

# ANNUAL REPORT

The Canadian Center for Vaccinology (CCfV) was established to develop, implement, and evaluate vaccine technologies and vaccines for infectious diseases that have a significant impact on Canadian and global health, and to train experts in these critical and evolving fields. Activity within CCfV is organized into three research groups: Discovery, Evaluation, and Health Policy and Translation









## Message from the Director

### Scott Halperin, мD

CCfV had another exciting and productive year of vaccine research. The Discovery, Evaluation, and Health Policy and Translation groups continued with ongoing research, and pursued several new and exciting study opportunities in the 2016-17 year. The Discovery Group continued progressing in vaccine-development research, and had a high output of peer-reviewed publications in mid-to-high impact journals. The Evaluation Group had a very active year, participating in 19 research projects including CIHR-funded, industry-funded, and government sponsored projects. The Health Policy and Translation Group was involved with several CIHRfunded studies (currently ongoing), such as a study to evaluate the effectiveness of the Tdap program for pregnant women in Nunavut, and another looking at the role of pharmacists in improving vaccine coverage amongst

adults. In terms of CCfV governance, the Discovery and Health Policy and Translation Groups welcomed new Associate Directors this past summer: Craig McCormick of Dalhousie and Donna MacDougall of StFX, respectively.

A continuing future priority for each group, and for CCfV as a whole, is to educate the next generation of academic, public health and industry vaccinologists through research mentorship and regular educational seminars and symposia for researchers, trainees, CCfV staff, public health stakeholders, and others interested in vaccine research. Formal graduate training programs in vaccine-related areas are provided through CCfV faculty home departments including Microbiology & Immunology, Pediatrics, Medicine, Bioethics, and Nursing.

CCfV will focus on maintaining and enhancing research funding and collaborations, and increasing awareness of emerging research opportunities. Several new studies will be starting, including:

- Two human challenge model studies
- An effectiveness study looking at a new hepatitis B virus vaccine
- Ongoing influenza safety surveillance
- Two national clinical trials for a new viruslike particle (VLP) influenza vaccine

CCfV is also developing a strategic plan, to be implemented in 2018. The Center has undertaken an in-depth engagement process with staff, faculty, CCfV membership, and stakeholders to drive the development of the overall plan, with the final stage of our engagement process, a half-day facilitated retreat, planned for late fall.

CCfV would like to thank our hundreds of volunteers who participate in our studies. Your support largely contributes to our researcher's ability to provide the evidence needed for safe and effective health products.

#### Scott Halperin

Director, CCfV

### VISION

CCfV is an integrated collaborative multidisciplinary vaccine research team committed to excellent research. CCfV unites the biomedical and clinical sciences with the social sciences and humanities to effectively span the research continuum from basic discovery to translation into useful vaccines to prevent disease in humans and to change population and public health outcomes.

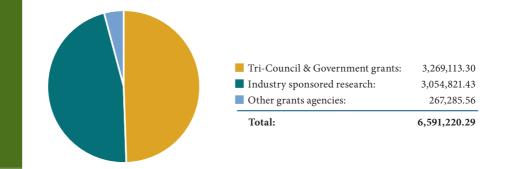
### ORGANIZATION

Activity within CCfV is organized into three groups:

- Vaccine Discovery Group
- Vaccine Evaluation Group
- Health Policy & Translation Group

An **Advisory Committee** of CCfV investigators and external advisors provides counsel on the strategic direction and objectives of CCfV research.

## CCfV Research 2016-17





\* Dalhousie University is the lead institution for the Canadian Immunization Research Network (CIRN). CIRN funds are disbursed across Canada, facilitating research at over 30 institutions.

## Discovery Group

The **Discovery Group** brings together a team of investigators with the shared academic objectives of undertaking basic and translational research that will lead to the identification of new vaccines, adjuvants and delivery mechanisms.

In September 2017, the Discovery Group leadership was taken on by Dr. Craig McCormick, replacing Dr. Bob Anderson, who is retiring this year.

Comprised of researchers from the fields of bacteriology, molecular biology, virology, and immunology, the group creates an environment in which close collaboration rapidly enhances research and development and provides excellent training opportunities. Recent key achievements and research activities within the group include:

- Ongoing progress in vaccine-development and related research for dengue, Respiratory Syncytial Virus (RSV), influenza, Hepatitis-C, measles, zika, malaria, pertussis, *Chlamydia, Haemophilus influenzae* type a, and *Burkholderia pseudomallei*
- · Ongoing studies on oncolytic potential of measles and related viruses
- High output of peer-reviewed publications in mid-to-high impact journals
- Vaccine development and immunological studies on dengue, RSV, melioidosis and other infectious disease pathogens, and a collaboration on nanocomplex-based dengue vaccine

RESEARCH HIGHLIGHTS • 2016-17

## **Evaluation Group**

The **Evaluation Group** undertakes clinical trials of novel vaccines and adjuvants and conducts epidemiological research in order to understand and support vaccine programs that prevent serious infectious diseases.

The Evaluation Group is led by Dr. Joanne Langley, who is also the Principal Investigator for the Canadian Immunization Research Network (CIRN) Clinical Trials Network (CTN).

The investigator team provides expertise in the development and implementation of first-in-human Phase I studies to post-licensure Phase IV trials, and explores the field effectiveness of the vaccines and their effects on disease burden, vaccine compliance, and public acceptance. This group's pivotal role within CCfV's multidisciplinary approach to vaccine research is evidenced through its interaction with industry, external organizations, and members of the Discovery and Health Policy and Translation groups. The Evaluation Group had a very active year, leading or participating in 19 research projects including Canadian Institutes of Health Research (CIHR)-funded, industry-funded, and government sponsored projects. Recent key achievements and research activities within the group include:

- Coordinating centre for the CIHR Canadian Immunization Research Network (CIRN), a national network of more than 35 institutions and 130 investigators across Canada (grant renewed Feb 2017: S. Halperin, NPI)
- A series of studies related to the Canadian developed Ebola vaccine including a Phase I study funded by the Public Health Agency of Canada (PHAC) and CIHR, a Phase II study funded by Merck, and the ACHIV-Ebola study, led by CIRN's Clinical Trials Network, which is a Phase II study in HIV-infected participants in Canada and Africa
- A Phase I, first-in-human study of a novel RSV vaccine which is a CIHR-industry partnered vaccine with ImmunoVaccine
- Acellular pertussis vaccine study looking at assessing laboratory markers and comparing different assays and responses to vaccination



## Health Policy and Translation Group

The **Health Policy and Translation** Group undertakes research that informs health policy at the local, regional and national levels, with members providing cross-cutting thematic interaction with the Discovery and Evaluation group teams.

In September 2017, the Health Policy and Translation Group leadership was taken on by Dr. Donna McDougall following the completion of Dr. Janice Graham's term in the role.

With expertise in public health, nursing, pharmacy, health law, bioethics, policy development, and the social sciences, investigators are able to predict and evaluate the impact new vaccines and vaccine technologies have upon the public and are able to guide vaccine research at the discovery and evaluation phases. Understanding public opinion, assessing acceptability, and attending to issues surrounding the governance and commercial aspects of vaccine research are critical roles in the development of innovative research plans. Recent key achievements and research activities within the group include:

- Global Vaccine Logics (CIHR funded) launch involves intensive work with collaborators in Guinea, Sierra Leone, Burkina Faso, Senegal, the US and Canada, and Europe
- Survey of nursing, medical and pharmacy students related to mandatory influenza vaccination

- Pain mitigation in schools: CIHR funded project that is in the Niagara school district, focus group discussions have been completed with parents, children, and public health nurses
- A CIRN-funded study of the role of pharmacists in improving vaccine coverage amongst adults (the intervention aspects of this study are being led by the Evaluation Group while the KABB aspects are led by the Health Policy and Translation Group)
- A CIHR-funded study to evaluate the effectiveness of the Tdap program for pregnant women implemented in Nunavut in May 2016 and to consult with Inuit to better understand the cultural and health factors that inform decision making about vaccines in their communities
- A PHAC funded study to enhance the immunization assessment process and improve adult immunization rates in Prince Edward Island

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## Engagement and Knowledge Translation

# Since 2012, CCfV has produced a nationally webcast *Education Series*, a joint collaboration with CIRN.

Between July 2016 and June 2017, nine seminar presentations on a variety of topics related to vaccinology were presented to more than 135 attendees across Canada; attendees included students and trainees, researchers and faculty, staff, and public health stakeholders. CCfV also conducted a summer student seminar series that included six lectures this past June. Faculty members presented timely topics on vaccinology and immunization to students from Dalhousie, with group discussions following each presentation.

The Ninth Annual CCfV Research Symposium/Infectious Diseases Research Day was hosted at Dalhousie this past April, with over 125 local and visiting attendees, including faculty, trainees, and healthcare professionals. Drs. Shelley Deeks and Andrea Cox were welcomed as keynote speakers, and Dalhousie's own Drs. Lisa Barrett and Paul Bonnar gave lectures on Hepatitis B and Antimicrobial Stewardship, respectively. The event saw 10 oral presentations and 24 posters, and was accredited by Dalhousie Continuing Professional Development.

In May 2017, PHAC and CIHR granted over ten million dollars in renewal funding to CIRN over a five-year period. The network will continue to be led by Dr. Scott Halperin as the Nominated Principal Investigator, with the Network Management Office operating out of CCfV. This past May, the CIRN Annual General Meeting was hosted in Halifax and welcomed 105 researchers, trainees, and stakeholders from across Canada. The two-day event featured plenary talks, workshops, and break-out sessions, as well as 19 oral presentations and 19 posters.





## Looking to the Future

For the coming year, CCfV will undertake a number of new activities alongside studies that are already ongoing and underway, some of which are highlighted below.

▶ Public Works and Government Services Canada issued a Request for Proposals to continue the influenza surveillance and influenza vaccine effectiveness work currently being done by the CIRN Serious Outcomes Surveillance (SOS) Network, led by Dr. Shelly McNeil. The SOS Network currently comprises 14 hospital sites in four provinces across Canada. The Halifaxled SOS team submitted its proposal on September 5<sup>th</sup>, and expect to be notified of a decision this fall.

CCfV Investigators are planning an initiative which will see two human challenge models launched for both influenza and pertussis. CCfV is working collaboratively with colleagues at Ottawa Health Research Institute, McGill, and the University of Saskatchewan to grow and manufacture influenza virus at Charles River Laboratories in the US, and CCfV plans to bring flu challenge studies online next year in its purpose-built Challenge Unit at the IWK. At the same time, the CCfV laboratory team are developing pertussis challenge materials in-house at CCfV labs, in order to develop and test a human pertussis challenge model at the CCfV Challenge Unit within the next two years. ▶ Several new clinical trials will be ramping up this fall, including a CIRN Clinical Trials Network (CTN) study sponsored by VBI Vaccines Inc. CTN sites participating in the study include the lead site in Halifax as well as Montréal, Ottawa, Winnipeg, Sudbury, Hamilton, Toronto, Calgary, and Vancouver. The CCfV Halifax site will act as the coordinating centre under the direction of Dr. Joanne Langley, CTN Lead. The trial will study the effectiveness of a new Hepatitis B vaccine in older people, with a focus on health problems such as diabetes and obesity.

#### LOOKING TO THE FUTURE | continued

► CCfV is also a participating site in two national clinical trials for a new virus-like particle (VLP) influenza vaccine developed by Medicago. These flu trials will see 250 participants enrolled at the Halifax site in early October.

▶ The ACHIV-Ebola Phase II vaccine study in HIV-infected adults, led by the CIRN CTN, screened its first participant in Canada this summer and will see enrollment expand to its two participating African sites (Senegal and Burkina Faso) in early 2018. The Ebola study is sponsored by the International Development Research Centre (IDRC); vaccine and regulatory support are being provided by Merck.

CCfV was asked by its Governing Council (GC) in November 2016 to develop a strategic plan with a five-year outlook. CCfV responded with a proposed step-wise approach for developing the strategy that included a membership survey, three Research Group meetings to discuss specific priorities, and an all-member retreat to be held in the fall. The survey and group meetings were completed over the summer, and staff are currently working to analyze the outcomes of those events and to organize a half-day, facilitated retreat with the entire membership. The objective is to create a long-term strategy for CCfV that includes priorities for each research group and relevant performance indicators, and to present this to the Governing Council in 2018.

► Annual Knowledge Translation activities will continue throughout 2017-2018: the CCfV/ CIRN Education series, the CIRN AGM, and CCfV Symposium/ID Research day are some highlighted events for the upcoming year.



## **CCfV** Trainees

CCfV Investigators are invested in our future researchers! Some of our 2016-17 trainees in vaccinology-related studies are listed here.

### **Bachelor of Science**

Christina Anthes Renee Amiro Elizabeth Campbell Antonia Di Castri Nicole Haijar Alexa Lund Kevin McIntyre Caoimhe McParland Grace Rooke Zach Schaffelburg Grayson Wilson Debby Chao Caroline Guinard Ryan Kapuscinski

### **Medical Student**

Ashley Cerqueira Kathryn Cull Daniel Dalcin Shweta Dhawan Vic Eton Rania Fashir Jessica Gencarelli Mikayla Kerr Sarah Lane Lynnea Lobert Ellen MacDonald Sarah MacDonald Sarah MacDonald Sam Mosher Eli Nix Hailey O'Donnell Joelle Thorgrimson

### Master of Science

Karen Black May ElSherif Rachel Kampen Lydia Li Laura Lin Michaela Nichols-Evans Yunnuo Shi Emily Shantz Cynthia Tram Christina Wang

### PhD

Lauren Davy Gabrielle Gaultier Sarah Peverill Patrick Slaine Alyne Teixeria Naif Jalal

#### **Postdoctoral Fellow**

Ava Vila-Leahey

### Postgraduate Residents

Glenn Patriquin



## Selection of Refereed Publications of Vaccine-Related Research by CCfV Members 2016-17

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► Lai YC, Chuang YC, Liu CC, Ho TS, Lin YS, **Anderson R**, Yeh TM. [2017] Modified NS1 wing domain peptide-induced antibodies protect against dengue virus infection. Scientific Reports 7, 6975.

► Andrew MK, Shinde V, Ye L, Hatchette TF, Dos Santos G, McElhaney JE, Ambrose A, et al. (2017). The importance of frailty in the assessment of influenza vaccine effectiveness against influenza-related hospitalization in elderly people. J Infect Dis. 2017 https://doi.org/10.1093/infdis/jix282

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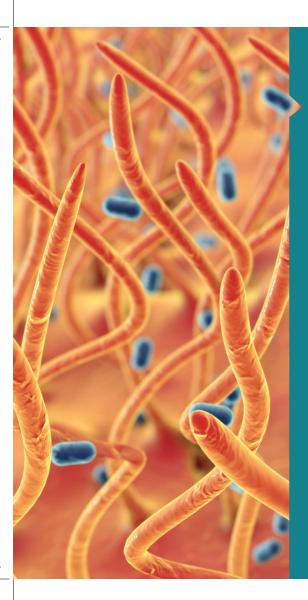
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