)	(399)
Defined benefit liability	39,445	40,485

(In thousands of dollars)

8. Employee future benefits (continued):

(c) Other retirement and post-employment benefits (continued):

The significant actuarial assumptions adopted in measuring the Corporation's other retirement and post-employment defined benefit obligation and benefit cost are as follows:

	2019	2018
Defined benefit obligation:		
Discount rate	3.10% -3.40%	3.30% - 3.70%
Rate of compensation increases	2.00% - 3.25%	2.00% - 3.25%
Mortality Table	CPM 2014-B CPM 2014Publ-B	CPM 2014-B CPM 2014Publ-B
Benefit cost:		
Discount rate	3.30% - 3.70%	3.20% - 3.90%
Rate of compensation increases	2.00% - 3.25%	3.50%

Hospital costs - 4.00% (2018 - 4.50%) per annum;

Drug costs - 6.50% (2018 - 6.87%) per annum, grading down to 4.00% (2018 - 4.50%) per annum in and after 2040 (2018 - 2029);

Other health costs - 4.00% (2018 - 4.50%) per annum.

Termination benefits have been recognized in accounts payable and accrued liabilities on the consolidated statement of financial position and in staff costs in the consolidated statement of operations. At March 31, 2019, $5,633 (2018 - $6,572) is accrued for termination benefits on the consolidated statement of financial position. During the year ended March 31, 2019, movements relating to the accrual included payments of $4,887 (2018 - $5,481), a reversal to opening accrual of $432 (2018 - $1,684) and the establishment of new termination benefits of $4,380 (2018 - $4,691).

9. Credit facilities:

(a) Demand operating credit:

This facility has been arranged as an operating line of credit in the amount of $100,000 and is secured by the plasma protein products inventory. At March 31, 2019, $Nil (2018 - $14,000) was outstanding under the facility.

(b) Demand installment loan:

A demand installment loan in the amount of $25,000 (2018 - $25,000) was arranged to cover contingencies or events not anticipated in the annual budget. Through March 31, 2019, no amounts had been borrowed under this facility.

(c) Standby letter of credit:

Standby letters of credit in the amount of $2,000 (2018 - $2,000) were arranged to cover municipal requirements with regard to the redevelopment of the Corporation's facilities. At March 31, 2019, $82 (2018 - $82) had been issued under the facility.

Pursuant to the arrangements above, the Corporation has provided a general security agreement in favour of the bank over receivables, inventory, equipment and machinery, a floating charge debenture over all present and future assets and property. Amounts deferred for contingency purposes are excluded from the general security agreement and debenture.

(d) Operating loan:

The Corporation has entered into two credit facilities to finance a portion of the national facilities redevelopment program phase IIa (NFRP IIa) focused in Alberta and Saskatchewan. The first facility was negotiated as an $85,000 term loan reducing to $68,000 at March 30, 2019. At the completion of the project, the first facility converts to a committed term loan to a maximum of $55,300. The credit facilities are secured by first ranking on the NFRP IIa assets and any member funding received under the NFRP IIa program. Through March 31, 2019, no amounts had been borrowed under these credit facilities.

(In thousands of dollars)

10. Deferred contributions:

	2019	2018
Expenses of future periods		
Balance, beginning of year	$ 216,743	$ 181,728
Increase in amounts received related to future periods	32,957	64,329
Less amounts recognized as revenue in the year	(7,656)	(12,350)
Less capital assets purchased from deferred contributions	(35,809)	(17,547)
Add income earned on resources restricted for contingency	447	302
Add income earned on other restricted resources	465	281
	207,147	216,743
Capital Assets		
Balance, beginning of year	223,849	210,686
Deferred contributions received	53,602	31,191
Capital funding received for leased assets	–	351
Less capital assets sold	(273)	(147)
Less amounts amortized to revenue	(19,994)	(18,232)
	257,184	223,849
	$ 464,331	$ 440,592

(a) Expenses of future periods:

Deferred contributions represent externally restricted contributions to fund expenses of future periods.

The capital assets purchased represent purchases from contributions that were deferred at March 31, 2018, as well as contributions received and deferred in the year ending March 31, 2019.

(In thousands of dollars)

10. Deferred contributions (continued):

(a) Expenses of future periods (continued):

At March 31, deferred contributions comprise:

	2019	2018
Members' funding received in advance	$ 62,178	$ 44,661
Deferred contributions restricted for specific projects or programs:		
Fundraising:		
Campaign for all Canadians	644	204
Other	607	523
Programs - Members funding:		
National facilities redevelopment program	18,990	49,100
Diagnostic services - Manitoba	750	751
Inventory:		
Plasma protein products inventory working capital	47,653	47,653
Medical supplies	5,239	6,123
Fresh blood components inventory	27,964	22,666
Projects:		
Digitalization	6,578	8,134
Laboratory Information System - Manitoba	1,264	1,345
Other:		
Prepaid rent	1,537	2,306
Research and development	12,589	12,570
Contingency	21,154	20,707
	$ 207,147	$ 216,743

(b) Capital assets:

Funds received to acquire capital assets are recorded as deferred contributions on the consolidated statement of financial position. They are amortized to revenue in the consolidated statement of operations at the same rate as capital assets are depreciated to expenses.

(In thousands of dollars)

11. Net assets:

Net assets restricted for captive insurance purposes are subject to externally imposed restrictions stipulating that they be used to provide insurance coverage with respect to risks associated with the operations of the Corporation.

Net assets restricted for forward contracts are subject to internally imposed restrictions on the unrealized fair value of the forward currency contracts not in a qualifying hedging relationship. This restriction will be released once the forward currency contracts mature.

12. Net investment income:

	2019	2018
Interest income on unrestricted funds	$ 3,324	$ 1,672
Net investment income earned on investments restricted for captive insurance	12,369	14,765
Interest income on restricted resources	912	595
	16,605	17,032
Less amounts deferred	(912)	(595)
	$ 15,693	$ 16,437

Included in net investment income earned on investments restricted for captive insurance is $10,965 (2018 - $13,269) of investment income and $1,404 (2018 - $1,496) of realized gains on sales of investments.

Canadian Blood Services BLOOD PLASMA STEM CELLS ORGANS & TISSUES

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Year ended March 31, 2019
(In thousands of dollars)

13. Canadian Blood Services revenue and expenses detail:

	Fresh Blood Products and NFRP[1]		Plasma Protein Products		Diagnostic Services		Stem Cells		Organs and Tissues		Total Canadian Blood Services		Captive Insurance Operations		Intercompany Transactions		Total Consolidated	
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Revenue:																		
Members' contributions	$ 437,318	$ 465,431	$ 680,853	$ 767,744	$ 17,091	$ 17,448	$ 15,769	$ 18,203	$ 3,580	$ 3,580	$ 1,154,611	$ 1,272,406	$ –	$ –	$ –	$ –	$ 1,154,611	$ 1,272,406
Federal contributions	6,202	6,250	–	–	–	–	–	–	4,246	3,580	10,448	9,830	–	–	–	–	10,448	9,830
Less amounts deferred	(40,718)	(70,818)	–	–	(232)	(293)	(2,715)	(1,131)	(3,709)	(3,627)	(47,374)	(75,869)	–	–	–	–	(47,374)	(75,869)
	402,802	400,863	680,853	767,744	16,859	17,155	13,054	17,072	4,117	3,533	1,117,685	1,206,367	–	–	–	–	1,117,685	1,206,367
Amortization of previously deferred contributions:																		
Relating to capital assets	20,267	18,379	–	–	–	–	–	–	–	–	20,267	18,379	–	–	–	–	20,267	18,379
Relating to operations	4,082	7,310	–	–	4	–	–	1,470	3,570	3,570	7,656	12,350	–	–	–	–	7,656	12,350
Total contributions recognized as revenue	427,151	426,552	680,853	767,744	16,863	17,155	13,054	18,542	7,687	7,103	1,145,608	1,237,096	–	–	–	–	1,145,608	1,237,096
Gross premiums written and earned	–	–	–	–	–	–	–	–	–	–	–	–	861	947	(861)	(947)	–	–
Stem cells revenue	–	–	–	–	–	–	15,585	15,387	–	–	15,585	15,387	–	–	–	–	15,585	15,387
Net investment income (note 12)	3,324	1,672	–	–	–	–	–	–	–	–	3,324	1,672	12,369	14,765	–	–	15,693	16,437
Other income (loss)	687	815	196	213	–	–	6	(5)	894	865	1,783	1,888	–	–	–	–	1,783	1,888
Total revenue	431,162	429,039	681,049	767,957	16,863	17,155	28,645	33,924	8,581	7,968	1,166,300	1,256,043	13,230	15,712	(861)	(947)	1,178,669	1,270,808
Expenses:																		
Cost of plasma protein products	–	–	655,604	728,086	–	–	–	–	–	–	655,604	728,086	–	–	–	–	655,604	728,086
Staff costs	271,708	273,704	2,016	1,999	12,764	13,509	8,575	11,404	5,945	5,545	301,008	306,161	–	–	–	–	301,008	306,161
General and administrative	114,151	107,054	3,028	4,435	1,183	696	18,006	19,724	2,636	2,423	139,004	134,332	2,375	2,507	(861)	(947)	140,518	135,892
Transfer of recovered plasma costs	(26,400)	(26,400)	26,400	26,400	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Medical supplies	51,742	56,503	772	769	2,916	2,950	2,164	2,864	–	–	57,594	63,086	–	–	–	–	57,594	63,086
Depreciation and amortization	19,994	18,232	–	–	–	–	–	–	–	–	19,994	18,232	–	–	–	–	19,994	18,232
Foreign exchange loss (gain)	(33)	(54)	(6,771)	6,268	–	–	(100)	(68)	–	–	(6,904)	6,146	–	–	–	–	(6,904)	6,146
Total expenses	431,162	429,039	681,049	767,957	16,863	17,155	28,645	33,924	8,581	7,968	1,166,300	1,256,043	2,375	2,507	(861)	(947)	1,167,814	1,257,603
Excess of revenue over expenses before the undernoted	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**10,855**	**13,205**	**–**	**–**	**10,855**	**13,205**
Change in cumulative fair value of forward currency contracts	–	–	297	5,860	–	–	–	–	–	–	297	5,860	–	–	–	–	297	5,860
Change in fair value of investments measured at fair value	–	–	–	–	–	–	–	–	–	–	–	–	977	6,860	–	–	977	6,860
Excess of revenue over expenses	**$ –**	**$ –**	**$ 297**	**$ 5,860**	**$ –**	**$ –**	**$ –**	**$ –**	**$ –**	**$ –**	**$ 297**	**$ 5,860**	**$ 11,832**	**$ 20,065**	**$ –**	**$ –**	**$ 12,129**	**$ 25,925**

(1) National facilities redevelopment program

(In thousands of dollars)

14. Fresh blood products and national facilities redevelopment program details:

	Fresh Blood Products		National Facilities Redevelopment Program		Total	
	2019	2018	2019	2018	2019	2018
Revenue:						
Members' contributions	$ 431,225	$ 418,407	$ 6,093	$ 47,024	$ 437,318	$ 465,431
Federal contributions	6,202	6,250	–	–	6,202	6,250
Less amounts deferred	(34,625)	(23,794)	(6,093)	(47,024)	(40,718)	(70,818)
	402,802	400,863	–	–	402,802	400,863
Amortization of previously deferred contributions:						
Relating to capital assets	20,267	18,379	–	–	20,267	18,379
Relating to operations	1,704	3,008	2,378	4,302	4,082	7,310
Total contributions recognized as revenue	424,773	422,250	2,378	4,302	427,151	426,552
Net investment income	2,368	1,224	956	448	3,324	1,672
Other income	687	815	–	–	687	815
Total revenue	427,828	424,289	3,334	4,750	431,162	429,039
Expenses:						
Staff costs	270,703	271,365	1,005	2,339	271,708	273,704
General and administrative (note 19)	111,857	104,644	2,294	2,410	114,151	107,054
Transfer of recovered plasma costs	(26,400)	(26,400)	–	–	(26,400)	(26,400)
Medical supplies	51,707	56,502	35	1	51,742	56,503
Depreciation and amortization	19,994	18,232	–	–	19,994	18,232
Foreign exchange gain	(33)	(54)	–	–	(33)	(54)
Total expenses	427,828	424,289	3,334	4,750	431,162	429,039
Excess of revenue over expenses	**$ –**	**$ –**	**$ –**	**$ –**	**$ –**	**$ –**

15. Financial instruments:

Risk management:

The Board of Directors has responsibility for the review and oversight of the Corporation's risk management framework and general corporate risk profile. Through its committees, the Board oversees analysis of various risks facing the organization that evolve in response to economic conditions and industry circumstances.

The Corporation's financial instruments consist of cash and cash equivalents, members' contributions receivable, other amounts receivable, investments, bank indebtedness, accounts payable and accrued liabilities, and forward currency contracts.

The Corporation is exposed to risks as a result of holding financial instruments. The Corporation does not enter into transactions involving financial instruments, including derivative financial instruments such as forward currency contracts, for speculative purposes. The following is a description of those risks and how they are managed.

(In thousands of dollars)

15. Financial instruments (continued):

Risk management (continued):

(i) Market risk:

Market risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices. Market risk comprises three types of risk: interest rate risk, foreign currency risk and other price risk. These risks are discussed below:

Interest rate risk:

Interest rate risk pertains to the effect of changes in market interest rates on the future cash flows related to the Corporation's existing financial assets and liabilities.

The Corporation is exposed to interest rate risk on its cash and cash equivalents and investments. At March 31, 2019, this exposure was minimal due to low prevailing rates of return and due to majority of fixed income investments having fixed rates.

Foreign currency risk:

Foreign currency risk is the risk that the value or future cash flows of financial instruments will fluctuate as a result of changes in foreign exchange rates. The Corporation is exposed to foreign currency risk on purchases that are denominated in currencies other than the functional currency of the Corporation. To mitigate this risk, the Corporation has a formal foreign currency policy in place. The objective of this policy is to monitor the marketplace and, when considered appropriate, fix exchange rates using forward contracts to reduce the risk exposures related to purchases made in foreign currencies. Generally, forward currency contracts are for periods not in excess of eighteen months.

At March 31, the Corporation had the following instruments denominated in U.S. dollar (USD):

	2019 CDN		2018 CDN	
	Carrying value	Fair value	Carrying value	Fair value
Financial assets:				
Cash	$ 916	$ 916	$ 4,995	$ 4,995
Accounts receivable	53	53	53	53
Financial liabilities:				
Accounts payable and accrued liabilities	(12,256)	(12,256)	(13,908)	(13,908)
Forward currency contract assets:				
Designated as hedges	–	10,956	–	10,084
Not designated as hedges	4,549	4,549	4,252	4,252

15. Financial instruments (continued):

Risk management (continued):

(i) Market risk (continued):

Foreign currency risk (continued):

During the years ended March 31, 2019 and 2018, the Corporation entered into forward currency contracts to hedge its foreign currency exposure on a substantial portion of its USD purchases of plasma protein products. The contracts are intended to match the timing of the anticipated future payments in foreign currencies.

The Corporation designated USD $274,406 of the 2019-2020 forward currency contracts as being in a hedging relationship with the equivalent amount of the 2019-2020 future forecasted plasma protein product payments. Hedge accounting has been applied in accordance with CPA Canada Handbook - Accounting, Section 3856, as these hedges are considered to be effective. The forward currency contracts designated as hedges mature monthly from April 2019 through March 2020, at an average rate of 1.29. The USD purchased under the hedging forward currency contracts will be used to pay USD $22,867 per month of USD plasma protein product purchases, creating a net cost for these products that fixes the foreign exchange rate to 1.29.

The remaining forward currency contracts were not designated as hedges of anticipated transactions and, accordingly, hedge accounting was not applied.

The forward currency contracts included on the consolidated statement of financial position represent forward currency contracts that have not been designated in a hedging relationship. The contracts fix the currency rate at 1.29 (2018 - 1.24) on USD $117,602 (2018 - USD $98,100) notional amount and one twelfth of the non-designated forward currency contracts mature monthly from April 2019 through March 2020. These forward currency contracts are recorded at fair value. The fair value of the forward currency contracts is determined using a quote from its forward exchange dealers.

In addition to operational foreign currency risk, investments held by CBS Insurance Company Limited denominated in currencies other than the Canadian dollar expose the Corporation to fluctuations in foreign exchange rates. Fluctuations in the relative value of foreign currencies against the Canadian dollar can result in a significant impact on the fair value of investments. The Corporation’s exposure to foreign currency arises from its investment of $116,406 in pooled funds (2018 - $111,063) which hold international equities and global fixed income of which $111,492 (2018 - $105,978) is denominated in foreign currencies.

15. Financial instruments (continued):

Risk management (continued):

(i) Market risk (continued):

Other price risk:

Other price risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices (other than those arising from interest rate risk or foreign exchange risk), whether those changes are caused by factors specific to the individual financial instrument or its issues, or factors affecting similar financial instruments traded in the market.

The Corporation is exposed to other price risk on its mortgage funds and pooled funds due to changes in general economic or stock market conditions, and specific price risk which refers to equity price volatility that is determined by entity specific characteristics. These risks affect the carrying value of these securities and the level and timing of recognition of gains and losses on securities held, causing changes in realized and unrealized gains and losses. The Corporation mitigates price risk by holding a diversified portfolio. The portfolio is managed through the use of third party investment managers and their performance is monitored by management and the Board of Directors of the captive insurance operations.

(ii) Credit risk:

The Corporation is exposed to the risk of financial loss resulting from the potential inability of a counterparty to a financial instrument to meet its contractual obligations. The carrying amount of cash and cash equivalents, Members' contributions receivable and other amounts receivable, and investments, captive insurance operations represent the maximum exposure of the Corporation to credit risk.

Cash and cash equivalents are held with a Canadian financial institution rated by Standard & Poor's credit rating as A+ with a negative outlook. All foreign exchange contracts must be transacted with Schedule I or Schedule II financial institutions as per the Corporation's foreign currency policy.

The Corporation is also exposed to credit risk on fixed income securities investments. The investment policy requires an average credit rating of 'A' on the credit quality of its fixed income portfolio, related to captive insurance operations.

Members' contributions receivable are current in nature and management considers there to be minimal exposure to credit risk from Members due to funding agreements in place and third party Member credit ratings. Standard & Poor's available credit ratings for Members range from A credit watch stable to AAA credit watch stable.

15. Financial instruments (continued):

Risk management (continued):

(ii) Credit risk (continued):

Credit risk associated with other amounts receivable is considered to be minimal, based on past experience with bad debts. The carrying amount of amounts receivable for these parties represents the Corporation's maximum exposure to credit risk.

(iii) Liquidity risk:

Liquidity risk is the risk that the Corporation will not be able to meet its financial obligations as they fall due. The Corporation's approach to managing liquidity is to evaluate current and expected liquidity requirements to ensure that it maintains sufficient reserves of cash and cash equivalents. In addition, the Corporation has credit facilities described in note 9 that it can draw on as required.

At March 31, 2019, the Corporation's accounts payable and accrued liabilities and forward currency contracts are all due within one year.

The provision for future claims has no contractual maturity and the timing of settlement will depend on actual claims experience in the future.

The liabilities for employee future benefits are generally long-term in nature and fall due as eligible employees in the Corporation's defined benefit pension plans retire or terminate employment with the Corporation.

16. Captive insurance operations:

The Corporation has established two wholly-owned captive insurance subsidiaries, CBS Insurance Company Limited (CBSI) and Canadian Blood Services Captive Insurance Company Limited/ Compagnie d'assurance captive de la société canadienne du sang limitée (CBSE). CBSI provides insurance coverage up to $250,000 with respect to risks associated with the operation of the blood system. CBSE has entered into an arrangement whereby the Members have agreed to indemnify CBSE for all amounts payable by CBSE under the terms of the excess policy up to $750,000, which is in excess of the $250,000 provided by CBSI. No payment shall be made under CBSE until the limit of the liability under the primary policy in CBSI, in the amount of $250,000, has been exhausted. As a result, the Corporation has $1,000,000 total in coverage. As a result, effective April 1, 2019, the provision for future claims will increase by $50,000 and a corresponding expense will be recognized in the Consolidated Statement of Operations. In turn CBSE's Board approved a decrease in the excess policy from $750,000 to $700,000. The total insurance coverage to the Corporation has been maintained at $1,000,000. As a result, effective April 1, 2019, the provision for future claims will increase by $50,000 and a corresponding expense will be recognized in the Consolidated Statement of Operation.

16. Captive insurance operations (continued):

The provision for future claims is an actuarially based estimate of the cost to the Corporation of settling claims relating to insured events (both reported and unreported) that have occurred to March 31, 2019.

A significant proportion of both the future claims expense for the period and the related cumulative estimated liability of the Corporation for these future claims at March 31, 2019, of $250,000 (2018 - $250,000) covers the manifestation of blood diseases, which is inherently difficult to assess and quantify. There is a variance between these recorded amounts and other reasonably possible estimates.

17. Guarantees and contingencies:

(a) Guarantees:

In the normal course of business, the Corporation enters into lease agreements for facilities and assets acquired under capital leases. In the Corporation's standard commercial lease for facilities the Corporation, as the lessee, agrees to indemnify the lessor and other related third parties for liabilities that may arise from the use of the leased premises where the event triggering liability results from a breach of a covenant, any wrongful act, neglect or default on the part of the tenant or related third parties. However, this clause may be altered through negotiation. In the Corporation’s assets acquired under capital leases both the lessee and the lessor agree to indemnify each other for death or injury to the employees or agents of either party, where the event triggering liability results from negligent acts, omissions or willful misconduct.

The maximum amount potentially payable under any such indemnities cannot be reasonably estimated. The Corporation has liability insurance that relates to the indemnifications described above.

Historically, the Corporation has not made significant payments related to the above-noted indemnities and, accordingly, no liabilities have been accrued in the consolidated financial statements.

(b) Contingencies:

The Corporation is party to legal proceedings in the ordinary course of its operations. In the opinion of management, the outcome of such proceedings will not have a material adverse effect on the Corporation’s financial statements or its activities. Claims and obligations related to the operation of the blood supply system prior to September 28, 1998, and the Canadian Council for Donation and Transplantation prior to April 1, 2008, are not the responsibility of the Corporation.

(In thousands of dollars)

18. Commitments:

At March 31, 2019, the Corporation had the following contractual commitments:

	Vendor commitments	Research and development grants	Operating leases	Total
2019-2020	$ 156,959	$ 2,091	$ 6,740	$ 165,790
2020-2021	1,522	849	3,775	6,146
2021-2022	1,410	511	3,021	4,942
2022-2023	–	152	2,251	2,403
2023-2024	–	–	1,160	1,160
Thereafter	–	–	1,795	1,795
Total	$ 159,891	$ 3,603	$ 18,742	$ 182,236

The research and development grants are funded by contributions included in deferred contributions for future expenses.

19. Research and development:

For the year ended March 31, 2019, the Corporation incurred $12,925 (2018 - $12,968) of expenses related to research and development. These costs are reported in note 13 under Fresh Blood Products and National Facilities Redevelopment Program and are included in general and administrative and staff costs.

20. Related party transactions:

The Members provide funding for the operating budgets of the Corporation. The Corporation enters into other transactions with these related parties in the normal course of business.

Transactions with the defined contribution pension plan, the two defined benefit pension plans, and the other defined retirement and post-employment benefits plan are conducted in the normal course of business. The transactions with these plans consist of contributions as disclosed in note 8, as well as administrative charges totaling $66 (2018 - $56). At March 31, 2019, the net amount due from the Corporation’s pension plans is $294 (2018 - $285).

21. Capital disclosures:

The Corporation is a non-share capital corporation and plans its operations to essentially result in an annual financial breakeven position. The Corporation considers its capital to be the sum of its net assets. This definition is used by management and may not be comparable to measures presented by other entities. The Corporation manages capital through a formal and approved budgetary process where funds are allocated following the underlying objectives below:

(a) to provide a safe, secure, cost-effective and accessible supply of blood and blood products, including red blood cells, platelets, cord blood, and plasma protein products, to all Canadians. The Corporation also provides the management of donor registries for stem cells, cord blood stem cells and organs, diagnostic services in certain parts of Canada, and research and development;

(b) to support the Corporation's ability to continue as a going concern;

(c) to meet regulatory and statutory capital requirements related to captive insurance operations; and

(d) to ensure the funding of working capital requirements.

The Corporation evaluates its accomplishment against its objectives annually. The Corporation has complied with all externally imposed capital requirements and there were no changes in the approach to capital management during the period.

The Corporation's captive insurance operations are required to maintain statutory capital and surplus greater than a minimum amount determined as the greater of a percentage of outstanding losses or a given fraction of net written premiums. At March 31, 2019, the Corporation's captive insurance operations were required to maintain a minimum statutory capital and surplus of $37,500 (2018 - $37,500). The actual statutory capital and surplus was $234,453 (2018 - $216,807) and the minimum margin of solvency was therefore met. The Corporation's captive insurance operations were also required to maintain a minimum liquidity ratio whereby the value of its relevant assets is not less than 75% of the amount of its relevant liabilities. At March 31, 2019, the Corporation's captive insurance operations were required to maintain regulatory assets of at least $188,939 (2018 - $188,110). At that date, regulatory assets were $486,371 (2018 - $467,620) and the minimum liquidity ratio was therefore met. The value of regulatory assets differs from that reported on the consolidated statement of financial position as it is determined under a different accounting framework, *International Financial Reporting Standards*.

22. Statutory disclosures:

As required under the Charitable Fundraising Act of Alberta, included in staff costs is $853 (2018 - $867) paid as remuneration to employees whose principal duties involve fundraising.

23. Reclassification:

During the year ended March 31, 2019, the Corporation recorded a transfer of unrestricted net assets to net assets restricted for captive insurance in the amount of $2,421 to adjust the balances for the impact of intercompany eliminations recorded on consolidation in prior years. This reclassification had no impact on the consolidated statement of operations.

24. Comparative information:

Certain 2018 comparative information has been reclassified to conform with the consolidated financial statements presentation adopted in the current year.

Canadian Blood Services

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