



PULMONARY HYPERTENSION
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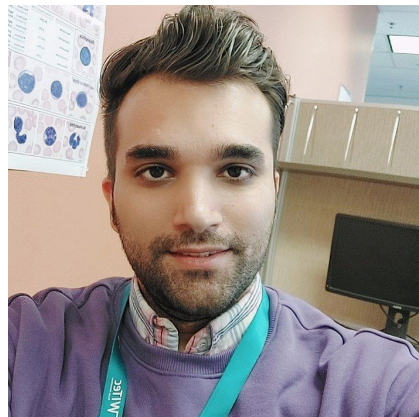
CONNECTIONS

The Official Magazine of the Canadian PH Community



Special Feature:
End-of-Life Planning

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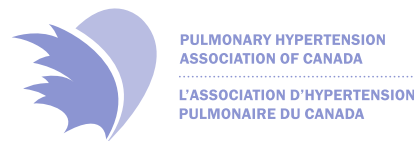
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Message from the Chair & Executive Director

Facing Life's Biggest Questions with Courage and Love



Nicole Dempsey



Jamie Myrah

Dear PHriends,

Welcome to the Summer-Fall issue of *Connections*. In this issue, we are proud to present a very important Special Feature on *End-of-Life Planning*. We want to begin by recognizing what a difficult topic this is for most people, but especially for those facing serious, life-limiting health conditions such as pulmonary hypertension (PH). It is hard enough to live with the grief and fear of knowing one's life expectancy is tied to the advancement and accessibility of treatments that may take years to be realized. But to outright plan for our own physical and cognitive decline—and eventual death—requires us to manage our fears and find answers for some of life's most difficult questions.

What support do I need to maintain my quality of life as my health changes/declines?

Who will make decisions on my behalf if I'm unable to speak for myself?

What extraordinary measures do I want to take to extend my life?

At what point do I no longer wish to be kept alive?

What does a dignified death mean to me?

What about a dignified life?

It is normal for us to want to avoid questions like these. Yet, it can also be normal for people dealing with a life-threatening condition to spend a lot of time thinking about such concerns. It can be impossible not to when hearing words like “no cure”, “lung transplant”, or “right heart failure”. The harsh realities of a disease like pulmonary hypertension can hover like dark clouds on the horizon, something unpredictable and beyond your control. Even if things are okay today, you don't know what's coming tomorrow.

It's easy to suggest that none of us really know what the future holds, and therefore we should all plan for the end of our lives. And yes, as you will see in this issue, there are lots of good reasons why everyone should take the time to think about their own values and preferences and plan accordingly. However, the addition of PH to the equation changes the nature of the discussion. It can suddenly feel much less intangible and much more concrete and real. Things that may have been important to you—perhaps staying in your home or living to a certain point in time—can shift in unexpected ways. How you define

“quality of life” or whom you want to share this part of your journey with may change.

As with most types of planning in life, end-of-life planning is most effective when viewed as a dynamic process rather than a fixed list of objectives and actions. Circumstances change—and so do we—so it's wise to re-evaluate occasionally to ensure we are remaining true to ourselves. This also means keeping the lines of communication open with our family and friends. Much of end-of-life planning entails communicating our views to others, often in the form of formal legal arrangements. Perhaps this is the hardest part of all—making the time and having the courage to clearly and compassionately make our wishes known to our loved ones.

Many of us know the courage it takes to sit across from our spouse, parent, or best friend and talk to them honestly about the thing they fear most: losing us. It is a profoundly vulnerable thing to do. It is also an act of deep love—a way to honour both yourself and the people who will be most impacted by your death. Sometimes this means making them a part of fulfilling the responsibilities associated with end-of-life care and decision-making; sometimes, it means releasing our closest loved ones from those responsibilities and finding trustworthy alternatives. Only you can decide the choices that are right for you and your family.

The staff team has been talking about dedicating an issue of *Connections* to *End-of-Life Planning* for many years. It's taken time for us to gather the right resources to ensure we are providing you with practical tools and credible sources of support. In addition to providing a list of end-of-life planning resources at the end of the Special Feature section, you will also find articles written by experts in palliative care and advanced care planning. As always, we have also included voices from the PH community. You might find that you aren't ready to read all the information presented in this issue, and that's okay. We hope you will come back to it when you are ready. For others, you may have questions and be interested in learning more about the tools available to help you and your family work through these important issues. Please visit our website for more information or contact us at any time.

In this issue, we will also revisit highlights from some of 2022's most important events, including *World PH Day*, the *National PH Community Conference*, and the *National PH Medical Think Tank*. These events are crucial for raising awareness of PH and educating both patients and their families, as well as health care providers. This year's conference featured sessions on new topics that the 2021 *Canadian PH Community Survey* illustrated are critical for the PH community, such as oxygen use, mental health, and financial planning. The Community Conference provides a unique opportunity to showcase the lived experiences of people affected by a PH diagnosis and share their expertise with the professionals dedicated to providing them with quality care. Meanwhile, the Medical Think Tank has become a significant platform for connecting Canada's PH research community. Thanks to this annual meeting, new research collaborations that encompass the entire country, improve coordination amongst researchers, and engage patients in decision-making roles are taking form.

None of these activities would be possible without the support of PHA Canada's volunteers, donors, and sponsors. Every day, people across the country generously give their time and money to support our cause and improve the lives of Canadians affected by PH. Without their support—your support—PHA Canada would not be growing to meet the needs of the PH community. Your efforts have created new resources and events, generated new partnerships and opportunities, and allowed our staff team to expand to three provinces (BC, AB, and ON). We can't thank you enough for always responding to our calls for support—whether we are asking you to speak to your government representatives, share your stories, host gatherings, facilitate connections, or give your hard-earned money. These things are not easy, yet you do them so willingly and with such generosity. You have our deepest gratitude.

Before we know it, the end of the year will be fast approaching, and we'll be coming to you again for your support. We hope you'll join us in November for our **10th Annual 6-Minute Walk for Breath**. Throughout November, you'll be invited to help us raise awareness of PH while also raising necessary funds to help expand our impact and benefit even more Canadians affected by PH. In November, we will also be announcing the recipients of this year's PHA Canada research scholarships. These scholarship awards are made possible because of the fundraising efforts of community members like you. Events like *GolPH for PH* and *Delores's Heavenly Heart* succeed thanks to the contributions of community members like you. We hope each of you will participate in this year's *6-Minute Walk for Breath*—whether you choose to fundraise, donate, or simply pay \$10 to register for the virtual event on November 19 (1 PM ET / 10 AM PT). We appreciate every action that you take in support of PHA Canada and our work together. Learn more about the impact of your donations in this issue's final article, an interview with 2021 scholarship recipient Austin Reed from Queen's University (Kingston, ON).

We have big plans for the future of PHA Canada and are eager for the new initiatives we're undertaking in research, leadership development, peer support, and education. Stay tuned for the next issue of *Connections* when we introduce you to some new faces and exciting new projects!

For now, be gentle with yourself as you go through this issue. It's okay to feel overwhelmed, scared, guilty, confused, or even bored by it all. Remember, planning is a process, so take it one step at a time and reach out anytime you feel you need assistance. We are always here for you.

Sincerely,

Nicole Dempsey

Living with IPAH since 2013
Board Chair, PHA Canada

Jamie Myrah

Executive Director, PHA Canada

MEMO: Inside PHA Canada At a Glance

Welcome to *Connections*' message board. This is your peak into things happening inside PHA Canada, from changes in leadership to new resources, special events, and more.

Ambassadors are champions of the PH community who seek to inspire others and facilitate collective action in support of a better life for those affected by PH. Individually and as a team, this group of exceptional volunteers plays a crucial role in raising awareness of pulmonary hypertension and advocating on behalf of the PH community. You can read more about the Ambassador team on our website at phacanada.ca/Ambassadors.

Welcome to our new Ambassadors

Please join us in welcoming our newest Ambassadors: Carl Selzer (patient BC), Jessica Marks-Cullum (caregiver AB), Don Downey (caregiver AB), Kathy Downey (patient AB), Lindsay ForsythBrochu (patient ON), and Jennifer Bryson (patient PEI).



Thank you to our retiring Ambassadors

Beth & Jas

We want to extend our heartfelt gratitude to Jas James and Beth Slaunwhite, who recently retired from the Ambassador team. Both have been exceptional leaders, working tirelessly on behalf of the PH community through these challenging times.

Knowledge Philanthropists (KPs) are specialized volunteers who help the organization fulfill its mission. Depending on their background and skills, KPs may develop content for PH resources, and assist in other knowledge translation activities. You can find out more about all of our Knowledge Philanthropists at phacanada.ca/knowledgephilanthropists.



Welcome to our new Knowledge Philanthropist

Saeid Maghsoudi

This spring, we welcomed Saeid Maghsoudi to the Knowledge Philanthropist team. Saeid is a Ph.D. student at the University of Manitoba, working on Persistent Pulmonary Hypertension in the Newborns (PPHN). Saeid also has an MSc. in Medicinal Chemistry and professional experience in the pharmaceutical industry. As a Knowledge Philanthropist, Saeid uses his expertise to share stories and updates about research with the PH community. Welcome, Saeid!

In the Research section, read about Saeid's interview with Austin Read, the 2020 Paroian Family PH Research Scholarship recipient.

PHA Canada is here to offer support and resources to the PH community - everything from how to support your wellness, where to find information about PH, and how to find local support so you can speak with someone who understands your experiences. To see all that PHA Canada offers go to phacanada.ca.

Caregiver Website:

Our newly updated website showcases resources and tools that are important to the unique role of the caregiver, offer opportunities for support and connections with the PH community, and educates on PH and how to support our loved ones, and create awareness of PH. You can view this webpage at phacanada.ca/caregivers



Wellness Wheel:

Along your PH journey, it may become increasingly difficult to maintain your overall wellness. A helpful tool for finding balance in your life is a *Wellness Wheel*. A wellness wheel is a tool that can help you to identify the things that you need to do to stay balanced in the critical areas of life. To download your Wellness Wheel, go to phacanada.ca/WellnessWheel.

Monthly Meet-Ups

PHA Canada has invited you to join the PH community for a casual meet-up from the comfort of your own home for more than a year. Meet-Ups have been a great way to keep us all connected throughout the pandemic. We hope that you will continue to join us! Find out more at phacanada.ca/support

Meet-Ups take place on the **last Wednesday & Thursday of each month.**

Wednesday @ 5 pm PT (Vancouver) / 8 pm ET (Toronto)

Thursday @ 10 am PT (Vancouver) / 1 pm ET (Toronto)

PH Monthly Meet-Up
.....
Connect with PH Friends



PH Awareness Month

Annual 6-Minute Walk for Breath

November 19, 2022
1:00 - 1:30 pm eastern

Join us online from wherever you're walking!

Wear purple and post your photos to social media at #LifeInPurple.

For more information go to phacanada.ca/LifeInPurple



“

Being new to the PHA Canada community, we were so happy to get involved with the 6-Minute Walk for Breath for the first time last year. We used the event to get to know the PHA Canada community better. We also used the event to raise awareness amongst our family and friends through social media posts and by reaching out directly. Even though the temperatures were cold outside, we also enjoyed getting out for some fresh air as a family.

– Michael Mayville. The Mayville family was one of the top fundraisers for the 2022 Annual 6-Minute Walk for Breath.

Your Community

The Merriam-Webster online dictionary defines a community as a unified body of individuals. Further breakdown of this definition includes phrases such as common interests, joint ownership or participation and common character. This description rings true when describing the PH community who have shown dedication, courage and commitment to ensuring everyone affected by a PH diagnosis can live the best life possible. You have shared your stories and experiences in the community survey, helped spread awareness of PH on World PH Day, and helped raise vital funds for programs and research. In addition to the ongoing virtual events, including the National PH Community Conference, many of you saw opportunities to start coming together again and seeing each other in person. From local events during the National PH Community Conference to the many fundraising events starting up again, the power of the community continues to be a source of strength and opportunity.

World PH Day, May 5

Each year PHA Canada, with the help and support of the PH community, works to raise awareness of PH locally, nationally, and as part of the international network of partners, globally. Examples of these incredible efforts include the release of “The Impact of Pulmonary Hypertension on Canadians” report by PHA Canada, local volunteers advocating to have moments in their community lit up periwinkle purple and hosting fundraising events. This year also saw PHA Canada represented at the European Parliament for the launch of PHA Europe’s Call to Action, demanding a more robust response to diseases and PH.

The Impact of PULMONARY HYPERTENSION on Canadians



This year, to mark World PH Day, PHA Canada launched a new report on “The Impact of Pulmonary Hypertension on Canadians.” The report highlights key findings from the 2021 Canadian PH Community Survey. Thank you to the over 400 patients, caregivers and healthcare providers who responded to this critical survey. Analysis of the survey data reveals both the resiliency of the PH community and the need for continued innovation in the care and treatment of pulmonary hypertension. Read the report at phacanada.ca/survey

On May 7, Delores’s Heavenly Heart organizers again welcomed Winnipeg supporters to this annual event raising a PHabulous \$2,500! Held in honour of Delores Rapinchuk, who was taken from her family and community by PH in 2016, Delores’s Heavenly Heart not only raises funds for PHA Canada, it plays an important role in building awareness of PH in the local community. Congratulations on a successful event!!



MLA Adrien Sala, Corrie Proulx, Reimi Rapinchuk and Samantha Roy

Each year, local communities are also encouraged by members of the PH community to recognize World PH Day by lighting up a local monument purple. Since 2014, thanks to these efforts, monuments have been illuminated in periwinkle purple on May 5 from coast to coast. This year, some communities went further for the first time, issuing official proclamations recognizing May 5, 2022, as World PH Day.



Calgary Tower

PHA Canada was proud to be represented by Board Member and former Ambassador Joan Paulin (located at the far right in the photo) at the European Parliament in Brussels for the launch of PHA Europe’s Call to Action for a more robust response to rare diseases and PH in Europe. Joan has been part of an international working group that developed the new policy paper calling for action on earlier diagnosis, treatment access, and better support for PH patients.



Eva Otter, President of PHA Europe; Matt J. Granato, President and CEO, PHA USA; Joan Paulin, Member, Board of Directors, PHA Canada

2022 National PH Community Conference

To view recordings of the virtual sessions and find out more about the 2022 National PH Community Conference go to phacanada.ca/conference

From May 28 to June 4, over 300 PH patients, caregivers, and health care professionals from across Canada once again came together for the National PH Community Conference. Using this year’s theme “Explore the Possibilities!” as our guide, the program was designed to inform, educate, and share the knowledge and practical skills within the PH community. We also wanted to provide opportunities to relax and try new things such as yoga, *essentric* stretching, and reiki. Most importantly, we wanted to celebrate the great potential and opportunities that can happen when the PH community comes together, virtually and in person!



Vanda and Gord MacLean getting into the conference spirit. Vanda and Gord MacLean get into the conference spirit using photo props which were included in their registration kits.



Community members from across the Ottawa region gathered together at Britannia Park



PH community members enjoying some in - person laughs in Calgary Alberta



The virtual program included sessions about new and innovative research, financial planning, relationship building, nutrition and exercise, as well as the question and answer sessions where participants were able to interact directly with healthcare professionals as well as other patients and caregivers.

Community members from across the Vancouver region gathered together at Garden Park



Getting into the Conference spirit in London Ontario



2021 Donor Recognition

Each year we dedicate this space in *Connections* to honouring the people and companies who ensure PHA Canada has the resources necessary to address the needs of people affected by pulmonary hypertension and create a strong, united PH community. We are incredibly proud to see the number of Major Donors and Monthly Donors grow by 50% last year! What a tremendous show of support for Canada's PH community! Thank you to *all* our donors and corporate sponsors for choosing to give to PHA Canada. Your commitment to PHA Canada's success is a testament to your passion for a better future for all Canadians affected by PH.

Major Donors

- Alison Adamson
- David Anthony
- Susan Barfoot
- Sanam Basirian
- Darren Bell
- Sarah Besik
- Debi Bowman
- Michael Cairns
- Wing Chu
- Michael Comeau
- John Curic
- Roger Dowdall
- Dr. Desmond & Stephanie Dwyer
- Elaine Forsey
- Andrew Friesen
- Joan & Ian Gibson
- Melvin Griffin
- Darwin Hofski
- Jonathan Hislop
- Bruse Hustins
- Pat James
- Garth Jopling
- Margaret Lacroix
- Sherif Masood
- Dr. Sanjay Mehta
- Jamie Myrah
- Lisa Noonan
- Joan & Patrick Paulin
- Jodi Paulin
- Jerome Pulcine
- Lorne Shantz
- Naveen Shastry
- Jane Shirley

- James Skippen
- Rob Sloan
- Virginia Steele
- Ronald Vance
- Russell Yablonski

Monthly/Quarterly/Annually

- Jeff Becker
- Dr. David Christiansen
- Dianne Curle
- Dominic Dedato
- Nicole Dempsey
- Sheila Dempsey
- Gillian Fenwick
- Alex Fontaine
- Katherine Huisman
- Mani Jafari
- Jasbir James
- Renee Levaque
- Robertta Massender
- Karen Mayner
- Renae Mohammed
- Angela Myrah
- Judith Pederson
- John Pettifor
- Edward Rathonyi
- Janette Reyes
- Michael Robach
- Garth Robertson
- Birdeen Selzer
- Jacqueline Selzer
- Balakrishna Shastry
- Jeffrey Skippen
- Marilyn Stubberfield

- Ashley Sudsbear
- Renee Wruck

Community Events & Campaigns

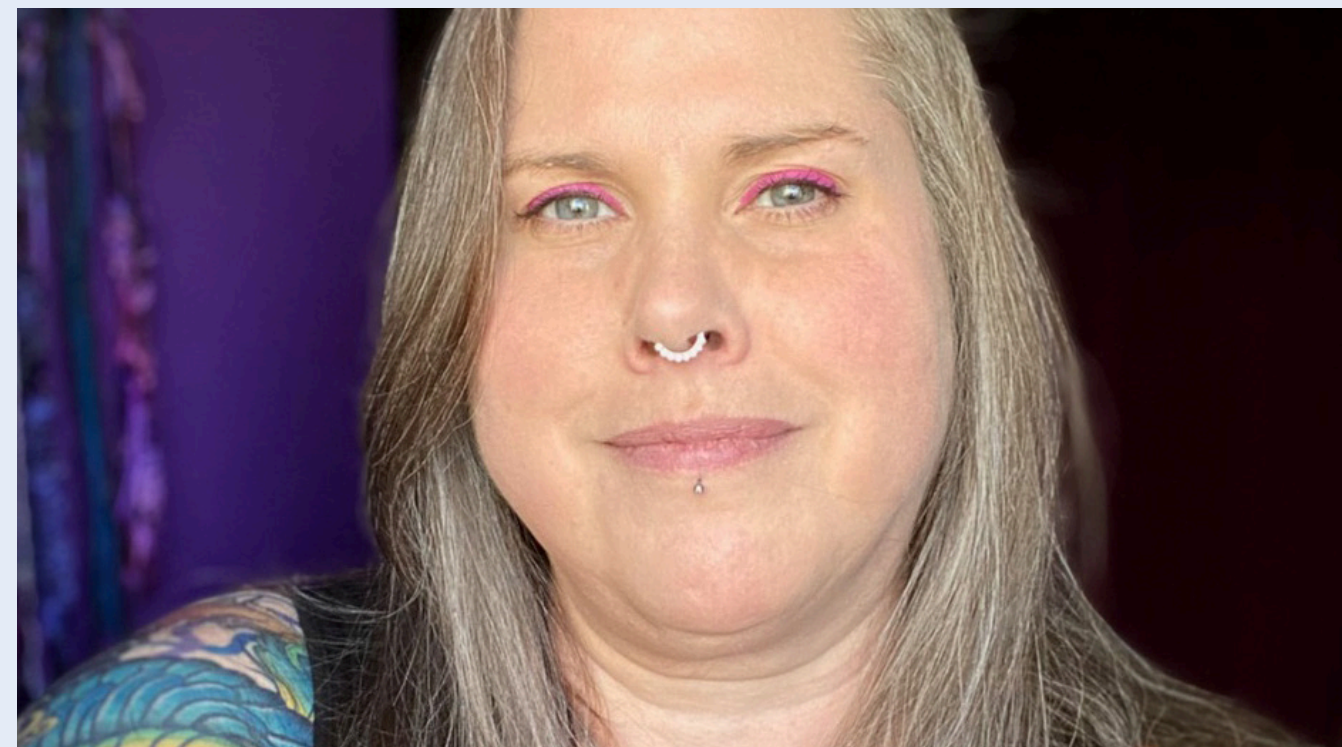
- Ajax Run/Walk for PH (Ajax, ON)
- Cheryl Uttley Jewellery Sale in Honour of Lynn Schnurr (Kitchener, ON)
- Dolores's Heavenly Heart (Winnipeg, MB)
- GolPH for PH (Milton, ON)
- 6-Minute Walk for Breath (National)
- Chicago Title Insurance Company Canada
- Paypal Giving Fund Canada (Facebook Fundraising)

Corporate & Foundation Donors

- Anonymous
- ICC Canada Contracting Inc
- Seva internal Charitable Foundation
- Sisters of Providence of St Vincent de Paul

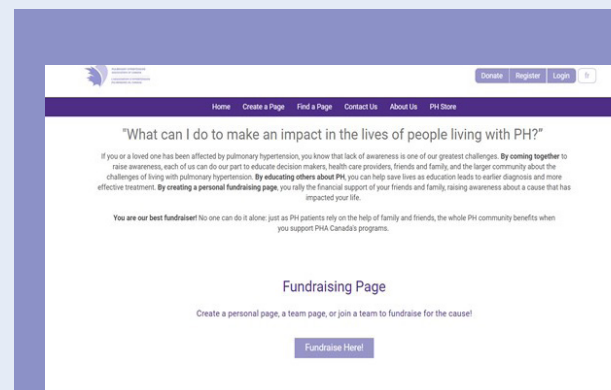
Corporate Efforts

- Accelaron
- Bayer Inc
- Gossamer Bio
- Janssen Inc.
- McKesson Canada
- Shoppers Drug Mart Specialty Health Network
- United Therapeutics Corporation
- Viartis



My husband was diagnosed with PAH in the fall of 2018. The decision to make a regular monthly donation to PHACanada was easy. PHACanada does so much for our PH Community including patient and caregiver education, patient advocacy, research funding, and so much more. Regular monthly donations help the organization to budget effectively and continue their important work.

-Birdeen Selzer



Fundraise Online

You can make a difference for the PH community from the comfort of your home! Create a personal or team fundraising page from PHA Canada's website. It's easier than ever to share your passion and commitment for helping Canadians affected by PH. Start a Personal Campaign: Create your own online fundraising page and collect donations from your personal network. It's a quick, easy, and free way to start fundraising.

phacanada.akaraisin.com/FundraiseForPH



Supporting People with Pulmonary Hypertension and Their Families

The HTAPQ Foundation has offered several online conferences throughout the year. Each presentation begins with a discussion period that allows participants to get to know each other better and exchange ideas. All the topics were chosen from suggestions provided by individuals suffering from pulmonary hypertension or intended to help them get through the isolation caused by the pandemic. We're aware that some of our members work and others do not use the Internet; we've mailed them summaries of past video conferences and highlighted the video conferences in our newsletter.

- On three occasions, Dr. Steeve Provencher, a pulmonologist at the IUCPQ, gave an update on COVID-19 and the health measures recommended by Public Health.
- We invited psychologist Christine Dion to help us cope with the anxiety caused by the pandemic. During eight videoconferences, she spoke about mental health, meditation, and grief caused by the disease.
- Jessica Pinto, a clinical nurse at the Jewish General Hospital in Montreal, presented a lecture on preparing for an emergency with COVID-19.
- Therapist Marie-Chantal Brisson gave us some tips on living with loneliness in *Vivre la solitude autrement*, and psychoeducator Yannick Fréchette encouraged us to cultivate kindness in his lecture *Cultivons la bienveillance*.

Our Facebook page was created in 2015 and has about 6,300 subscribers. HTAPQ's Facebook page is a way for the Foundation to publicize its events, promote its fundraising campaigns and raise awareness about pulmonary hypertension. In November 2020, during Pulmonary Hypertension Awareness Month, 20 videos were posted online to raise awareness of the disease, its symptoms and its impact on daily life. Some of the videos were viewed more than a thousand times! Hosted by Ms. Line Ducharme, our Facebook group is reserved for people living with pulmonary hypertension. Membership of this group currently consists of 61 members. It is a valuable space where members can exchange ideas, support each other, overcome isolation and share information from the Foundation and PHA Canada.

The Foundation's newsletter is available on our website and is sent by email or, when available, by mail. In 2020 three issues of our newsletter were published and sent out. A new leaflet has been produced in French and English to inform those newly diagnosed with PH about the Foundation's existence and the support it can provide.

Despite the pandemic and the decrease in revenue, the Foundation has provided financial assistance to more than 30 members for a total amount of \$55,000. In addition, each member receives a birthday card with a small gift, a check for \$50.

2020 ended with a joyful holiday concert. *Le temps des fêtes "Entre nous,"* featuring the multi-instrumentalist Patricia Marcoux. Although we would have liked to see greater participation, those present expressed enjoyment and wanted these meetings to continue.

Contributed by: Stéphanie Théorêt, Vice-President, HTAPQ Foundation



Réjean Dupont, Francine Fortier, Marthe Poulin, France Dupont and France Pratte

Special Feature

End-of-Life Planning

End-of-Life planning can be an uncomfortable subject, bringing forth thoughts and ideas we instinctively try to suppress. Like planning for other life events, having a plan, and even just moving through the process of planning, can ease anxiety and give one a sense of control. As with many areas of our life, the process can be as important as the outcome. Identifying your personal priorities and communicating them to those closest to you can help increase your quality of life immediately. It can also help guide decisions along your journey, including if you ever need someone to speak on your behalf. These discussions allow your loved ones to better understand your feelings and intentions, potentially easing their burden a little as well.

Your Life, Your Decisions: An Introduction to End-of-Life Planning

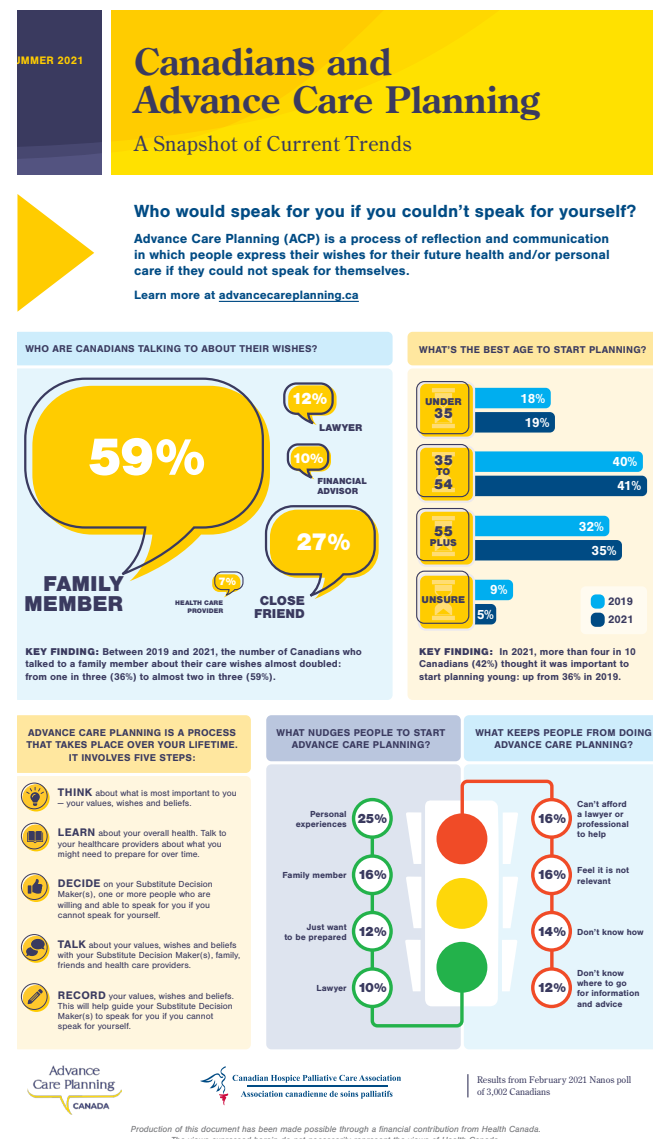
Identifying and documenting your wishes and priorities can help ensure you remain an active participant in the events that affect you, even when you need others to speak on your behalf.

Life is complicated, and it seems that we are continuously being told to plan — for our children’s education, our parents’ care, for everything from going to school to buying a house to planning for retirement. Many people like planning, many others, however, can find this process stressful.

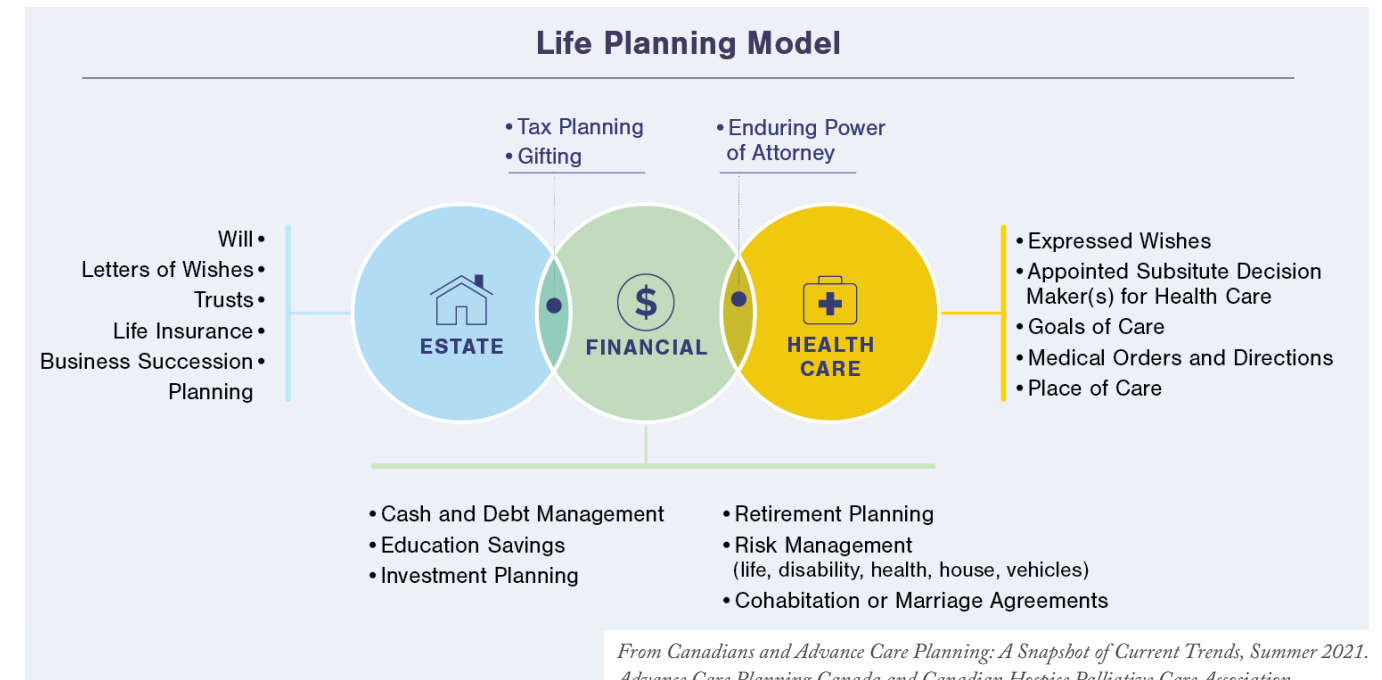
When you have a chronic health condition, life gets even more complicated, and now you need a plan to help you live. You plan to ensure you have the medications you need, enough oxygen in your tanks, and the personal support you need to keep your hearts and minds strong. You do this so that you, your family, and loved ones can have the best quality of life possible, despite the challenges of a PH diagnosis. End-of-life planning can be daunting and scary and involves having difficult conversations with yourself and others. It is also a valuable process that helps ensure you can focus on the best quality of life possible throughout our journey. We plan as best we can for life; why not give the same focus and attention to how we experience the end of our life. We often think of end-of-life planning as deciding between burial or cremation or pre-paying for funeral costs. Those are important decisions to make; however, other important conversations also need to occur.

It is important that your loved ones have the appropriate tools and knowledge to take care of you and your affairs at the end of your life. They need to know everything from what to do with your social media accounts to how to dispose of your personal items, your wishes concerning your medical treatments, and what kind of legacy you want to leave behind. These conversations can help you live as well as possible and with agency over the decisions affecting you. They can also be essential to building an honest and safe relationship with the people you will rely on to ensure your wishes are fulfilled.

Let’s be real — these conversations are not easy and don’t often come naturally to us. They can feel very depressing and sad, and most of us might want to avoid them altogether. We might hold off from having these conversations because we don’t want to upset the ones who love us the most — our caregivers, parents, children, and friends. Having



**Results from February 2021 Nanos poll



an end-of-life plan is a gift that we give ourselves and our family members. It helps us express what we want and helps our loved ones understand their roles in making those wishes happen. A plan can also help us make those tough decisions in the most stressful times.

You may not have all the answers right away and some may change as you go along. The key is to get the conversation started. Plant the seeds and start the hard conversations. It doesn't have to happen in one night or over a single weekend. Start where you feel comfortable and work through your wants, needs, and fears. Most importantly, do it surrounded by those who will support you and honour your wishes.

For this *Special Feature*, we have invited experts in advance care planning and palliative care to explain these topics further and hopefully make them less daunting. We also provide some resources to help guide you and show you where to find information and tools specific to your needs.

Contributed by: Kimberly Brunelle, Manager of Support and Education Programs

Having an end-of-life plan is a gift that we give ourselves and our family members. It helps us express what we want and helps our loved ones understand their roles in making those wishes happen.

Introduction to Advance Care Planning

Karine Diedrich is the Director of Operations and Engagement at the Canadian Hospice Palliative Care Association (CHPCA). She is responsible for Advance Care Planning (ACP) in Canada, a national collaborative project led by CHPCA. ACP in Canada works with leaders across the country to raise awareness of the importance of advance care planning and support individuals in undertaking ACP by providing tools, resources and learning opportunities for individuals, families and health care and allied professionals.



Karine Diedrich

Advance Care Planning (ACP) is one of several life planning activities you should do in your life. Life planning includes setting up your will, buying insurance and saving money for retirement. Advance Care Planning is also about preparing for your future. It is a process of reflection and communication. It is a time for you to reflect on your values and wishes, and to let people know what kind of health and personal care you would want if you were unable to speak for yourself.

ACP includes choosing whom you would like to make decisions about your care if you cannot, your “Substitute Decision Maker” (SDM). If you do not specify whom you want to act as your SDM, every province and territory has a default list for health care providers to turn to. However, their decisions will be impersonal and not tailored to your specific wishes and desires.

Specifying whom you want to act as your SDM is an important step. Ensuring your SDM knows what matters most to you is equally important. The more people know about your values, goals and wishes, the more they can ensure your health care decisions are respected.

ACP is important for everyone, and it is essential for people who think their loved ones may have views or beliefs different from their own. It is also important for those diagnosed with a chronic condition that could affect their ability to communicate in the future.

While it may feel strange or uncomfortable to think and talk about your future health and personal care, having these conversations before a crisis or sudden decline can spare everyone from harm and suffering. So, where do you begin?

The hardest part is often starting the talk. Here are some ways to start the conversation with family and friends:

Be Straight Forward. I need your help with something ...

Knowledge Share. I was reading an article today and I would like to share what I learned with you...

Reflection. I was thinking about what happened to _____ and it made me realize....

Proactive Planning. Right now, I'm doing well, but I want to think ahead and be prepared for when things are not so good... and how we might want to handle that situation...

What Matters Most. I think it's really important that people who matter to me know what's important to me about my health care...

Clarification. I want to make sure you understand and could honour my wishes...

Thinking Ahead. I want you to be prepared if you had to make decisions on my behalf...

Advance care planning is a process that takes place over your lifetime. It involves five steps:



THINK



LEARN



DECIDE



TALK



RECORD

Learn more at advancecareplanning.ca

Advance Care Planning in Five Steps

1. **THINK** about what is most important to you, your values, wishes and beliefs. What brings you joy? What do you value most about your mental or physical health?
2. **LEARN** about your overall health. This may include any current conditions you want to understand better. Talk to your healthcare providers about what you might need to prepare for over time.
3. **DECIDE** on your Substitute Decision Maker(s), one or more people willing and able to speak for you if you cannot speak for yourself. Whom do you trust to make decisions that reflect your wishes, even if they differ from their own? Can they make difficult decisions during stressful times?
4. **TALK** about your values, wishes and beliefs with your Substitute Decision Maker(s), family, friends and health care providers.
5. **RECORD** your values, wishes and beliefs in your Advance Care Planning Guide or in a letter, poem, video or audio recording. Having your wishes documented will help guide your Substitute Decision Maker(s) to speak for you if you cannot speak for yourself.

Your health and life circumstances will change over time. Revisit these five steps often and include your Substitute Decision Maker(s) in these conversations whenever possible. Make sure they can learn about what's important to you and are prepared to make decisions for you in the future if they need to.

Remember the Five Steps: Think, Learn, Decide, Talk, and Record. That's It! Advance Care Planning – It's how we care for each other.

Contributor: Karine Diedrich, Director of Operations and Engagement, Canadian Hospice Palliative Care Association

Learn more at
advancecareplanning.ca

Palliative Care: It's About Living

Jose Pereira is a Professor and Director of the Division of Palliative Care in the Department of Family Medicine at McMaster University. He is the co-founder and Scientific Officer of Pallium Canada, an organization whose mission is to build capacity for primary-level palliative care and help advance the compassionate communities movement. Dr. Pereira leads the development courseware and resources for the *Learning Essential Approaches to Palliative Care* (LEAP) program, including the *Pallium Palliative Pocketbook* and research related to the impact of the program.



José Pereira

What comes to mind when you hear “palliative care”? Many people mistakenly believe that it refers to care provided only in the last days or weeks of life when someone is dying—this stigma and misunderstanding results in lost opportunities to live better. Instead, palliative care is about living as best as one can when one has an illness that is not curable. It is an approach to care that aims to optimize one’s quality of life when living with such an illness.

Some people experience distress related to social needs such as financial stresses, feelings of being a burden on loved ones, or feelings of social isolation and loneliness. Others seek spiritual and religious support when they experience emotions like loss of meaning in life or loss of personhood and dignity. Palliative care focuses on the whole person. It helps control or palliate symptoms such as pain, shortness of breath, loss of appetite and fatigue. It addresses feelings such as anxiety, fear, sadness, depression, and hopelessness which can appear while a patient is still receiving treatment.

An increasing number of studies are showing the benefits of starting palliative care earlier, alongside treatments to control the disease. These benefits include improved quality of life, reduced distress, increased feelings of hope and dignity, and even, in some cases, living longer. Starting palliative care early, therefore, does not, as some may think, mean «giving up,» removing hope, or living shorter. It is always active care.

Unfortunately, many doctors and other healthcare professionals wait until near the end of a patient’s life to discuss or start palliative care. They may not know or believe the benefits of starting palliative care

earlier. This means that sometimes patients need to take the first step and ask about palliative care. You may even also have to advocate for palliative care to be considered alongside treatment.

Traditionally, palliative care has been treated as care that is given outside of the treatment process, considered only when a person’s disease worsens despite treatments. The progression of the disease can be slow, over many months or years, for some, or more rapid, over weeks or months, for others. In the latter situations, the palliative care approach takes precedence as the treatments become less effective. The focus becomes controlling symptoms, providing psychological, social and spiritual support, and making the best decisions possible about care. For most, it becomes less about living longer and more about living better at that time. For many, connecting with loved ones and friends becomes a top priority when the illness advances.

An increasing number of healthcare professionals are realizing the benefits of integrating palliative care into the patient’s circle of care, rather than as a separate process.

Dr. Elizabeth Latimer, a Canadian palliative care pioneer, once wrote that there are *little, medium* and *big* questions that arise when we experience a serious illness. The *little* questions are the easiest to ask and answer, such as “What test is being done and why? Can I still travel?” *Medium* questions include: “What is the illness, and at what stage is it? What results will different treatments produce?” The *big* questions are the ones that worry us the most, that we are often afraid to ask. But they are important to discuss without our care teams. These are questions like, “How serious is my illness? Will I be cured? If cure is not possible, is control possible? If control is not possible, what is possible? How long do I have to live?” Health care professionals are sometimes uncomfortable initiating these important discussions, so don’t be afraid to take the first step.

Who, you may be asking, provides palliative care, and where does one receive it?

Some people may require the help of doctors or nurses with advanced palliative care expertise. Such teams increasingly, but sadly not always, can be found in hospitals and communities across Canada. They can work alongside respiratory teams, other specialists,

family physicians and primary care teams. If you feel you need palliative care, or information about it, as part of your care package, don’t hesitate to ask for it.

Depending on a patient’s needs, specialist palliative care services like palliative care units, hospices, and palliative care clinics exist. Palliative care units may admit patients temporarily to bring their problems under control. Once controlled, they are discharged home or to other care settings. Residential hospices usually provide end-of-life care for the last days or weeks when care at home is impossible. Many hospices also offer additional support services like day hospice and bereavement support.

Palliative care, in many cases, can be provided very effectively in a patient’s home. Most people prefer to spend their last days of life at home, or for as long as possible without exhausting their family. Successful palliative care in the home requires palliative care home care services (which are available to various degrees in most Canadian regions), home visits by a clinician (such as a family doctor, palliative care doctor or nurse), and support from family and friends.

An increasing number of health care professionals are realizing the benefits of integrating palliative care into the patient’s circle of care, rather than as a separate process. To accomplish this, we cannot rely only on specialist palliative care teams to provide it. An increasing number of medical students, residents, and nurses are learning palliative care skills during their training. Many health care professionals are also updating their palliative care skills when already in practice through courses like Pallium Canada’s *Learning Essential Approaches to Palliative Care* (LEAP) program. A growing number of health care professionals across many care settings, including hospitals, homes and communities, and long-term care, can also provide palliative care. As part of your advance care planning, it is important to explore the options available to you and to advocate for your chosen options.

Contributed by: Dr. José Pereira, Palliative Care Physician Professor and Director of Palliative Care in the Department of Family Medicine, McMaster University; Co-founder and Scientific Officer of Pallium Canada.

What does Advance Care Planning mean to you and have you started these conversations with those closest to you?

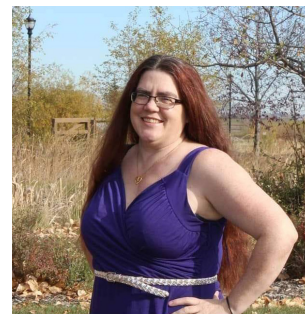


My PAH diagnosis in 2019 has made me think about and discuss Advance Care Planning more often. Having a life-limiting condition along with lupus has made me consider how I want to live and how I want to die. It's important to me to have as much say as possible over both, and not to assume that others will know my wishes. In times of crisis, loved ones can default to decisions to "do whatever it takes to keep someone alive," when it is my worst nightmare that I'd wake up traumatized from CPR and plugged into machines and tubes. Thinking about dying allows me to think about how I want to live and what's important to me now. I'm not afraid of dying, but of dying badly.

Julie Mikuska, living with PAH since 2019, Winnipeg, MB

My husband, kids and I have discussed it briefly, but we have nothing formal. They have a general idea about what my wishes are but nothing specific.

Maureen Harper, living with PH since 2017, Olds, AB



Because of my age when diagnosed and the seriousness of the disease (CTEPH), I decided to do all the End-of-Life/Advance Care planning to feel at ease for everyone concerned. I had my Executor and Power of Attorney. I did my Representation of Agreement and all the other legal documents and had discussions with family and friends about my wishes in case of any problems while I had surgery in Ottawa. Making the best decisions while I was well enough to communicate and make the arrangements was as easy as it could be. It was a very stressful time, getting all of this arranged plus learning what was wrong with me and the upside-down feeling of what was ahead of me one way or the other.

Dianne Curle, living with CTEPH since 2013, Richmond, BC

End-of-Life planning is always on our minds at some point or another. We have talked about a few things and made decisions, but have we sat down and planned with family members? No! Not because we don't think that it is something that should be done; we feel we are not there yet. Kendall is stable, and his doctor has him on wonderful things.

Wendy Bedard, caregiver since 2010, Mansonville, QC



Why is End-of-Life Planning important for PH patients and their families to consider?



We all know how unpredictable PH can be, which is why having an End-of-Life/Advance Care Plan in place is extremely important for PH patients and their families. The formation of this plan allowed my wife and I to have important discussions on a wide range of topics. From being placed on a ventilator or having a DNR ("Do Not Resuscitate") in place to even planning a funeral in the event things didn't go according to plan. We were also able to prepare our wills and determine our medical and financial power of attorney. At this point, we realized just how much there was to consider when a loved one can no longer make decisions for themselves and how much easier it is to discuss and make changes to the plan while they still have all their cognitive abilities. Having a plan in place also allows a caregiver and family members to truly honour our loved ones until the very end, which is what being a caregiver is all about.

Jason Brochu, caregiver since 2018, Almonte, ON

I would recommend others, not just in the PH community but everyone, to take some time to talk about their End-of-Life/Advance Care Plan, so everyone who needs to know (decision makers) is aware of one's wishes. This will hopefully take some stress and strain off those left to close the book on one's life.

Jane Sernoskie, living with PAH since 2016, Ottawa, ON



In general, I feel like everyone should consider what actions they want to take in the event they cannot speak for themselves. The sooner and more frequently you can have those conversations, the better! They are challenging, and often the instinct is to avoid them, but there is no getting out of the inevitable outcome for all of us. My goal at my end is to make my passing as easy as possible for my friends and family. That means having everything in place long before that time is actually upon me.

Jay Scraba, living with PAH since 2018, Calgary, AB

It will be hard, and it will be sad to have these discussions. You might want to do them later. Believe me, that "later" might not happen. But, in the long run, it will help make things so much easier for the person left alone. I am so thankful that James and I had those conversations and planned for my life without him. It was a great act of love from him.

Donna Downes, caregiver from 2015 to 2019, Ottawa, ON



End-of-Life Planning Resources

End-of-Life planning is complicated, often raising new questions as you answer existing ones. Most of the requirements and options available to you will be based on where you live. Below is a list of resources to help direct you to the organizations and websites that can best answer your questions and support you in these important discussions.

Government of Canada

canada.ca/en/health-canada/topics/end-life-care.html

Provides information about End-of-Life care, including palliative care and medical assistance in dying.

- Options available to those who are making End-of-Life care decisions
- Provincial and territorial contact numbers and links

Dying With Dignity Canada

dyingwithdignity.ca

A national human-rights charity committed to improving the quality of dying, protecting end-of-life rights, and helping people across Canada avoid unwanted suffering. Resources include:

- End-of-life planning tips
- National Support Registry
- Resources and information about medically assisted dying and patients' rights

Advance Care Planning Canada

advancecareplanning.ca

Highlights the latest news, updates, activities, and events regarding Advance Care Planning (ACP) across Canada. ACP Canada also offers a repository of resources and tools developed for professionals and patients/individuals to assist them in making appropriate decisions regarding their End-of-Life care.

- Living Well, Planning Well – toolkit summarizing the process of health care consent, capacity, ACP, and substitute decision-making in Canada
- ACP workbooks for each provincial/territorial jurisdiction
- Conversation starters
- Information and resources for choosing a substitute decision maker
- Resources for finding legal advice and navigating the different jurisdictions

The Canadian Hospice Palliative Care Association

[CHPCA.ca](https://chpca.ca)

The Canadian Hospice Palliative Care Association (CHPCA) is the national voice for Hospice Palliative Care in Canada. CHPCA's work includes public policy, public education, awareness, and advocating for quality end-of-life/hospice palliative care in Canada.

- Resources for patients and caregivers, including on grief and bereavement
- Directory of provincial associations
- Grief and bereavement Repository: resources and links to services

Financial Standards Planning Council

fpcanada.ca

Financial Standards Planning Council is a not-for-profit organization that certifies financial planners in Canada. The Council can give you the names of certified financial planners, including elder planning counsellors in your community.

The Estate Planning Council of Canada

[EPC-canada.org](https://epc-canada.org)

A National Association of Professionals and Advisors is linked in the Estate Planning industry, providing valuable Estate Planning information and helping Canadians find Estate Planning professionals.

Research Corner

This issue of Research Corner brings you articles from each of PHA Canada's Knowledge Philanthropists. Miriam Bergeret talks with Dr. Archer and Dr. Michelakis about precision medicine and the role it plays in developing the care most suited for each patient. Ashok Pandey shares his overview of the 2022 Medical Think Tank and the National PH Community Conference closing plenary: New and Emerging Research in PH. Finally, our newest Knowledge Philanthropist, Saeid Maghsoudi, interviews Austin Read, 2020 recipient of the Paroian Family PH Research Scholarship, about his research into the treatment of Persistent Pulmonary Hypertension of the Newborn (PPHN).

Precision Medicine in Pulmonary Hypertension

Using different tests and biomarkers, precision medicine can help doctors select the best treatments for each patient. Miriam Bergeret, PHA Canada Knowledge Philanthropist and Knowledge Translator discusses precision medicine with Dr. Stephen Archer and Dr. Evangelos Michelakis. Dr. Archer is head of the Department of Medicine at Queens University in Ontario, physician scientist and a practicing cardiologist who specializes in the care of patients with various forms of Pulmonary Hypertension (PH). Dr. Evangelos Michelakis is the Associate Chair Research in the Department of Medicine and founder of the Pulmonary Hypertension Program at the University of Alberta.

What is precision medicine?

Being diagnosed with PH can be a long process with what can seem like an endless list of tests. But from blood work to heart catheterizations, these tests allow doctors to provide patients with a more precise pulmonary hypertension (PH) diagnosis and select the treatments most likely to be effective for each person—a process known as precision medicine.

Why do we need precision medicine?

Everyone is different. We all have unique DNA that contributes to differences in disease and how our bodies respond to treatments. Because of these differences, it can sometimes take time to find the most effective treatment through trial and error. The goal of precision medicine is to improve that process using different tests and biomarkers.

For example, precision medicine revolutionized the treatment of cystic fibrosis (CF), a genetic disease that affects the lungs, leading to frequent lung infections. Researchers identified that specific mutations in the *CFTR* gene were responsible for the disease, facilitating the development of the first CF drug to treat the cause of the disease instead of just the symptoms. The drug helps restore normal function of the *CFTR* protein in CF patients who have specific *CFTR* mutations.

According to Dr. Stephen Archer, head of the Department of Medicine at Queens University and a cardiologist and PH specialist, precision medicine is very important when it comes to PH because what we often think of as one disease is, in reality, a collection of diseases. “For example, we call it pulmonary arterial hypertension [PAH], but someone with congenital heart disease is different than someone with scleroderma, and they are both different than someone with PAH with a *BMPR2* gene mutation,” he says. And differences in the cause of disease affect treatment options.

Precision Medicine in PH

Vasodilator tests

One of the first precision medicine tools in PH is the vasodilator

test. Before people with PH receive any therapy, they must undergo heart catheterization and should have an acute vasodilator test using drugs like inhaled nitric oxide (NO). “If you have a fall of 10 mmHg to pressures below 40 mmHg, that’s considered a positive vasodilator response,” says Dr. Archer. “That’s a marker of good prognosis. But it’s also a precision medicine marker that means patients can have a calcium channel blocker as part of their therapy.” He says that calcium channel blockers are very effective and inexpensive, and historically, patients who respond to them do very well, so it’s essential to identify these patients.

Sex differences

“One of the great paradoxes is that pulmonary hypertension in adults is more common in women, and yet the prognosis is worse in men” says Dr. Archer. Not only do differences between the sexes affect disease progression, but they can also affect how patients respond to treatment. Although Dr. Archer and his research group haven’t yet published the data, he has found that a drug they developed for PAH isn’t as equally effective in both sexes, with it working better in women. Thus, sex can be a precision medicine marker in terms of prognosis and drug response.

Genetics and PAH

Gene mutations occur in less than 15% of patients with idiopathic PAH (IP) and rarely occur in associated PAH. The most common gene mutations in patients with PAH are mutations in the *BMPR2* gene, while others include mutations in *ACVRL1*, *ENG*, *CAV1*, *KCNK3*, and *EIF2AK4* genes. Mutations affect the sequence of the gene, which sometimes impairs the function of the encoded protein.

For those with specific *BMPR2* mutations, recent studies have suggested that a drug called Ataluren, developed to treat Duchenne muscular dystrophy, could partially restore *BMPR2* protein function, warranting further investigation in people with PAH.^{1,2}

Though only 0.39% of patients with IPAH have *TET2* gene mutations, the majority of which are inherited, one study of 140 patients found that more than 86% of the participants had decreased levels of circulating *TET2* protein compared to the healthy group of participants, suggesting decreased expression of the gene is involved in PAH.³ In fact, animal models with *TET2* gene mutations have developed PAH. Thus, though having a direct *TET2* gene mutation is

uncommon, dysregulation of the gene is not, meaning scientists need to continue to look beyond genetics to understand the disease in different patients.

Metabolism

Mitochondria are organelles often known as the powerhouse of cells, but they also regulate cell division and death. Dr. Evangelos Michelakis, a PH researcher at the University of Alberta who studies metabolism, is studying the dysfunction of mitochondria in PAH. Similar to cancer cells, the cells in the pulmonary arteries (PAs) have an altered metabolism that reduces cell death and promotes cell proliferation, narrowing the PAs and increasing PA pressure. In a Phase 1 clinical trial, Dr. Michelakis and his group treated idiopathic PAH patients with dichloroacetate, a cancer drug, to restore mitochondrial function and found that this improved PA pressures and functional capacity.⁴ In the study, certain patients with gene mutations in two mitochondrial proteins, were less responsive to dichloroacetate, making it possible to identify which patients would benefit most from the drug and paving the way for a future precision medicine tool for PH.

Disease classification

Instead of relying solely on the World Health Organization’s (WHO) five distinct PH groups, there are ongoing efforts to incorporate genetics into PH classifications. “As a doctor, it’s rare that I meet a patient who is just Group 1 PH. It’s hard to find someone with PH which doesn’t have some element of Group 2 or Group 3 disease” says Dr. Archer. “In the future, we could improve classification based on precision medicine markers and disease pathways, which could identify new and different subgroups of patients and better guide their treatment.”

In 2014, The National Institutes of Health/National Heart, Lung and Blood Institute (NHLBI) in the US launched an initiative called PVDOMICS (Redefining Pulmonary Hypertension through Pulmonary Vascular Disease Phenomics). This initiative aims to improve classification and subclassification using machine learning and in-depth medical evaluations to identify shared markers of disease in 1,500 PH patients.⁵ The PVDOMICS trial is expected to be completed in 2026.

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Disease models of PAH

Researchers have also begun working on organ-on-a-chip models of PAH, where they grow different cells on a device that imitates the different layers of tissue in a pulmonary artery.^{6,7} By using cells from patients with PAH, they can recreate the disease state of PAH. The researchers hope to use the PAH-on-a-chip models to study the disease further and evaluate new PAH treatments, including potentially evaluating which treatments a patient’s cells respond to best to personalize treatment plans.

Precision medicine is based on precision knowledge

Profiling and analyzing each PH patient’s medical history, genetics, metabolism, immune system, and more can lead to a better treatment plan today. Collectively, patients’ data can also help improve future diagnostic and prognostic algorithms, helping doctors and researchers identify new relationships between previously unrecognized PH factors of PH and develop new treatments.

Though clinicians currently practice some measure of precision medicine for PH, there is no cure, so there is great potential to improve and further personalize PH treatments toward better outcomes. “One of the biggest problems we have in pulmonary hypertension is that, although we have 10 or 11 approved drugs—they are all primarily vasodilators. And yet, we know from different groups’ research that there is a lot more going on in the disease, such as changes in inflammation and metabolism,” says Dr. Archer. “In a future perfect world, the cause of your PH could be specifically identified, and you would receive a drug targeted just for you. But we’re just not there yet.”

Contributed by: Miriam Bergeret, living with PAH since 2016, PHA Canada Knowledge Philanthropist and Knowledge Translator

Exploring the Possibilities in PH Research: An overview of the National PH Medical Think Tank and National PH Community Conference Closing Plenary

PHA Canada is proud to collaborate with PH healthcare providers from across the country to support the timely and accurate diagnosis of pulmonary hypertension and the most effective care and treatment of patients.

Scientific research is an essential manner by which healthcare for PH patients can be improved. Scientists in Canada and worldwide continue to attack the key issues and questions surrounding PH across multiple disciplines.

On May 27 and 28, just before the National PH Community Conference, researchers shared their findings and updates at PHA Canada's third National PH Medical Think Tank. The event was organized by the Programs Subcommittee of the Canadian PH Medical Committee. Chaired by Dr. John Granton, members of the subcommittee include Drs. Angela Bates, George Chandy, Paul Hernandez and Luc Mertens. Canadian PH researchers and special guests from Canada and the US, presented their research, fielded questions, and held discussions with other experts. The format of the Medical Think Tank is designed to foster collaboration and improve the care and treatment of PH patients. The challenge of managing PH involves tackling multiple problems, and the Canadian PH research presented at the Think Tank reflects this. Below are some of the highlights from the presentations:

Characterizing the biology of PH involves laboratory and animal research. This is done with the hope of better understanding the disease, leading to new and faster diagnosis tools, more effective treatments, and hopefully, one day, a cure. Research presented by Dr. Jefferey Mann is looking to better understand the cause of CTEPH by studying the cellular composition of blood clots found in the blood vessels of CTEPH patients. Another study by Dr. Stephen Archer seeks to understand the role of the inflammasome, a type of immune system receptor, in PAH. In particular, the research looked at how the inflammasome could contribute to Right Ventricular Failure in PAH patients, which may lead to a new therapeutic pathway for PAH. Dr. Sebastien Bonnet is seeking to analyze the markers of PAH disease through a "multi-omics" approach. This involves studying a variety of biological and cellular components such as proteins, DNA, and RNA transcripts, among others and searching for links to PAH. Various other lab and animal research was presented, including a look at sex hormones and PAH and a new animal model for sclerosis-associated PAH.

Human trials and research are essential not only for testing the safety and efficacy of new treatments but also for studying other factors in patient welfare. The Canadian Pulmonary Hypertension Registry (CPHR) seeks to further understand the demographics of PH patients, patterns in disease treatment and patient outcomes as they exist in the real world. Dr. John Swiston provided an update on the CPHR, identifying the successes to date, limitations and challenges moving forward. In the same lens, Dr. Anne Stephenson also presented lessons from the Cystic Fibrosis registry, and how these learnings can be applied to PH. Dr. Marc de Perrot presented findings about patient outcomes following pulmonary endarterectomy (PTE) in those with CTEPH to determine ways to improve the quality of life after the surgery. Various other clinical research was presented, hopefully leading to more effective treatment strategies and a greater understanding of how best to improve patients' lives.

Researchers at this year's Medical Think Tank showed that significant progress had been made in the fight against PH in Canada. However, there is still much work to do, and the key to our success is the meaningful involvement of PH patients and the PH community. I encourage everyone in the PH community to learn more about participating in one of the many research opportunities available. Learn how to participate in the Canadian Pulmonary Hypertension Registry or how to participate in one of the many PH trials in Canada.

Contributed by: Ashok Pandey, PHA Canada Knowledge Philanthropist

To learn more about ongoing trials and other research news, go to phacanada.ca and click on the Research tab.

After a week of online seminars, exhibits, and discussions, the National PH Community Conference ended with a final presentation and Q&A panel discussion about new and emerging PH research.



Dr. Lisa Mielniczuk

Jamie Myrah, the Executive Director of PHA Canada, opened the session and introduced Dr. Sanjay Mehta, who went through a slideshow presentation detailing the various medications used to treat PH and the pathways through which those medications work. The presentation highlighted the three major pathways of treatment for PAH: Endothelin, Nitric Oxide, and Prostacyclin. Although these pathways have existed for some time, new treatments that utilize them have been developed in the last five years. Dr. Mehta also discussed new targets for treatment, such as inflammation and metabolism. Canadian researchers have been exploring new pathways, such as with apabetalone, which may alter the high level of inflammation found in pulmonary arteries in PH patients, and dichloroacetate, which may alter the cell metabolism in PH.

Following Dr Mehta's overview, Dr. Lisa Mielniczuk joined the session to moderate the panel discussion. This year the panel included Dr. Steeve Provencher (Laval University); Dr. Nathan Brunner (University of British Columbia); Dr. Mitesh Thakrar (University of Calgary); Dr. Erika Vorhies (University of Calgary). The panellists provided insights into current and emerging research and a well-rounded taste of the research landscape. Topics discussed included how COVID research may be applied to PH, the 'cancer theory' of PH, anti-inflammatory drugs and PH, chemotherapy and PH, and new pathways for PAH treatment. Session attendees also submitted questions that the panel responded to in a roundtable format.

The key message from the panel was that there is reason to be optimistic about PH research, both for new treatments already being tested in labs and in clinical trials, as well as for the potential that a cure may be discovered someday. Dr. Mehta discussed that the COVID pandemic has led to a renewed interest in scientific research and clinical trials, "Science has become valued... it has been an incredible time of collaboration with research".

The other key message emphasized by the speakers is the necessity for PHers to get involved in research and trials. Patient enrollment is critical for clinical trials to lead to new treatments and diagnoses. Patients can also help researchers with their unique points of view by providing critical feedback when a new study is being designed.

Contributed by: Ashok Pandey, PHA Canada Knowledge Philanthropist



Dr. Sanjay Mehta

Watch the closing plenary at phacanada.ca/conference



The panel of speakers in the final session were awesome, congratulations in pulling together such a great team! And congratulations to the PHA Canada staff who did a tremendous job!

– Conference attendee

PH Research Scholarship Update: Austin Read

Saeid Maghsoudi, PHA Canada's newest Knowledge Philanthropist, recently interviewed Austin Read, 2020 recipient of the Paroian Family PH Research Scholarship, about his project: *Mechanisms of fetal oxygen sensing and the role of the electron transport chain in the pulmonary artery and ductus arteriosus*.

This interview has been edited for length and clarity.

Read's project aims to identify how cells of the fetal pulmonary arteries and ductus arteriosus sense and respond to oxygen in their environment, in order to identify new molecular targets to treat PPHN.



Q: Can you briefly explain your hypothesis and what your project aims to achieve?

A: I hypothesize that differential effects of increases in oxygen on the expression/activity of the mitochondrial electron transport chain underlie the opposing effects of oxygen on these adjacent fetal arteries. Essentially, my project aims to identify how cells of the fetal pulmonary arteries and ductus arteriosus sense and respond to oxygen in their environment to identify new molecular targets to treat PPHN.

Q: Please explain briefly about Persistent Pulmonary Hypertension of the Newborn (PPHN).

A: During pregnancy, a fetus obtains oxygen from its mother via the placenta. The pulmonary arteries, which normally supply the lungs with blood as an adult, remain primarily collapsed as a fetus. At birth, the pulmonary arteries rapidly dilate, increasing the blood flow to the lungs and allowing the baby to get oxygen through breathing. During PPHN, the arteries supplying the lungs fail to expand, limiting oxygen uptake and delivery throughout the body appropriately. Limited oxygen delivery is a serious condition associated with increased morbidity and mortality.

Q: Please briefly describe your project and how your research will contribute to PPHN babies.

A: Understanding the mechanisms underlying the expansion of the pulmonary arteries at birth is crucial to developing potential therapeutics for treating PPHN. We know that increased oxygen content in the blood triggers the expansion of the pulmonary arteries of the newborn. Understanding how the pulmonary arteries can sense changes in oxygen in the blood is crucial to understanding how normal arterial expansion occurs. Previous work in adult pulmonary arteries suggests that the mitochondria within the smooth muscle cells that make up the pulmonary arteries act as a sensor for changes in arterial oxygen content.

We were interested in investigating how the fetal pulmonary arterial mitochondria sense oxygen at birth and how the mitochondria can communicate changes in oxygen content to the rest of the cell to initiate arterial expansion. By understanding the mechanism by which the fetal pulmonary arteries expand at birth, therapeutics may be developed to assist this process in cases where normal arterial expansion does not occur, such as in PPHN.

Q: Please explain what makes your research interesting.

A: What makes our research interesting is that we are comparing/contrasting the pulmonary arteries with another tissue important for allowing blood to bypass the fetal lungs, the ductus arteriosus. The ductus arteriosus connects the pulmonary arteries to the descending aorta, the artery which delivers oxygen to the other organs in the body. In the womb, the ductus arteriosus is dilated, allowing blood to be redirected through the aorta to the body's other organs.

At birth, in contrast to the dilation of the pulmonary arteries, increased oxygen content in the blood causes the ductus arteriosus to constrict and eventually become functionally closed. These vascular changes allow blood to travel toward the lungs properly. Despite the mitochondria acting as the oxygen content sensor in both tissue types, it signals opposing responses in both fetal vessels. The exact sensors responsible for the signals from the mitochondria have not been identified. However, we have demonstrated two distinct populations of mitochondria in each tissue type, providing a possible mechanism by which the same signal (increased oxygen) is capable of causing opposing changes in each vessel.

Q: What are the differences/rationale between your research and similar studies in PPHN?

A: Incidents of PPHN and patent ductus arteriosus (PDA), a condition where the ductus arteriosus fails to close at birth, are higher in preterm infants compared to term infants. Throughout fetal development, the composition of vessels like the pulmonary artery and ductus arteriosus are changing and only become functional ready to adapt to oxygen as the fetus gets closer to term. When these vessels are not functionally developed enough, they cannot respond appropriately to the rise in oxygen content.

Our research has taken advantage of a timed-pregnancy rabbit model to obtain term and preterm rabbit kits. By evaluating preterm vs term rabbit kits using the timed-pregnancy model, we can compare and contrast preterm vs term pulmonary artery and ductus arteriosus vessels. We can also possibly provide insights into what compositional changes in these vessels are required to prepare each tissue's response to oxygen and the possible compositional changes needed for their opposing responses.

Q: What are the biggest challenges in your experiments? How do you overcome these challenges?

A: The most important facet of our experimental designs is the control of the oxygen levels that the pulmonary arteries and ductus arteriosus are exposed to. In the womb, the fetus is in a hypoxic environment, or an environment where oxygen levels are lower than usual (also referred to as normoxia/normoxic). To study the signaling mechanisms underlying the vascular changes in the pulmonary arteries and ductus arteriosus at birth, we must be able to carefully control the exposure of these vessels to hypoxic and normoxic conditions. Although

maintaining cells in normoxia is relatively straightforward, keeping cells or tissues in hypoxia requires careful experimental design. In our experiments, a specialized chamber is added to the microscope stage (called a confocal microscope) to image ductus arteriosus A and pulmonary artery smooth muscle cells. This process allows us to maintain a constant flow of either hypoxic or normoxic air over the cells to control oxygen exposure effectively.

Q: Do you want to pursue your research as a Ph.D.?

A: At this point in my career, I am looking to move away from academia and enter the field of biotechnology. I am very interested in some of the technologies biotech companies in Toronto alone are developing. I am excited and eager to apply the skills I have developed throughout my Master's work to a career in the biotech industry.

Q: How will your research lead to a new treatment for PPHN?

A: Despite modern therapies, PPHN and PDA are not rare and can cause morbidity and mortality. By understanding the exact mechanisms by which the pulmonary arteries and ductus arteriosus respond to oxygen at birth, therapeutics could be developed to target these mechanisms to assist in these transitions when they fail. For example, we have found the novel compound S1QEL, a drug capable of modulating the activity of the mitochondria within the ductus arteriosus, reversing ductus arteriosus constriction in response to oxygen. This may prove valuable in congenital birth conditions where ductus arteriosus dilation is required to maintain adequate blood flow supply in the newborn.

Contributed by: Saeid Maghsoudi, PHA Canada Knowledge Philanthropist

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