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Created in 1989, the NCE program currently supports four national initiatives: Networks of Centres of Excellence (NCE); Centres of Excellence for Commercialization and Research (CECR); Business-Led Networks of Centres of Excellence (BL-NCE); and the Industrial Research and Development Internship Program (IRDI).

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Over the past 12 months,
36 research projects and strategic
initiatives received Network funding.
While some were new, the majority
represent a continuation and maturation
of projects and teams established during
the first seven years of Network activity.

Corporate Profile

AllerGen NCE Inc. (AllerGen), the Allergy, Genes and Environment Network, was established in response to the fact that one in three Canadians is living with allergic disease. The associated economic and healthcare burden reaches billions of dollars annually. AllerGen is a national research network funded by Industry Canada through the Networks of Centres of Excellence (NCE) program. Since 2004, AllerGen has united Canada's leading experts in allergic disease and asthma.

Working in trans-disciplinary and multi-sectoral teams, and in partnership with organizations and stakeholders across sectors, AllerGen addresses gaps in knowledge and seizes opportunities to generate new preventive strategies, diagnostic tests, therapeutic approaches, medications, public policies and patient education to reduce the morbidity, mortality and socio-economic impacts of allergy, asthma, anaphylaxis and related immune diseases.

These teams are also training the next generation of researchers, innovators and clinician-scientists; improving allergy, asthma and anaphylaxis management; and increasing the number of medical professionals researching and practicing in these areas. Since its inception, AllerGen has provided education, training and capacity building opportunities to 1,126 trainees and new professionals, and disbursed over \$2.1 million in trainee awards, grants and fellowships.

AllerGen brings together 129 Network investigators and 474 trainees and young professionals, research associates and technicians, who together represent a research team equivalent to 184 full-time participants. In addition, over the last year, AllerGen worked closely with 227 partner organizations across academic, industry and government sectors on 36 research projects and strategic initiatives.

AllerGen's Vision

To create an enduring network of allergy and immune disease experts whose discovery and development efforts contribute to reducing the impact of allergic and related immune diseases nationally and globally.

AllerGen's Mission

To catalyze and support discovery, development, networking, capacity building, commercialization and knowledge translation to reduce the morbidity, mortality and socio-economic burden of allergy, asthma and anaphylaxis for the benefit of Canadians and the global community.

Message from the Board Chair and Scientific Director

2012-2013 marked the first year of the AllerGen Network following NCE renewal. We embark upon our final seven years of NCE support with mature and globally-connected research teams; a balanced portfolio across investments in discovery, development, commercialization and knowledge mobilization; and an integrated research strategy spanning three Enabling Platforms and three Legacy Projects that build upon core research investments established in 2005.

Over the past 12 months, 36 research projects and strategic initiatives received Network funding. While some were new, the majority represent a continuation and maturation of projects and teams established during the first seven years of Network activity. These projects involve 129 Network investigators, over 450 trainees, 227 partners, and engage an average of 2.1 collaborators per project. The highlights in this year's annual report reflect both the scientific excellence of this research and the richness of the supporting partnerships.

In 2012, initial findings from the Canadian Healthy Infant Longitudinal Development (CHILD) Study emerged. This national birth cohort study follows 3,300 children from pre-birth to age five. It aims to investigate the early-life origins and development of asthma, allergies and other chronic immune/inflammatory diseases. Preliminary findings

revealed that by one year of age, more than 10% of participating Canadian children experienced wheezing; 16% had positive skin allergy tests; 14% had atopic dermatitis; and 6% reported a food allergy. These findings represent "firsts" in Canadian data.

In early 2013, exciting gut microbiome research using CHILD Study samples garnered international attention and highlighted the potential impact of early childhood exposures, such as the method of delivery in childbirth and the method of infant feeding, on lifelong health.

Knowledge from the landmark CHILD Study, along with discoveries by AllerGen investigators studying the impact of gene-environment interactions, involving such elements as traffic-related air pollution and indoor exposure to phthalates and other chemicals, will influence our understanding

of the development of complex, non-communicable illnesses. In November 2012, a *CBC Marketplace* feature highlighted the research of AllerGen investigator Dr. Miriam Diamond, a chemist who measures the level of phthalates and other potentially toxic chemicals common in children's toys, personal care products and furniture found in Canadian homes.

These projects, in conjunction with the Network's knowledge mobilization initiatives and commercialization strategy, continue to advance our strategic goal to bridge the gap between the research lab and 'real life.' To the same end, AllerGen has invested in the Platform for Outcomes Research and Translation in Asthma and Allergy (PORTAL) — a unique health economics platform that integrates outcomes research into our portfolio. PORTAL provides a mechanism for evaluating costs, cost

effectiveness, quality of life, burden of illness and preferences for health care interventions and programs across AllerGen projects.

As well, AllerGen has continued to build on the momentum of 11 successful international partnerships and facilitate the establishment of Memoranda of Understanding (MOUs) with leading research and development centres focusing on asthma and allergic disease across the globe.

Finally, AllerGen continues its commitment to train, educate and build capacity in the next generation of allergic disease researchers. In 2012, the Network launched its *Undergraduate Allergy, Asthma and Anaphylaxis Summer Studentship Research Training Awards* program, which provides outstanding undergraduate students with research experience and mentorship, and complements a suite of other value-added, novel programs that aim to develop our trainees and young professionals into globally-engaged scientists.

As we close the year, we wish to thank the Board of Directors, the Research Management Committee

and our many advisory committee members who have been extraordinarily generous with their time and expertise.

In particular, we wish to thank Mr. Graham Scott, who retired as Chair of the AllerGen Board of Directors, for his wise counsel and his leadership of the Network during our NCE renewal bid. We also thank Drs Claude Roy, AllerGen's Vice-Chair of the Board of Directors, and elected researcher representative John Gordon, who completed their terms on the Board of Directors, for their valuable contributions.

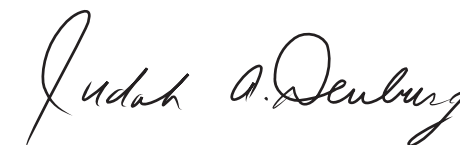
We were delighted to welcome Dr. Howard Bergman as the new Chair, and long-standing Board member Dr. Mark Bisby as the Vice-Chair, of the AllerGen Board of Directors.

This year's accomplishments could not have been realized without the commitment and contributions of our entire Network of investigators, trainees, committee members, ASNPN executive members, national and global collaborators, stakeholder organizations and healthcare providers. We thank

them for their ongoing support and dedication to the goal of reducing the burden of allergic disease in Canada.




**Dr. Howard Bergman,
MD, FCFP, FRCPC**
Chair,
AllerGen Board of Directors,
AllerGen NCE Inc.




**Dr. Judah Denburg, MD,
FRCP(C)**
Scientific Director and CEO,
AllerGen NCE Inc.

AllerGen continues its commitment to train, educate and build capacity in the next generation of allergic disease researchers. In 2012, the Network inaugurated its *Undergraduate Allergy, Asthma and Anaphylaxis Summer Studentship Research Training Awards* program, which provides outstanding undergraduate students with research experience and mentorship, and complements a suite of other value-added, novel programs that aim to develop our trainees and young professionals into globally-engaged scientists.

2012 . 2013

AllerGen plays a leading role in accelerating the development of new diagnostic tests, better medications, accessible patient education tools and more effective public policies for asthma, allergies and anaphylaxis, so communicating its research findings to a broad scientific audience is crucial.

2012-2013 Highlights



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“Our findings are particularly timely given the recent affirmation of the gut microbiota as a ‘super organ’ vital to good health, as well as the increasing concern over rising cesarean delivery, which deprives an infant of its first exposure to the mother’s microbiota,” said Dr. Kozyrskyj.

The impact of early childhood exposures on lifelong health

In March 2013, AllerGen researcher Dr. Anita Kozyrskyj of the University of Alberta and AllerGen trainee and postdoctoral fellow Dr. Meghan Azad published findings in the *Canadian Medical Association Journal* (CMAJ) that the method of delivery in childbirth (vaginal *versus* cesarean) and the method of infant feeding (breastfeeding *versus* formula) influence the bacterial colonization of an infant’s gut. The composition of gut microbes — known as the microbiota — may affect a child’s susceptibility to chronic diseases such as obesity, type 1 diabetes, allergies or asthma.

“Our findings are particularly timely given the recent affirmation of the gut microbiota as a ‘super organ’ vital to good health, as well as the

increasing concern over rising cesarean delivery, which deprives an infant of its first exposure to the mother’s microbiota,” said Dr. Kozyrskyj.

The researchers examined stool samples from 24 healthy infants at 3 to 4 months of age who are participating in the CHILD Study — an AllerGen-funded, national birth cohort study that is following more than 3,300 children from pre-birth until age five in order to determine the origins of asthma and allergic disease.

Bacterial DNA was extracted from the samples and analyzed to identify the microbes present. At the University of Toronto, Dr. James Scott’s laboratory provided the fecal analysis, while Dr. David Guttman’s laboratory applied a new high-throughput gene sequencing technology,

allowing the researchers to pinpoint microbes in each sample.

The study compared each infant’s gut bacterial profile with that infant’s unique environmental exposures as captured in the CHILD Study data and identified cesarean delivery and formula feeding as factors that disrupt the development of the gut microbiota

This research helps further our understanding of the impact of early childhood exposures on gut microbiota and will inform investigations using larger study populations to examine other exposures, including antibiotic use, which may also affect microbial diversity and have lifelong health effects.



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Broad challenges — Canadian research — Global dissemination

From 2005 to 2013, AllerGen invested over \$28 million to support 130 research projects. Outcomes include 49 research workshops; 39 innovations with an array of associated patents, start-up companies, copyrights and industry licenses; five interactive *Café Scientifique* public events; and the creation of knowledge, tools, technologies and educational materials that aim to improve the quality of life for Canadians living with asthma, allergies and related immune diseases.

AllerGen plays a leading role in accelerating the development of new diagnostic tests, better

medications, accessible patient education tools and more effective public policies for asthma, allergies and anaphylaxis, so communicating its research findings to a broad scientific audience is crucial.

Since the Network's inception, AllerGen Investigators and Highly Qualified Personnel (HQP) have produced 2,066 scientific publications related to Network-funded research: 975 specialized publications; 419 refereed publications; 442 poster presentations; and 230 other publications.


- **Specialized Publications** include: abstracts, discussions, conference and scientific meeting presentations/proceedings, theses, workshop reports, industrial reports, technical reports and symposium records.

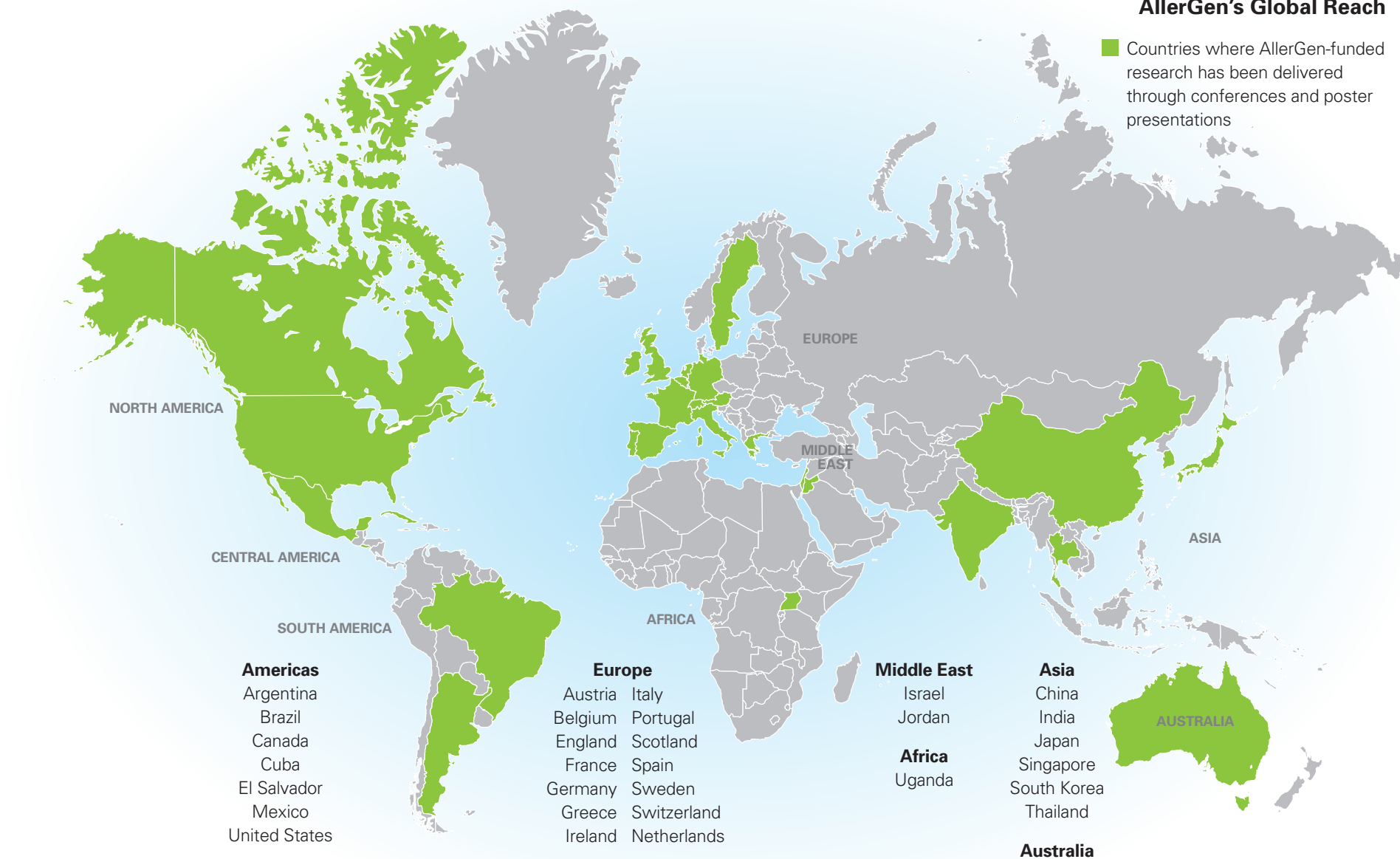
- **Refereed Publications** include: published, accepted or submitted articles in peer-reviewed publications.
- **Poster presentations** include: oral presentations, abstracts and poster viewings.
- **Other Publications** include: published letters, review articles, papers in refereed conference proceedings, monographs, books, book chapters, government publications, newsletters, magazines, booklets, pamphlets, online tools, news blasts, press releases, interviews, newspaper articles and other contributions to lay media.

In 2012-2013, AllerGen scientists set a Network record for communicating their allergy, asthma and immune disease research with the publication of over 470 articles and poster presentations. This represents a 24% increase in total publications and a 15% increase in refereed articles appearing in high-impact journals, such as the *Journal of Allergy and Clinical Immunology*, over the previous year.

AllerGen is committed to sharing its research findings, not only in this country, but across the globe. AllerGen-funded research has been disseminated worldwide through journal articles, media releases, and conferences and poster presentations delivered in more than 30 countries, including developing nations such as Argentina, Brazil, El Salvador, India, Thailand and Uganda.

AllerGen's Global Reach

 Countries where AllerGen-funded research has been delivered through conferences and poster presentations



2012-2013 AllerGen-funded Aboriginal Projects		
Research Project Title	AllerGen Principal Investigator	Tools/Outcomes
Enhancing the “Roaring Adventures of Puff (RAP)” for First Nations Communities	Dean Befus Alberta Asthma Centre, University of Alberta	“The Legend of Tahnee, My Asthma Journey” activity book <ul style="list-style-type: none"> Asthma education booklet for children “Roaring Adventures of Puff (RAP)” Instructor’s Training <ul style="list-style-type: none"> Online training program adapted to train First Nations community teams to deliver asthma education program in schools
Getting Asthma on the School Agenda: A KT Strategy	Dean Befus Alberta Asthma Centre, University of Alberta	“AsthmaSphere” e-messages <ul style="list-style-type: none"> E-messages using art, stories, photographs, videos and diagrams to encourage the adoption of a school-based model of care for students with asthma
Respiratory Health Awareness Community Outreach and Engagement of First Nations Community in Alberta: Pilot Intervention	Miriam Stewart University of Alberta	“Breathe: Making Healthier Communities” <ul style="list-style-type: none"> Brochure in three languages (French, English and Cree) “Walking a Good Walk with Asthma: An Educational Workbook” <ul style="list-style-type: none"> Workbook developed in consultation with community members to ensure its relevance and cultural appropriateness “Kiniknik” digital stories <ul style="list-style-type: none"> 2 DVDs, one suitable for adults and another for youth, on the traditional and commercial use of tobacco
Engaging Aboriginal Families Affected by Allergies and Asthma in Support-Education Program Development	Miriam Stewart University of Alberta	Assessment of support needs, resources and intervention preferences; pilot implementation of support-education interventions <ul style="list-style-type: none"> A public report, fact sheet, and up to four peer-reviewed publications are in progress
Surveying the Prevalence of Food Allergies in All Canadian Environments (SPAACE)	Ann Clarke McGill University	Prevalence data <ul style="list-style-type: none"> Publications showing that the self-reported prevalence of several food allergies in the Aboriginal population is 4.9%, lower than the rate of 8% in the non-Aboriginal population

Enhancing engagement in Aboriginal communities

In 2012-2013, AllerGen investigators completed several research studies that aimed to provide First Nations, Inuit and Métis children, families and communities with accessible, appropriate and culturally-relevant resources to help reduce the rates of asthma and allergies affecting their populations.

The work spanned five projects:

- 1) An assessment of the support needs and preferences of Aboriginal children and youth with asthma and allergies;
- 2) A pilot test of a multi-level community engagement intervention developed by the Asthma Society of Canada;
- 3) An e-message campaign to encourage the adoption of a school-based model of care for students with asthma;
- 4) The development of asthma education tools for children and online training for health care professionals; and
- 5) A nation-wide questionnaire to measure the self-reported prevalence of food allergies.

Asthma and allergies represent a growing concern for Canada’s First Nations, Inuit and Métis populations. A 2007 report by the Public Health Agency of Canada estimated that the prevalence of asthma

is 40% higher in First Nations and Inuit communities compared with non-Aboriginal Canadians, and the National Lung Health Framework recognized all three groups as “vulnerable populations” who bear a large burden of risk for respiratory illness due to their unique social, economic and environmental conditions.

Each AllerGen project team partnered with community-based organizations and Aboriginal communities to overcome geographic barriers and develop linguistically-accessible and culturally-relevant materials. These collaborative teams sought to improve awareness of asthma and allergies and to enhance the uptake of respiratory health interventions.

In partnership with First Nations participants, valuable tools have emerged from this work, including an asthma education booklet for children; an online training program for First Nations community teams to deliver school-based asthma education programs; and interactive brochures, digital stories and

materials to promote community empowerment and facilitate the translation of knowledge into practice.

These research and knowledge mobilization initiatives build upon earlier investments by the Network and its partners to develop culturally-relevant resources for Canada’s Aboriginal populations, including communities in Conne River, NL; Saddle Lake, AB; Listuguj, QC; Wendake, QC; Postville, NL; and Prince George, BC. Since 2008, AllerGen has invested more than \$1.5 million (cash) and \$126,000 (in-kind) in research, and published 83 articles and presentations related to respiratory health, asthma and food allergies in Aboriginal communities. AllerGen’s partner organizations, including the Asthma Society of Canada, the Public Health Agency of Canada, Anaphylaxis Canada and others, have further invested over \$1.8 million in cash and over \$400,000 in time, expertise and non-financial resources to support these endeavours.



Dené graphic artist: Carla Gilday
Artwork from “The Legend of Tahnee, My Asthma Journey” activity book

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AllerGen provided over \$1.2 million in continued support to a number of Cycle 1 projects and strategic initiatives, and invested over \$4.8 million in new research that aims to enable Canadians to better prevent, treat and manage allergic diseases.



AllerGen's Integrated Research Program

In 2012, AllerGen completed the first of two seven-year NCE funding cycles. In line with its strategic priorities, AllerGen supports a broad spectrum of research aimed at accelerating innovation to improve the quality of life of those affected by allergy, asthma, anaphylaxis and other immune diseases. AllerGen's second funding cycle (2012-2019) will see continued investment in research, networking and capacity building, and an increase in knowledge mobilization in areas of significant potential impact.

During the fiscal year 2012-2013, AllerGen provided over \$1.2 million in continued support to a number of Cycle 1 projects and strategic initiatives, and invested over \$4.8 million in new research. Through strong continuing partnerships, AllerGen leveraged its research investments, generating an additional \$11.3 million in cash and in-kind support from partner and stakeholder organizations over the year — a leveraging ratio of 1:1.65.

AllerGen's integrated research strategy and its associated platforms and programs are led by internationally recognized Canadian researchers with expertise across a wide range of disciplines.

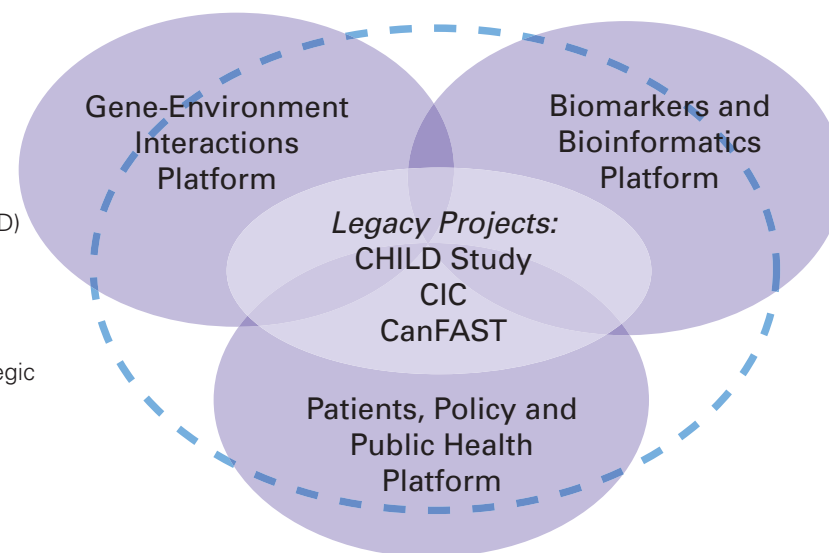
AllerGen's Integrated Research Strategy

Three Legacy Projects:

- The Canadian Healthy Infant Longitudinal Development (CHILD) Study;
- The Clinical Investigator Collaborative (CIC); and
- The Canadian Food Allergy Strategic Team (CanFAST); and

Three Enabling Platforms:

- Gene-Environment Interactions;
- Biomarkers and Bioinformatics;
- Patients, Policy and Public Health.





Malcolm Sears, MB



Paul O'Byrne, MD



Parameswaran Nair,
MD, PhD, FRCP, FRCPC



Anne Ellis MD, MSc,
FRCPC



Jean Marshall, PhD



Ann Clarke, MD

The Canadian Healthy Infant Longitudinal Development (CHILD) Study

Research Leader:

Dr. Malcolm Sears, Professor,
Division of Respiriology, Department of
Medicine, McMaster University

Strategic Focus:

The CHILD Study is a national birth cohort study that aims to uncover the root causes of asthma, allergies and other chronic immune and inflammatory diseases. The CHILD Study collects immunological, physiological and genetic data from over 3,300 Canadian children from pre-birth to age five to inform the impacts of genetics and early childhood environmental and psychosocial exposures on the development of asthma and allergies.

The Clinical Investigator Collaborative (CIC)

Research Leaders:

Dr. Paul O'Byrne, CIC-Allergic Asthma,
Professor and Chair,
Department of Medicine,
McMaster University

Dr. Parameswaran Nair, CIC-Severe Asthma,
Associate Professor,
Department of Medicine,
McMaster University

Dr. Anne Ellis, CIC-Allergic Rhinitis,
Associate Professor,
Department of Biomedical and Molecular
Sciences, Queen's University

Strategic Focus:

This multi-centre, Canadian-based Phase II clinical trials group fast-tracks early-stage potential drug candidates for allergic asthma, severe asthma and allergic rhinitis to accelerate the development of new therapies for allergic disease.

The Canadian Food Allergy Strategic Team (CanFAST)

Research Leaders:

Jean Marshall, Professor and Head
of Microbiology and Immunology,
Dalhousie University

Ann Clarke, Professor,
Department of Medicine,
McGill University

Strategic Focus:

This highly innovative, nationally-networked approach to food allergy and anaphylaxis research is contributing to our understanding of the origins, causes, prevalence and treatment of food allergy and informing the development of improved clinical management strategies and public health measures.



Andrew Sandford, PhD



Jeffrey Brook, PhD



Kelly McNaghy, PhD



Dean Befus, PhD



John Gordon, PhD

Allan Becker, MD, PhD,
FRCPC

Gene-Environment Interactions

Research Leaders:

Dr. Andrew Sandford, Associate Professor,
Department of Medicine,
The University of British Columbia

Dr. Jeffrey Brook, Environment Canada;
Assistant Professor, Division of Occupational
& Environmental Health, Dalla Lana School
of Public Health, University of Toronto

Strategic Focus:

Gene-Environment Interactions focuses on genetic, environmental and epigenetic research with the twin goals of discovering novel therapies and diagnostics, and implementing novel public health interventions and policies in the areas of asthma and allergies.

Biomarkers and Bioinformatics

Research Leaders:

Dr. Kelly McNaghy, Professor,
Department of Medical Genetics,
The University of British Columbia

Dr. Dean Befus, Professor,
Department of Medicine,
University of Alberta
(on leave since October 2012)

Dr. John Gordon, Professor,
Department of Medicine; Director,
Centre for Health and Safety in Agriculture,
University of Saskatchewan
(interim from November 2012)

Strategic Focus:

Biomarkers and Bioinformatics researchers use standard operating protocols and animal models to develop an integrated, world-leading systems-biology approach to development and commercialization.


Patients, Policy and Public Health

Research Leader:

Dr. Allan Becker, Professor and Head,
Section of Allergy & Clinical Immunology,
Department of Pediatrics and Child Health,
University of Manitoba

Strategic Focus:

This research platform focuses on knowledge translation and knowledge mobilization projects that leverage the Network's research expertise to generate new knowledge, products and services that inform public policy, public health practices, patient and health professional outreach, and educational disease management tools.



2012 . 2013

**A recent collaboration between
AllerGen's CHILD Study and the South
Asian biRth cohort (START) — a study of
1,000 South Asian mothers and their newborns
from the Greater Toronto Area — provided an
unprecedented opportunity to further our
understanding of asthma and allergies, and
the role that inflammation may play in the
development of other conditions, such
as cardiovascular disease.**

Research Highlights

When START meets CHILD: Asthma among South Asians in Canada

South Asians (primarily people originating from India, Pakistan, Bangladesh and Sri Lanka) belong to the fastest growing immigrant population in Canada. South Asians have a high risk of developing diabetes and cardiovascular disease, and the burden of asthma and respiratory illnesses in this population is poorly understood.

A recent collaboration between AllerGen's CHILD Study and the South Asian birth cohort (START) — a study of 1,000 South Asian mothers and their newborns from the Greater Toronto Area — provided an unprecedented opportunity to further our understanding of asthma and allergies, and the role that inflammation may play in the development of other conditions, such as cardiovascular disease.

Using secondary datasets, CHILD and START researchers demonstrated that asthma prevalence is increasing at a faster rate — and related hospitalizations and health claims are higher — among South Asians compared to the general Canadian population or other immigrant groups. These findings, arising from an examination of the effect of migration and acculturation on the prevalence of asthma in a South Asian population in Canada,

provide vital baseline data for future studies and policy initiatives.

Further, the CHILD and START studies expanded and harmonized their questionnaires, protocols and physical measures, strengthening the potential for both cohorts to answer important research questions as the children become adolescents and adults. A subset of the START cohort has been invited to participate in the CHILD Study, providing an additional 250 South Asian subjects for this landmark population-based research project.

Harmonization of these large birth cohorts allows for a more powerful examination of complex gene-environment interactions and the exploration of new hypotheses regarding the causes of ethnicity-based differences in asthma prevalence and disease burden.

Mapping molecular interactions of allergic disease

Allergic diseases are complex: they encompass intricate cellular processes regulated by extensive networks of molecular interactions that are impacted by environmental stimuli and individual genetics.

To improve our understanding of the components of these networks and how they interact, Dr. Fiona

Brinkman, a professor in Bioinformatics and Genomics at Simon Fraser University, heads an AllerGen project to develop an integrated database of the genes, proteins, molecular interactions and pathways involved in allergic responses. This landmark resource will provide a platform for sophisticated investigations of asthma and allergy responses and can be combined with bioinformatics and visualization tools for more holistic, systems-level analyses that were not previously possible.

As a first step towards the integration and organization of diverse allergy and asthma datasets, Dr. Brinkman and her research team completed a preliminary AllerGen research project in 2011. The team reviewed existing ontologies (definitions) associated with asthma/allergies and their molecular interactions. As well, selected allergy/asthma pathways were curated in detail from the literature. The results identified clear shortfalls in the current annotation of allergy and asthma-relevant descriptions and revealed that, while the literature is filled with information about allergy and asthma, the data remains relatively inaccessible and unorganized.

This new database will ensure maximal integration of improved definitions and global standards, and

will position AllerGen as an international leader in ontology development efforts. Further, it will facilitate development of a landmark Allergy and Asthma Portal — a web-accessible resource that will combine data from the literature and AllerGen research to aid more integrated, advanced studies of allergic diseases.

New technologies for improved measurement of air pollution exposure

The air we breathe contains a complex mixture of gases and particles that fluctuates in space and time depending upon the sources, the environment, the weather and the presence of other components. Because of this, measuring the content of air is challenging. Although traditional air-monitoring stations are effective, they are expensive to install and maintain, and the size of these stations limits where they can be deployed.

As a step towards creating a low-cost, portable system for real-time monitoring of air pollution, AllerGen investigators Drs Greg Evans and Jeff Brook created and tested five small prototype devices equipped with an array of sensors to monitor local concentrations of nitrogen oxide (NO₂), ozone (O₃) and particulate matter (PM_{2.5}).

These prototypes, including a handheld instrument for tracking personal exposure to air pollution, were tested in different locations and microenvironments, including a highway, a medium-sized road, a public transport stop and an indoor setting. Although further development is needed, the prototypes were sensitive enough to distinguish pollutant levels, track changes over time and monitor ambient air pollution in the microenvironments investigated. In the next phase of testing, these sensor-array devices will help

to assess the air pollution exposure of lung-transplant recipients.

Low-cost, portable technologies for personalized air pollution monitoring will assist enhanced air quality modelling, allow Canadians to identify and avoid areas where air pollution levels are dangerously high, and help people suffering from environmental allergies and respiratory conditions to adjust their disease management strategies in relation to environmental exposures.

Discovering biomarkers of allergic disease

The identification of biomarkers — molecular signals found mainly in blood — may soon revolutionize allergy treatment. These distinct biological markers can predict an individual's susceptibility to developing allergic disease, indicate when treatment is

AllerGen Partners with the Canadian Institutes of Health Research (CIHR)

In collaboration with the CIHR Institute of Infection and Immunity (III); Institute of Circulatory and Respiratory Health (ICRH); Institute of Population and Public Health (IPPH); and Institute of Nutrition, Metabolism and Diabetes (INMD), AllerGen has contributed to a range of CIHR *Signature Initiatives*, *Programmatic Grants in Food and Health*, and *Emerging Network Grants*. These initiatives are aligned with AllerGen's research mission and goals, and have the potential to bring new teams into the Network.

successful, and guide scientists to design therapies that modify the immune system (immunomodulation) — freeing patients from lifelong therapy with antihistamines and steroids.

With this goal in mind, a team led by AllerGen Investigator Dr. Mark Larché evaluated three laboratory methods used to identify and study a biomarker known as an ‘allergen-specific T cell.’ Concluding that none of the methods provided an accurate representation of how allergen-specific T cells behave in the body, the investigators developed an alternative technique to study this rare biomarker. Funded by AllerGen and Adiga Life Sciences, this new method enriches the level of allergen-specific T cells in blood, providing the first-ever picture of how immunomodulatory therapies, like allergy shots, work.

During the three-year study, the team also tracked immune system development over the first two years of life, identified genetic variations that influence immune function in neonates, and analyzed the technical variables affecting biological samples in large, multi-site studies.

These studies formed the basis of a successful application to the National Institutes of Health (NIH) and resulted in the establishment of a

\$6.4 million NIH Center at McMaster University to allow Dr. Larché and others to continue their investigations. Further development of biomarkers as indicators for allergic disease and successful treatment could allow for early intervention and treatment strategies that may potentially slow, halt or avoid disease development.

Cross-country collaboration focuses on food allergies

The prevalence of peanut allergy, which accounts for many fatal and near-fatal allergic reactions, is increasing. To improve diagnosis of this condition, researchers with the Canadian Group on Food Allergy Research (CanGoFAR) identified and tested characteristics of peanut allergic subjects for use in predicting patient outcomes. The resulting algorithm is now available to help clinicians across Canada assess which patients are most at risk for severe reactions — knowledge that will help save lives.

Led by 12 AllerGen investigators, CanGoFAR formed to provide a cross-country collaborative foundation for food allergy research in Canada. CanGoFAR projects have examined the impact of antihistamine therapy on side effects associated with oral immunotherapy for peanut allergy; evaluated the mechanisms of anaphylaxis in mouse models; identified targets for improved prevention



and treatment of food allergy; and generated findings on the role of mast cells in the development of oral tolerance to the egg and peanut proteins that trigger allergic responses. These studies have contributed valuable knowledge about the diagnosis, prevention and treatment of food allergy and have provided clinical and research capacity building opportunities to over 30 AllerGen trainees.

CanGoFAR is an important component of AllerGen’s new CanFAST Legacy project, wherein researchers are studying low-dose immunogenicity, oral tolerance and allergen thresholds. The outcomes, particularly those arising from the team’s investigation of peanut allergy thresholds, will have a profound effect on the food preparation and food service sectors, food labelling policy and practice, and on the diet and eating patterns of allergic individuals.

Engaging Aboriginal families affected by asthma and allergies

Asthma and allergies are the most common chronic conditions affecting First Nations children and adolescents. Aboriginal children are more likely to be admitted to hospital for asthma, and social isolation and loneliness have been commonly reported among children and adolescents with asthma and allergies. However, no studies assessing the unique support and education needs of Aboriginal youth with asthma and allergies or their parents have been reported.

In response to this gap, AllerGen Investigator Dr. Miriam Stewart led a community-based participatory research project that established 33 partnerships with Aboriginal communities, health professionals and not-for-profit organizations in Alberta, Manitoba and Nova Scotia.

Six different support-education interventions were designed, pilot tested and delivered by trained peers, health professionals and community elders, based on the needs and preferences expressed by Aboriginal youth and their parents in pre-intervention interviews. For children, support interventions combined activities such as active games, role playing, art, music and group discussions about

living with asthma and allergies. Implications for improved practice, programs and policies were later identified through multi-stakeholder symposia, focus groups and group interviews.

Results indicated that intervention strategies tailored to each age group, province and community enhanced Aboriginal children's and parents' coping skills and raised community awareness of allergies and asthma. This research is relevant and timely in light of reports highlighting the prevalence of these conditions among Aboriginal children and the lack of peer-supported interventions.

Dr. Stewart's team's findings are being disseminated through a public report, a fact sheet and peer-reviewed publications with the aim of improving the relevance, uptake and efficacy of health programs in Aboriginal communities. These findings are empowering Aboriginal children and families to manage asthma/allergies and to support others, and informing the development of policies promoting collaboration of health and health-related sectors.

Using scientific evidence for effective health policy

In response to growing recognition that health policy should be informed by reliable and rigorous evidence, the University of Alberta's Professor Tim

Caulfield headed two AllerGen research projects exploring how evidence in health policy is produced and used.

First, Dr. Caulfield's team evaluated the nature and sources of evidence used in a variety of public policies, laws and regulations relevant to allergy and asthma prevention and management. Public documents (government documents, press releases, Hansard transcripts and articles from the popular press) were reviewed to identify the evidence used to inform: Canada's H1N1 vaccine program; decisions in British Columbia and Ontario to expand the scope of practice for naturopaths to include allergies; the portrayal of laws and policies designed to manage food allergies and anaphylaxis; and policy responses to the handling of allergens in schools and on commercial aircraft.

Second, the team examined issues surrounding the topic of 'biobanking' and offered recommendations to improve the legal and ethical governance of health research, particularly in the context of multi-site and longitudinal studies like the CHILD Study.

Dr. Caulfield's research provides a broader understanding of how evidence has been used in the development of a number of public policies and

legislative initiatives directly relevant to the asthma and allergy community. Through the project team's publications and its knowledge mobilization and community engagement efforts, these findings are contributing to more efficient and effective policymaking and to ethical and legal innovations in the management and governance of health research.

A national strategy for monitoring asthma care in Canada

In April 2013, 30 experts from across the country gathered to outline the elements of a national strategy to monitor asthma care in Canada. Organized by AllerGen investigator Dr. Teresa To of The Hospital for Sick Children in Toronto and funded through AllerGen's Strategic Initiatives program, this one-day workshop focused on moving beyond

local, regional and provincial initiatives to establish a national set of evidence-based performance indicators for the effective treatment and management of asthma.

Workshop participants formulated recommendations for: developing standard indicators for monitoring asthma care across practices and provinces; engaging participation from primary care providers and patients; capturing and sharing data; and collaborating with stakeholders to provide leadership for a national strategy.

This initiative builds upon a five-year process undertaken by Dr. To and others to establish asthma-specific quality of care indicators in Ontario. Since 2008, these researchers have developed,

pilot tested and validated a set of 15 Asthma Performance Indicators (APIs) that will be used to benchmark and monitor asthma management, towards improving the care of asthma patients across the province.

Recommendations from the 2013 workshop have been incorporated into a proposal submitted to CIHR seeking funding for a nation-wide API implementation and evaluation study. This next step in developing national asthma performance indicators will aim to accommodate the needs of multiple jurisdictions and electronic health record (EHR) systems; contribute to the creation of standard clinical guidelines for asthma management; and place Canada at the forefront of global scientific efforts to improve asthma care.

AllerGen Strategic Initiatives: Knowledge Mobilization and Commercialization

Each year, AllerGen supports time-sensitive strategic initiatives that enable Network investigators to respond rapidly to new opportunities relevant to existing projects. In 2012-2013, AllerGen invested in strategic initiatives in two priority areas: knowledge mobilization and commercialization. Strategic initiative funding aims to ensure that Network results translate into better health and improved quality of life for people living with asthma and allergies, and into new tools and technologies to sustain Canadian jobs and productivity for the long term.

2012 . 2013

AllerGen's research portfolio involves 129 investigators and over 225 partners and collaborators. In 2012-2013, AllerGen-funded research involved, on average, 2.1 collaborators per project.



Network Partners, Collaborators and Knowledge Users

Since 2005, Allergan has developed and nurtured diverse partnerships that span the spectrum of collaboration, ranging from researcher-to-researcher partnerships on Network-funded projects to the creation of multi-disciplinary, multi-sectoral teams to mobilize Allergan's knowledge translation, capacity building and commercialization activities.

Collaborators: n=227

Universities (n=50)

(23 Canadian, 27 International)

Acadia University
American University
Brock University
Charité - Universitätsmedizin Berlin
Dalhousie University
Harvard University
Helmholtz Zentrum München
Icahn School of Medicine at Mount Sinai
Indiana University
Istituto Universitario di Studi Superiori di Pavia
Karolinska Institute (Centre for Allergy Research)
Lakehead University
McGill University
McMaster University
Northwestern University
Queen's University
Simon Fraser University

Southern Methodist University
Stanford University
Technische Universität München
The University of Arizona
The University of British Columbia
The University of Edinburgh
The University of Newcastle (Priority Research Centre for Asthma and Respiratory Disease)
The University of Western Australia
The University of Winnipeg
Trinity University
Université du Québec à Chicoutimi
Université Laval
Université de Montréal
University College Cork
University of Alberta
University of Bristol
University of Calgary
University of Copenhagen
University of Groningen

University of Manitoba
University of Nebraska
University of New Brunswick
University of Ottawa
University of Oxford
University of Saskatchewan
University of Tasmania
University of Toronto
University of Victoria
University of Waterloo
University of Wisconsin
Utrecht University
Western University
Yeshiva University

Hospitals and Health Centres (n=12)

Children's Hospital of Winnipeg, Winnipeg
 Centre hospitalier universitaire Sainte-Justine,
 Montréal
 Hôpital du Sacré-Cœur de Montréal, Montréal
 Institut universitaire de cardiologie et de
 pneumologie de Québec, Québec City
 Kingston General Hospital, Kingston
 McGill University Health Centre, Montréal
 Montréal General Hospital, Montréal
 Our Lady's Children's Hospital, Dublin, Ireland
 St. Joseph's Hospital, Hamilton
 St. Mary's General Hospital, Kitchener
 Stonegate Community Health Centre, Toronto
 The Hospital for Sick Children, Toronto

Industry (n=31)

(28 Canadian, 3 International)

Adiga Life Sciences Inc.
 AIM Therapeutics Inc.
 Amgen Inc.
 Arrowcan Partners Inc.
 Carlton Cards Limited Inc.
 Carr-Gordon Limited
 Chapman's Ice Cream
 CHENOMX, Inc.
 Club Penguin™ Disney Online Studies Canada Inc.
 CTI Life Sciences Fund
 David Brener & Associates
 Elinor Wilson Consulting

GlaxoSmithKline Inc.
 Intelliware Development Inc.
 Kincora Innovation
 Leap Learning Technologies Inc.
 Lincoln Diagnostics
 Lumira Capital
 Maple Leaf Foods
 Mark Bisby Consulting
 Merck Canada Inc.
 Norlien Foundation
 Novartis
 Novartis Pharma Canada Inc.
 Ono Pharmaceuticals Co. Ltd.
 Pfizer Canada Inc.
 Pro-Bio Associates
 Roche Canada
 Stem Cell Technologies
 Suzanne Tough Consulting
 TVM Capital

Federal Agencies (n=12)

Canada Mortgage and Housing Corporation
 Canadian Foundation for Innovation
 Canadian Institutes of Health Research
 Compute Canada
 Environment Canada
 Health Canada
 Health Canada - Food Directorate
 National Research Council Canada

Natural Sciences and Engineering
 Research Council
 Office of the Privacy Commissioner of Canada
 Public Health Agency of Canada
 Secretariat on Responsible Conduct of Research

Provincial and Municipal Agencies (n=24)

Agence de la santé et des services sociaux
 de l'Outaouais
 Agence de Montréal et sa direction
 de santé publique
 Alberta Cancer Foundation
 Alberta Health and Wellness
 Alberta Health Services
 Alberta Innovates
 BC Children's Hospital
 BC Ministry of Health Services
 City of Toronto
 Commission de la santé et de la sécurité
 du travail (CSST)
 Eastern Health
 Fonds de recherche du Québec-Santé (FRQS)
 Genome Alberta
 Hamilton Niagara Haldimand Brant LHIN
 Health Quality Ontario
 Healthy Child Manitoba
 Institut national d'excellence en santé
 et en services sociaux
 Manitoba Innovation, Energy and Mines
 Michael Smith Foundation for Health Research

Ontario Ministry of Economic Development
and Trade

Ontario Ministry of Health and Long-Term
Care Region of Halton

Saskatchewan Ministry of Health

Winnipeg Regional Health Authority

**Non-Profit, Community-based and Charitable
Organizations, Networks and Professional
Associations (n=72)**

(66 Canadian, 6 International)

Aboriginal Nurses Association of Canada

Alberta Breathes

Alberta College of Social Workers

Alberta Lung Association

Anaphylaxis Canada

Assembly of Manitoba Chiefs

Association Québécoise des Allergies
Alimentaires (AQAA)

Asthma Allergy Information Association (AAIA)

Asthma Society of Canada

Canada Games Council

Canada Health Infoway

Canadian Allergy, Asthma and Immunology
Foundation

Canadian Centre for Ethics in Sport

Canadian Environmental Law Association

Canadian Institute of Child Health

Canadian Lung Association/Canadian
Thoracic Society

Canadian Network for Respiratory Care

Canadian Society of Allergy and Clinical
Immunology (CSACI)

Cancer Stem Cell Consortium (CSCC)

Centre for Addiction and Mental Health

Centre for Drug Research and Development
(CDRD)

Centre of Excellence for the Prevention of
Organ Failure (PROOF)

Childhood Asthma Foundation

Children's Hospital Foundation of Manitoba

Clean Air Champions

Coaching Association of Canada

COPD and Asthma Network of Alberta

Creating Hope Society

Dairy Farmers of Canada

Dreamspeakers on Tour

Edmonton Social Planning Council

Enoch Cree Nation Economic Development
Department

Environmental Health, LLC

Eskasoni First Nation

European Association of Allergy and
Clinical Immunology

European Respiratory Society

Family Physician Airways Group of Canada

Federation of Clinical Immunology Societies
(FOCIS)

Hamilton Family Health Team

Jim LaPlante The Family Center

Killam Trusts

Lung Association of Nova Scotia

Manitoba ACADRE-NEAHR Network

Mathematics of Information Technology
and Complex Systems

Max Bell Foundation

Membertou First Nation

Ontario College of Family Physicians

Ontario K-NET

Ontario Lung Association

OntarioMD Inc.

Pollution Probe

Potlotek First Nation

Public Interest Alberta

Saudi Cultural Bureau of Canada

Siksika First Nations

Sport Matters Group

Stem Cell Network

TEC Edmonton

The First Nations Child & Family Caring
Society of Canada

The Hospital for Sick Children Foundation

The Lung Association

The Manitoba Lung Association

The Sandbox Project

Toronto 2015 Pan American/
Parapan American Games

Treaty 7 Management Corporation

Tui'kn Partnership



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Wagmatcook First Nation
 Wahkotowin (Kinship) Society
 Waycobah First Nation
 Whitefish Lake First Nation (Goodfish Lake)
 World Health Organization
 X Prize Foundation

Other (Research Institutes, International Organizations, Private Donors, and School Boards) (n=26)

Agriculture and Food Development Authority
 Alberta Asthma Centre
 Alberta Centre for Child, Family and Community Research

Cheryl Cuddeford, MD
 Collegium Internationale Allergologicum (CIA)
 Daniel McKennitt, MD
 Delton School
 Eva Bereti
 Halton Catholic District School Board
 Halton District School Board
 Inner City High School (ICHS)
 Institut de recherche Robert-Sauvé en santé et en sécurité du travail
 Institut National de la Santé et de la Recherche Médicale
 Institute for Clinical Evaluative Sciences
 Kathy Hayward
 Loretta Fiorillo, MD
 Munich Allergy Research Center (MARC)
 National Collaborating Centre for the Determinants for Health
 National Institute of Allergy and Infectious Diseases
 National Institutes of Health
 Nestor Cisneros, MD
 Queensland Children's Medical Research Institute
 Southern Ontario Centre for Atmospheric Aerosol Research
 The Hospital for Sick Children Research Institute
 Tom Gersner, MD
 Women & Children's Health Research Institute

AllerGen has signed four MOUs with research centres in Australia, Germany and Sweden. These relationships leverage the expertise of each organization's researchers and research infrastructure, allowing collaborative research and scientific activities, the exchange of students and academic staff, and providing training and skill acquisition opportunities for the next generation of allergic and related immune disease researchers.

International Partnerships

In alignment with its strategic objectives, AllerGen continues to spearhead networking and partnership initiatives across the globe to tackle complex allergy and immunology problems. To date, AllerGen has developed 11 international partnerships, including a particularly fruitful collaboration with the Centre for Allergy Research (CfA) at the Karolinska Institute in Stockholm, Sweden. This partnership has resulted in new guidelines for

allergic rhinitis and asthma, research on novel strategies for allergy vaccines, the establishment of an international Traffic pollution, Asthma and Genetics (TAG) project, a Genome-Wide Data Workshop, and the first CIC site outside of Canada.

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allowing collaborative research and scientific activities, the exchange of students and academic staff, and providing training and skill acquisition opportunities for the next generation of allergic and related immune disease researchers. Over the past year, AllerGen has continued to build on the momentum of these successful international collaborations. Highlights include:

Memoranda of Understanding (MOU) Agreements in effect 2012-2013

	Country
Centre for Allergy (CfA) Karolinska Institute	Sweden
The University of Newcastle	Australia
The Allergie - Centrum - Charité at Charité – Universitätsmedizin Berlin	Germany
Munich Allergy Research Center (MARC) – Technische Universität München (TUM) and Helmholtz Zentrum München - German Research Centre for Environmental Health	Germany



Dr. Jennifer Protudjer
Karolinska Institute

AllerGen international exchange led to global research career

Dr. Jennifer Protudjer, a past President of the AllerGen Students and New Professionals Network (ASNP), is currently a postdoctoral fellow at the Centre for Allergy Research (CfA) at the Karolinska Institute in Stockholm, Sweden — an AllerGen partner and one of the world's leading medical universities. With her supervisor,



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Dr. Catarina Almqvist Malmros, Dr. Protudjer studies the intersection of asthma and puberty, and whether

or not the use of childhood asthma medication influences pubertal growth and development.

In addition to her work focusing on asthma in children and teens, Dr. Protudjer is passionate about helping people manage their food allergies. With an international team of Swedish and Canadian researchers, Dr. Protudjer is helping to develop a novel food allergy education program for youth. Also, as a member of the FoodHE team at the Karolinska Institute (part of the larger EuroPrevall Study), she examines the inter-connections among food allergy, quality of life and socio-economic cost.

Dr. Protudjer originally developed her relationships at the Karolinska Institute during a six-week trainee exchange made possible through AllerGen's *International Partnership Initiative* (IPI) funding, which aims to produce globally-engaged scientists in the fields of allergy and asthma.



Elaine Fuertes
The University of
British Columbia

AllerGen trainee and ASNPN Leadership Committee member receives Doctoral Research Award

Elaine Fuertes, a PhD candidate at The University of British Columbia (UBC), received a 2012 CIHR *Frederick Banting*

and Charles Best Canada Graduate Scholarship Doctoral Award. This award, valued at \$105,000 over three years, will allow Elaine to complete international internships with AllerGen partner organizations.

At UBC, Elaine is supervised by AllerGen Principal Investigators Drs Chris Carlsten and Michael Brauer to study the associations between traffic-related air pollution, childhood allergic rhinitis and genetic variability.

To date, AllerGen has developed 11 international partnerships, including a particularly fruitful collaboration with the Centre for Allergy Research (CfA) at the Karolinska Institute in Stockholm, Sweden. This partnership has resulted in new guidelines for allergic rhinitis and asthma, research on novel strategies for allergy vaccines, the establishment of an international Traffic, Pollution, Asthma and Genetics (TAG) project, a Genome-Wide Data Workshop, and the first CIC site outside of Canada.

Currently, Elaine is completing an internship at the Helmholtz Zentrum München - German Research Centre for Environmental Health in Germany, under the guidance of Dr. Joachim Heinrich. She plans to complete a second internship at the CfA Karolinska Institute in Sweden with Professor Göran Pershagen. Elaine's global experience illustrates the Network's commitment to generating new research and development opportunities for AllerGen trainees.



Dr. Steven Maltby
The University of
Newcastle

AllerGen-mentored researcher studies microRNA in Australia

The international collaboration between AllerGen and Australian researchers was formalized in 2011 with the signing of a MOU with The University of Newcastle's Priority Research Centre for Asthma and Respiratory Disease — a national training centre for clinician scientists, postdoctoral fellows, PhD scholars and undergraduates in respiratory medicine.

AllerGen trainee **Dr. Steven Maltby** has completed the first 15 months of his three-year postdoctoral fellowship at the Centre.



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Supported by grants from The University of Newcastle and the CIHR, Dr. Maltby works with Professor Paul Foster, an internationally recognized researcher on the molecular and cellular basis of asthma, allergy, respiratory disorders and chronic inflammation.

Dr. Maltby's research interests include microRNA function in immune cell migration and pathology,

focusing on inflammatory respiratory disease models. Dr. Maltby completed his PhD at The University of British Columbia under the supervision of AllerGen investigator Dr. Kelly McNagny, Professor, Department of Medical Genetics.

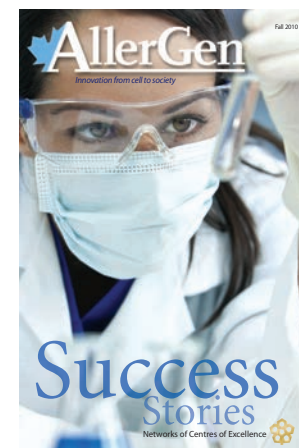
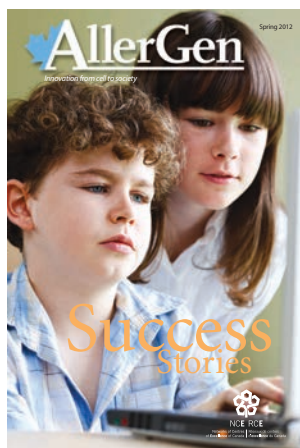
2012 . 2013

Effective KTEE and knowledge mobilization strategies are critical to successful dissemination of Network research results and ensuring that the social and economic value of AllerGen's national and international networking and research are realized.



Knowledge and Technology Exchange and Exploitation (KTEE)

As part of the **Networks of Centres of Excellence Program**, AllerGen is committed to facilitate the uptake and application of the Network's research results by partner organizations, stakeholders and receptor communities across the country. AllerGen's comprehensive KTEE activities focus on strategic initiatives in the areas of knowledge mobilization and commercialization through collaborations with academia, industry, government and not-for-profit organizations across many sectors and disciplines. These partnerships disseminate allergic and immune disease-related knowledge and accelerate its application for the social and economic benefit of Canadians.



Knowledge Mobilization

AllerGen Success Stories

AllerGen's *Success Stories* publication offers a lay audience access to cutting-edge research results. *Success Stories* showcases the Network-

supported research and accomplishments of leading Canadian allergy, asthma, anaphylaxis, genetics, environment and education researchers, their students and partner organizations. *Success Stories* is available on AllerGen's website at

www.allergen-nce.ca and in hard copy.

To date, AllerGen has published and distributed five issues of *Success Stories* to over 1,200 Network participants, research partners and knowledge users. In sharing these stories, AllerGen aims to

AllerGen in the Media — Selected Stories	
05-Apr-12	Reuters Health – online – Aparna Narayanan “Consumers often ignore food allergy labels: study”
Spring 2012	Allergic Living magazine – Claire Gagné “Urine test predicts asthma in kids”
10-May-12	National Post – online – Indranil Nadarajah “Don’t self-diagnose: see your doctor”
17-Aug-12	CBC International – online “Advancing asthma research: World Asthma Congress”
10-Oct-12	Canada AM “Why are food allergies on the rise?”
30-Nov-12	CBC’s Marketplace “Burned” (Health effects of chemical flame-retardants in the home)
05-Dec-12	Global TV “December asthma spikes”
11-Jan-13	CTV News – online/broadcast “Can a little exposure to peanuts lessen severe reactions in allergy sufferers?”
11-Feb-13	Macleans magazine – print – Joanne Latimer “The healing powers of—salt? Believers claim salt therapy fixes asthma, allergies and more”
11-Feb-13	The Globe & Mail – print – Paul Taylor “C-section babies missing crucial gut bacteria, study finds”
11-Feb-13	The New York Times – online/print – Douglas Quenqua “Healthy Bacteria in Babies”
18-Feb-13	Radio Canada International “Allergies complicate kissing”
20-Feb-13	CBC National News “Environmental Exposure Unit at Kingston General Hospital”
21-Feb-13	La Presse – online – Catherine Doré “Percer le mystère des allergies”
18-Mar-13	The Hamilton Spectator – online/print – M. Hayes “Allergy deaths offer lessons, doctors say”

improve the quality of life of Canadians living with allergic diseases, asthma and anaphylaxis.

AllerGen in the Media

AllerGen’s communication strategy targets diverse national, international, external, internal, scientific and lay audiences. In 2012-2013, AllerGen experienced a steady stream of visitors to its web-site, with a peak of 1,078 unique visitors in a single month. National and international media coverage quadrupled over the previous fiscal year, and AllerGen researchers were featured in the media on 92 occasions.

AllerGen’s *Café Scientifique* highlights the return to school is a risky time for children with asthma

For many children, heading back to school means fresh school supplies, bagged lunches and crowded hallways. But for children with asthma, it may also mean a sudden increase in doctor’s appointments and emergency room visits. In Canada, between 20 and 25% of children’s hospital admissions for asthma occur in September, peaking between two and three weeks after Labour Day. This seasonal surge — a pattern that has also been observed in the United States, the United Kingdom, Mexico and Finland — is known as the September asthma spike.

To help parents, families and educators learn more about seasonal asthma in children and how to manage it, AllerGen hosted a *Café Scientifique* entitled *Preventing children's seasonal asthma spikes: What parents, teachers and the public need to know*. Held in November 2012, with partner funding from CIHR, this interactive public event responded to a community need for evidence-based, up-to-date and accessible information to enable better asthma management.

The *Café Scientifique* allowed members of the public to interact with some of Canada's leading experts in childhood asthma research, care, diagnosis and treatment. AllerGen researchers Drs Malcolm Sears and Susan Wasserman, along with AllerGen's Scientific Director and panel moderator, Dr. Judah Denburg, discussed the causes of the September asthma spike, offered prevention tips and best practices, and engaged with the audience in an extensive question and answer period.

To accelerate the 'knowledge to action' cycle, follow-up materials — a summary newsletter, research snapshot, an online video recording of the evening's events, and links to additional support material — were distributed by email to attendees

four months after the initial *Café Scientifique*. Regular follow-up with attendees will occur every June and November, transmitting evidence-based tips and reminders to help parents prevent asthma-related emergencies during high-risk periods.

An essential component in the success of this *Café* was partnership engagement. AllerGen partnered with the Halton Region Public Health Unit, the Halton District School Board and the Halton Catholic School Board, as well as community organizations, such as the Ontario Lung Association and the Asthma Society of Canada, to provide a networked and multidisciplinary approach to this knowledge mobilization initiative.

Getting asthma on the school agenda with a 21st century KT strategy

In 2012, AllerGen Principal Investigator Dr. Dean Befus led an important knowledge translation initiative to encourage school health decision-makers in Ontario, Manitoba and Alberta to provide access to supports, education and resources for elementary students with asthma.

The *AsthmaSphere* project used a novel knowledge translation (KT) approach to promote the vision that: "Every Canadian elementary student with asthma will enjoy optimal quality of life resulting



AllerGen's *Café Scientifique*, November 2012: Dr. Judah Denburg, Scientific Director and CEO, AllerGen NCE, moderates an expert panel that answered audience questions about asthma management in school-age children.

from well-controlled asthma, and knowledgeable, enabled and coordinated family, social, school and health supports."

AsthmaSphere developed and disseminated five e-messages to over 1,200 school decision-makers, using art, stories, photographs, videos, screen casts and diagrams to provide evidence-based information and to encourage the adoption of a school-based model of care for students with asthma. The dynamic and varied e-message



Artist: Mauricio Mejía, El Salvador

AsthmaSphere vision of elementary students with asthma enjoying an optimal quality of life.

content was designed to capture interest, cater to various learning styles and facilitate the knowledge-to-action process. A painting by Salvadorian painter Mauricio Mejía depicted elements of the project's vision and served as the banner and letterhead for the campaign.

A key component of the *AsthmaSphere* model was the development of partnerships that enabled effective KT. An advisory team of researchers, clinicians, educators, NGOs and multi-sectoral partners supported the development, implementation and evaluation of the messaging campaign in each of the three provinces.

Evaluation outcomes, including size/quality of databases, retention of target audience, requests for additional information, e-message statistics, and online/phone evaluations, revealed that 24% of *AsthmaSphere* messages were opened and the retention rate of the target audience was 98 percent.

The achievements of *AsthmaSphere* contributed to the validation of effective KT strategies and tools that facilitate the movement of health research and programs toward practical applications, policy changes and improved health.

Commercialization

Two NCEs team up to develop tests for allergic asthma

AllerGen and the Centre of Excellence for the Prevention of Organ Failure (PROOF) Centre are working together to develop blood tests that will speed up clinical trials investigating the efficacy of drugs treating allergic disease.

Leveraging the PROOF Centre's expertise in biomarker development and using blood samples obtained from AllerGen's CIC, the joint research study identifies molecular signals (biomarkers) predictive of chronic inflammatory responses in adults with allergic asthma.

Following exposure to an allergen such as pollen, mites or mould, some people with asthma develop an isolated early response (early responders), while others (dual responders) go on to develop a late response — which may contribute to chronic airway inflammation and uncontrolled disease. The collaboration between these two Networks of Centres of Excellence aims to elucidate why late responses do not develop in all cases, and to develop a blood test that can accurately predict late phase allergic responses.

Dr. Scott Tebbutt, an AllerGen Principal Investigator, is the Chief Scientific Officer of the PROOF Centre — an NCE co-hosted by The University of British Columbia and Providence Health Care in Vancouver, BC. “Such biomarkers, determined by a simple blood test, will identify subjects who are late asthmatic responders so that they can be pre-selected for clinical trials that examine how effective new pharmacological interventions are in attenuating inflammatory responses to allergen exposure,” says Dr. Tebbutt.

By early 2014, the PROOF Centre and AllerGen anticipate completing the development and validation of a biomarker panel that will predict an asthmatic individual’s response to allergen exposure and will diagnose a late allergic response.

Commercialization toolkit supports pre-incubation discoveries

AllerGen has developed a streamlined process to support promising innovations arising from Network-funded research by providing guidance to Network investigators in the commercialization of research discoveries that will benefit Canadians living with asthma and allergic diseases.

Using a commercialization toolkit, scorecard and mentorship program, this pre-incubation method-



ology assesses the value of a discovery, evaluates how it can be leveraged for a successful outcome and fosters connections with university technology transfer offices, business innovators and technology development partners. A commercialization assessment scorecard evaluates commercial potential in five areas: intellectual property/copy-right/licensing; competitiveness; financial viability; production; and marketing.

The mentorship component of the process helps researchers protect the intellectual property associated with their inventions and discoveries. Mentors help create a value proposition; articulate the problem statement and added-value of the discovery to benefit patients, clinicians or the community; and develop strategies to build and sustain partnerships with industry, the medical community, and potential investors.

2012 . 2013

Since 2005, Allergan has provided education, training and capacity building opportunities to 1,126 Highly Qualified Personnel (HQP) and disbursed over \$2.1 million in trainee awards and fellowships.

Tomorrow's Leaders: AllerGen's Highly Qualified Personnel (HQP)



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AllerGen creates unique, value-added opportunities for the training, education and professional development of students and early-career professionals who strengthen Canada's knowledge base, innovative capacity and work-force productivity.

Since 2005, AllerGen has provided education, training and capacity building opportunities to 1,126 Highly Qualified Personnel (HQP) and disbursed over \$2.1 million in trainee awards and fellowships.

AllerGen Students and New Professionals Network (ASNPN)

Founded in 2007 to foster networking, knowledge exchange and professional skill development, the ASNPN comprises trainees (undergraduate students to postdoctoral fellows), new professionals and research staff working in the fields of allergy and asthma research.

Led by the ASNPN President, an elected ASNPN Leadership Committee provides advice to AllerGen's Advanced Training and Education Opportunities Advisory Committee (AETOAC).

HQP working on AllerGen-funded projects are automatically enrolled as members of the ASNPN Network. Individuals not directly working on an AllerGen project may apply to become an ASNPN member and access the associated benefits. There are currently 474 ASNPN members: 315 HQP actively involved in Network research, and 159 students and new professionals working or employed in related research areas.

AllerGen Emerging Clinician-Scientist Research Fellowship

In January 2013, **Dr. Philippe Bégin**, a physician and associate researcher from Centre hospitalier de l'Université de Montréal (CHUM) and Centre hospitalier universitaire (CHU) Sainte-Justine in Montréal, Québec, was selected to receive the prestigious AllerGen *Emerging Clinician-Scientist*



Dr. Philippe Bégin

Research Fellowship award, valued at \$250,000.

This award helps to address the critical shortage of allergy and clinical immunology expertise in Canada, and the need to enable newly trained Canadian clinical immunologists and allergists to pursue academic research training in the fields of allergy, asthma and anaphylaxis.

Dr. Bégin's fellowship showcases an international collaboration between AllerGen, CHU Sainte-Justine and Stanford University in California. During his two-year fellowship, Dr. Bégin will perform clinical and fundamental research on oral immunotherapy for patients suffering from food allergy, under the co-supervision of Dr. Elie Haddad, Chief of

“By giving me the means to visit the Stanford Alliance for Food Allergy Research, Allergan has provided me with an unparalleled opportunity to participate in cutting-edge research on food immunotherapy and mechanisms of oral tolerance. The strong biotechnology focus, the rich academic environment of Stanford University, and the Silicon Valley culture of entrepreneurship, afford unique experiences in my career development as a clinician-scientist in the field of allergy and immunology.” — **Dr. Philippe Bégin**

Immunology, CHU Sainte-Justine and Professor at Université de Montréal, and the internationally-renowned Director of the Stanford Alliance for Food Allergy Research (SAFAR) and Associate Professor at Stanford University, Dr. Kari Nadeau.

This is the second *Emerging Clinician-Scientist Research Fellowship* awarded by Allergan. The inaugural recipient, Dr. Moshe Ben-Shoshan, is now an Assistant Professor at McGill University and a Principal Investigator on Allergan's C-CARE Project.

Food allergy article wins HERA Paper of the Year

Dr. Daniel Harrington received the 2012 *Risk Perception/ Communication Paper of the Year* award from the *Journal of Human and Ecological Risk Assessment* (HERA). His winning paper



Dr. Daniel Harrington
University of Toronto
Mississauga

is titled *Exploring the Determinants of the Perceived Risk of Food Allergies in Canada*. Dr. Harrington is currently a Population Health Intervention Research Network (PHIRNET) postdoctoral fellow in the Department of Geography at the University of Toronto Mississauga, under the supervision of Allergan Investigator Dr. Kathi Wilson.

Dr. Harrington completed his PhD training with Allergan Investigator Dr. Susan Elliott, working on the Allergan research project *Surveying the Prevalence of Food Allergy in all Canadian Environments* (SPAACE).

Health Canada cites Allergan HQP's research

Ms. Lianne Soller's paper, *Overall prevalence of self-reported food allergy in Canada*, which was published in the *Journal of Allergy and Clinical Immunology* (JACI) in June 2012, is cited on Health Canada's website as the source for the self-reported food allergy rate of 8% in Canada. Ms. Soller is a PhD candidate at McGill University supervised by Allergan Investigator Dr. Ann Clarke.

Allergan HQP secures two prestigious fellowships

Dr. Pawan Sharma, University of Calgary, has been awarded the prestigious *CIHR Fellowship in Respiratory Health*. This national award is offered by the CIHR Office for Patient-Oriented Research, in partnership with the Canadian Lung Association



Dr. Pawan Sharma
University of Calgary

and GlaxoSmithKline. Dr. Sharma has also been recognized with the Alberta Innovates - Health Solutions *Early Career Development Fellowship Award*, ranking first out of 72 applicants.

Dr. Sharma's multidisciplinary research project will investigate the novel molecular mechanism by which PDE4 inhibitors (in combination with glucocorticoids) exert their clinical activity in chronic obstructive pulmonary disease.

Following completion of his PhD at the University of Manitoba, Dr. Sharma joined the Airway Inflammation Group and Dr. Mark Giembycz's laboratory at the Snyder Institute for Chronic Diseases, University of Calgary, in 2011. He has been a member of the ASNPN since its inception and served on the inaugural ASNPN Leadership Committee as Secretary/Treasurer.

Trainee excels in first poster competition

Hessam Kashani, an ASNPN member and a Master's degree student at the University of Manitoba, arrived in Canada from Iran with a medical degree but with little hands-on research experience.

Under the supervision of Dr. Andrew Halayko, a professor at the University of Manitoba, Mr. Kashani has gained research expertise and honed his publication skills.

At the 2012 International Conference of the American Thoracic Society (ATS) in San Francisco, CA, Mr. Kashani's first research abstract, titled *An Autocrine Mediator of TGF- β 1 Induced Extracellular Matrix Production by Human Airway Smooth Muscle Cells*, was ranked among the top 10% of all abstracts submitted by Canadian trainees. Out of the 58 abstracts entered in the Airway Remodeling: Smooth Muscle, Fibroblasts, and Extracellular Matrix and Functional Consequences category, Mr. Kashani's



Hessam Kashani (left) with supervisor, Dr. Andrew Halayko, at the 2012 ATS International Conference

abstract was ranked first among M.Sc. students, fourth among trainees from all academic levels and sixth overall at the conference, earning him a \$500 USD travel grant from the ATS.

Mr. Kashani's work, which includes data that he collected, describes the first observations of

"AllerGen has helped to shape my career over the last six years. The Network has provided me with new opportunities to collaborate and enhance my learning, and I am in a much better position to achieve my professional goals in respiratory research as a result of my involvement with AllerGen." — **Dr. Pawan Sharma**

inflammatory mediators called ‘alarmins’ and their role in lung tissue remodeling. This groundbreaking research identifies a new target for developing better drug therapies for the treatment of severe asthma and has since advanced to studies using experimental animal models. As Mr. Kashani transitions to his PhD studies, he hopes to move his research forward into pre-clinical testing.

AllerGen Travel Awards Program growing

AllerGen’s *Travel Awards Program* supports attendance and participation in national and international conferences, symposia and workshops that are aligned with AllerGen’s mission and vision. Travel awards provide Network trainees and investigators with unique opportunities for

networking, research collaboration, knowledge exchange, and skill acquisition and development.

In 2012-2013, AllerGen disbursed 42 Travel Awards, representing a 61% increase in the number of awards issued and 45% growth in the total number of events attended compared to the previous fiscal year. In total, 37 HQP were funded to participate in 19 national and international events throughout the year.

Travel awards were issued to facilitate attendance at the following events:

American Academy of Allergy, Asthma & Immunology (February 22-26, 2013), San Antonio, TX

McMaster University - Claudia Hui
Queen’s University - Michelle North,
Jenny Theile, Vanessa Omana

American Thoracic Society Annual General Meeting (May 18-23, 2012), San Francisco, CA

McMaster University - John Paul Oliveria
The University of British Columbia -
Masatsugu Yamamoto, Jasemine Yang
University of Alberta - Meghan Azad
University of Calgary - Pawan Sharma
Université Laval - Philippe Prince
University of Manitoba - Hessam Kashani



Claudia Hui, McMaster University, at the American Academy of Allergy, Asthma & Immunology conference (February 22-26, 2013), San Antonio, TX



Masatsugu Yamamoto, The University of British Columbia, at the World Congress of Asthma (August 18-21, 2012), Québec City, QC

Association of Physiologists & Pharmacologists International Conference (December 18-20, 2012), Meerut, India

University of Calgary - Pawan Sharma

Canadian Respiratory Conference (April 26-28, 2012), Vancouver, BC

Université Laval - Francine Deschesnes

Canadian Society for the Sociology of Health Conference (October 25-27, 2012), Ottawa, ON

McGill University - Stephanie Nairn

Collegium Internationale Allergologicum Conference (October 12-19, 2012), Jeju Island, Republic of Korea

The University of British Columbia -
Tillie-Louise Hackett

Colloque sur l'éthique et l'intégrité scientifique en recherche médicale (September 13-14, 2012), Montréal, QC

Université Laval - Hélène Villeneuve, Marie-Eve Boulay, Joanne Milot, Myriam Gagné, Martine Bordeleau, Philippe Prince

European Academy of Allergy and Clinical Immunology Food Allergy and Anaphylaxis Meeting (February 7-9, 2012), Nice, France

McGill University - Lianne Soller

European Academy of Allergy and Clinical Immunology Congress (June 16-20, 2012), Geneva, Switzerland

Queen's University - Michelle North

European Research Society's Lung Science Conference (March 15-17, 2013), Estoril, Portugal

The University of British Columbia -
Shannon Russell

European Respiratory Society Annual Congress (September 1-5, 2012), Vienna, Austria

The University of British Columbia - Denise Daley

FOCIS - Advanced Course in Basic and Clinical Immunology (February 24-28, 2013), Scottsdale, AZ

The University of British Columbia - Sara Leo

Formation de base en asthme du RQAM (October 3-5, 2012), Longueuil, QC

Université Laval - Myriam Gagné

Immunology Montréal Symposium (November 30, 2012), Montréal, QC

Queen's University - Steven Long

Keystone Symposium on Lung Development, Cancer and Disease (February 5-10, 2013), Taos, NM

The University of British Columbia - Bernard Lo

Society for Leukocyte Biology Annual Meeting (October 28-30, 2012), Maui, HI

The University of British Columbia - Jeremy Hirota

Summer Institute in Statistical Genetics (July 17-27, 2012), Seattle, WA

The University of British Columbia -
Amritpal Singh

World Congress of Asthma (August 18-21, 2012), Québec City, QC

Queen's University - Katie Killorn
The Hospital for Sick Children - Elinor Simons
The University of British Columbia -
Sheka Yagub Aloyouni, Roxanne Rousseau,
Mohsen Sadatsafavi, Francesco Sava,
Masatsugu Yamamoto
University of Alberta - Erika Ladouceur
University of Montréal - Carlo de Olim Rugginenti

World Health Organization/Global Alliance Against Respiratory Diseases General Meeting (July 9-12, 2012), St. Petersburg, Russia

The Hospital for Sick Children - Teresa To.

“The AllerGen Trainee Symposium always provides a refreshing program of professional development topics, focusing on areas such as mentorship, career paths and public speaking skills — topics typically not included in other conferences. I have attended seven AllerGen Trainee Symposia and find that they are specifically designed to meet needs that are not well addressed by graduate training alone.”

— **Dr. Michelle North, Post-doctoral fellow, Queen’s University**



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Seventh Annual AllerGen Trainee Symposium

The 7th Annual AllerGen Trainee Symposium was held in Calgary, Alberta, from May 27 to 29, 2012. Fifty-one AllerGen trainees and ASNPN members representing 11 academic institutions attended

the symposium — the highest attendance to date. The program featured interactive workshops on knowledge translation, media, networking, intellectual property, grant and journal writing, interview skills and formulating effective feedback.

This annual event provides a rich networking environment for trainees and young professionals who share an interest in allergy and asthma research and clinical practice, and offers professional development in areas not usually covered by clinical or academic training programs. A *Networking for Success* dinner featuring senior researchers from the University of Calgary was an event highlight.

AllerGen launches an Undergraduate Summer Studentship program

In 2012, AllerGen introduced an *Undergraduate Allergy, Asthma and Anaphylaxis Summer Studentship Research Training Awards* program. Summer

studentship awards are designed to foster an interest in allergic and related immune disease research among undergraduate students in biomedical, health, social and/or natural science and engineering programs.

Award winners work throughout the summer with AllerGen research teams and it is hoped that this experience will spark an enduring interest in the field, leading to their pursuit of advanced studies in allergic disease research and clinical practice.

This year, 10 outstanding undergraduate students from six Canadian universities and research institutes were chosen to receive Summer Studentships. AllerGen provided grants, typically in the amount of \$3,000 per student, and matched 1:1 or more by partner organizations from across Canada, for a total program investment of \$58,076.

AllerGen 2012-2013 Undergraduate Summer Studentship Award winners

McMaster University

Trainee: Juliana Xie

Impact of iLC depletion on PN Allergy and Anaphylaxis

Supervisor: Manel Jordana, Professor, Pathology and Molecular Medicine; Head, Respiratory Diseases and Allergy Division Centre for Gene Therapeutics; Tier 1 Canada Research Chair in Immunobiology of Respiratory Diseases and Allergy

Trainee: Sina Rusta-Sallehy

Identify the Mechanisms Involved in Increasing Eosinophil Lineage Commitment of CD34+ HP in Response to TSLF Stimulation in the Presence of the Hemopoietic Cytokine IL-5

Supervisor: Judah Denburg, William J. Walsh Professor of Medicine; Director, Immunology & Allergy; Scientific Director, AllerGen NCE

McGill University

Trainee: Madelaine Yona

Ability of CD8a+ CD11c+DCs in Potentiating the Recruitment of Treg

Supervisor: Bruce Mazer, Professor of Paediatrics; Division Head, Allergy and Immunology, Montréal Children's Hospital

The Hospital for Sick Children

Trainee: Laura Feldman

The Burden and Spatial Distribution of Fatal and Severe Asthma in Ontario 2001-2010

Supervisor: Teresa To, Senior Scientist, Child Health Evaluative Sciences; Professor, Dalla Lana Graduate School of Public Health, Institute of Health Policy and Management and Evaluation, Institute of Medical Sciences

The University of British Columbia

Trainee: Janet Xu

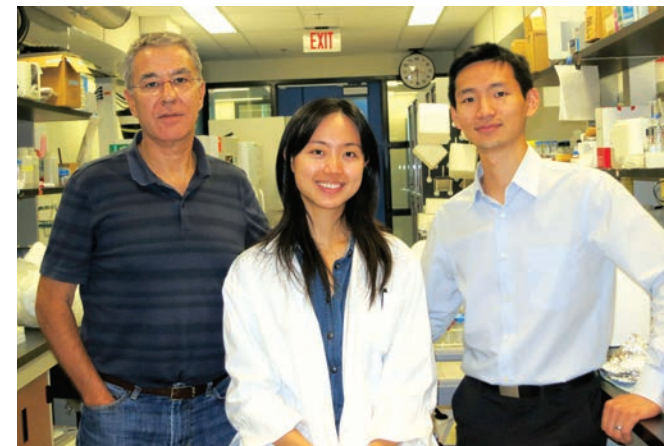
Expression and Modulation of Surfactant Protein D in the Airway Epithelium of Asthmatics

Supervisor: Delbert Dorscheid, Associate Professor of Medicine, The James Hogg Research Centre, Institute for Heart + Lung Health, St. Paul's Hospital

Trainee: Ting-I (Tina) Wang

Role of RIG-I in Respiratory Syncytial Virus Infection

Supervisor: Stuart Turvey, Senior Clinician-Scientist, CFRI; Associate Director, Clinical, CFRI; Associate Professor, Division of Infectious and Immunological Diseases, Department of Pediatrics



Juliana Xie's (centre) studentship experience in the McMaster laboratory of Dr. Manel Jordana (left) affirmed her interest in research.

University of Alberta

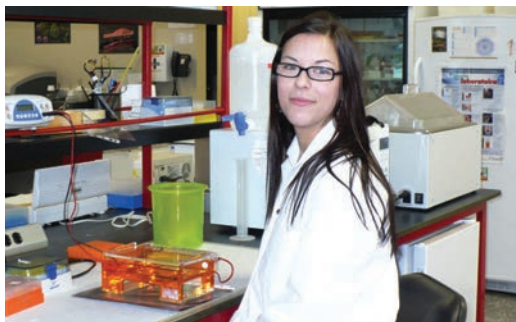
Trainee: Kiho Son

Evaluation of mRNA Expression in the Lung

Supervisor: Dean Befus, Professor; Astra-Zeneca Canada Inc., Chair in Asthma Research, Division of Pulmonary Medicine, Department of Medicine

AllerGen 2012-2013 Undergraduate Summer Studentship Awards

Institution	AllerGen Funding	Partner Funding	Total Award Value
McMaster University	\$6,000	\$6,000	\$12,000
McGill University	\$3,000	\$3,000	\$6,000
The Hospital for Sick Children	\$3,000	\$3,000	\$6,000
The University of British Columbia	\$6,000	\$6,000	\$12,000
University of Alberta	\$6,576	\$9,500	\$16,076
Université du Québec à Chicoutimi	\$3,000	\$3,000	\$6,000
TOTAL	\$27,576	\$30,500	\$58,076



Valérie Gagné-Ouellet received training in sequencing and qRT-PCR during her studentship at Université du Québec à Chicoutimi under the supervision of Dr. Catherine Laprise.

Trainee: Danielle Tougas

The Roaring Adventures of Puff Knowledge Translation Project

Supervisor: Dean Befus, Professor;
Astra-Zeneca Canada Inc., Chair in Asthma Research, Division of Pulmonary Medicine, Department of Medicine

Trainee: Tin-Shan (Tim) Chung

Acute Management of Anaphylaxis

Supervisor: Brian Rowe, Professor,
Department of Emergency Medicine;
Tier 1 Canada Research Chair in Evidence-Based Emergency Medicine

Université du Québec à Chicoutimi

Trainee: Valérie Gagné-Ouellet

Role of 1L1R2 in Allergic Asthma

Supervisor: Catherine Laprise, Professor;
Canada Research Chair on the Study of Asthma Genetic Determinants

AllerGen trainees take top honours in CSACI Poster Competition

For the third consecutive year, AllerGen trainees and ASNPN members earned top honours at the Canadian Society for Allergy and Clinical Immunology (CSACI) Poster Competition, placing first in four of five categories. The event was held at the CSACI Annual Scientific Meeting in Calgary, Alberta, in October 2012.

2012 winners include:

Meghan Azad, a postdoctoral fellow from the University of Alberta, won first place in the Basic Science category for her poster, *Infant Gut Microbiota and the Hygiene Hypothesis of Allergic Disease*.

Elinor Simons, a clinician and PhD candidate from The Hospital for Sick Children, took top honours in the Asthma/Allergic Rhinitis category for her poster, *Associations between Second-Hand Smoke Exposure in Pregnancy and Age of Childhood Asthma Development*.

Doug Houlbrook, a Research Nurse for the CHILD Study at the University of Manitoba, received the Allied Health top award for his poster, *Parental Asthma Diagnosis and Age of Onset as a Risk Factor in Children's Asthma*.

Joanne P. Yeung, a Clinical Immunology and Allergy Fellow-in-Training (FIT) from McGill University, placed first in the Allergy/Anaphylaxis category for her poster, *Oral Immunotherapy for Milk Allergy: A Systematic Review*.

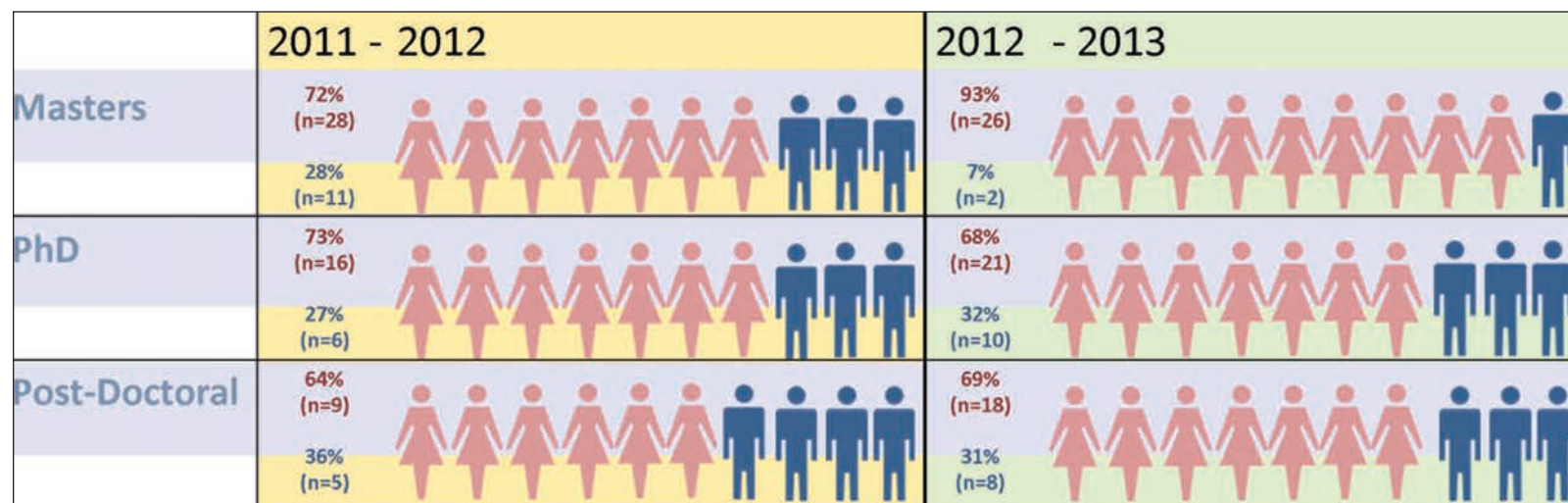
Sophia Xu, a Clinical Immunology and Allergy Fellow-in-Training from McMaster University, placed second in the same category for her poster, *Anaphylaxis Deaths in Ontario: A Retrospective Review of Cases from 1986 to 2011*.

Boosting Canada's research reservoir: Supporting women in science

AllerGen's HQP program is designed to offer skill and knowledge acquisition, networking opportunities and mentorship to men and women with a shared interest in the field of allergy and asthma research and clinical practice. Through its diverse initiatives, AllerGen's HQP program has successfully attracted and retained a high proportion of Canadian female researchers skilled in the study and practice of science — in a gender ratio that far exceeds the national average.

A November 2010 report produced by the Natural Sciences and Engineering Research Council of Canada (NSERC) suggests that despite increases, women are still under-represented at higher degree levels in the fields of natural science and

AllerGen Trainees by Gender and Academic Level



engineering. The report shows the ratio of women to men at the Master's level of academic study is approximately 0.64, slightly higher than at the Bachelor's level. However, the ratio drops off significantly at the Doctoral level to roughly 0.48.

Other data sources confirm similar trends: although women represent a large part of the undergraduate pool in science-related programs, they are more likely than men to leave the academic pipeline at certain critical junctures, such as following the completion of a Master's degree or between

earning a PhD and beginning a university research career. The declining representation of women at higher degree levels has often been referred to as the "leaky pipeline."

An analysis of AllerGen trainees by gender and academic level reveals that graduate students and postdoctoral fellows working on AllerGen-funded research are predominantly female. In 2011-2012, women represented 72% of Masters students, 73% of PhD students and 64% of post-doctoral fellows.

In this past year, the proportion of women developing advanced-stage research expertise through

their involvement with AllerGen has increased even further. In 2012-2013, 93% of Masters students, 68% of PhD students and 69% of post-doctoral fellows working on AllerGen-funded projects were women.

Several women mentored through the AllerGen Trainee Network have gone on to secure employment across diverse sectors or were promoted within their institutions. AllerGen congratulates the following HQP graduates for their accomplishments:



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Elaina MacIntyre completed her PhD in the School of Environmental Health at The University of British Columbia, where she examined the relationship between ambient air pollution and respiratory disease in childhood under the supervision of AllerGen Investigator Dr. Michael Brauer. During her postdoctoral training, Elaina spent four years at the Helmholtz Zentrum München German Research Centre for Environmental Health working with Professor Joachim Heinrich. Her research included work on the AllerGen-funded *Traffic, Asthma and Genetics* (TAG) study. Dr. MacIntyre is now employed as an Epidemiologist Specialist in Environmental and Occupational Health at **Public Health Ontario**.

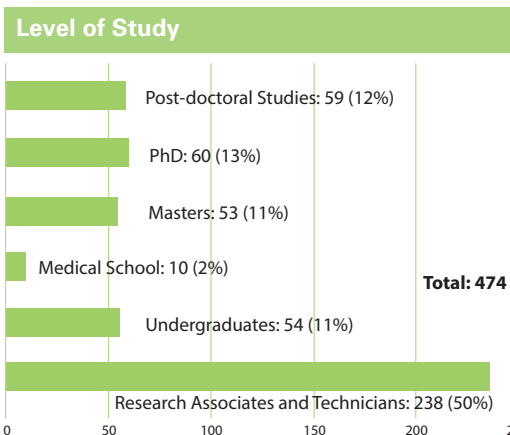
Katherine Arias is a Clinical Scientist at **Boehringer Ingelheim** in Burlington, Ontario, where she provides leadership and expertise in scientific and operational functions inherent in the planning, conduct and completion of clinical trials. Katherine completed her PhD in Medical Sciences (Infection and Immunity Stream) at McMaster University under the supervision of Drs Manel Jordana and Susan Waserman. Katherine was the recipient of an AllerGen *Canadian Allergy and Immune Diseases Advanced Training Initiative* (CAIDATI) *Research Award* in 2009 (PhD) and 2011 (PDF).

Dr. Tillie-Louise Hackett was named an Assistant Professor in the **Department of Anesthesiology, Pharmacology & Therapeutics at The University of British Columbia** in February 2013. She was an AllerGen trainee from 2007 to 2011, under the supervision of Drs Tony Bai and Darryl Knight. Dr. Hackett is also the first female Associate Director of UBC's James Hogg Research Centre.

Sarah Kam is employed as a Research Assistant at **The University of British Columbia's Child and Family Research Institute**. While completing her M.Sc. in Experimental Medicine at UBC, Sarah worked with Dr. Scott Tebbutt on the AllerGen-funded project, *Genetics of the early and late response to allergen challenge*. In February 2012, her research paper, titled *The peripheral blood gene expression changes during allergen inhalation challenge in atopic asthmatic individuals*, was published in *The Journal of Asthma*. Sarah was the recipient of an AllerGen CAIDATI Research Award (Masters) in 2009 and 2011.

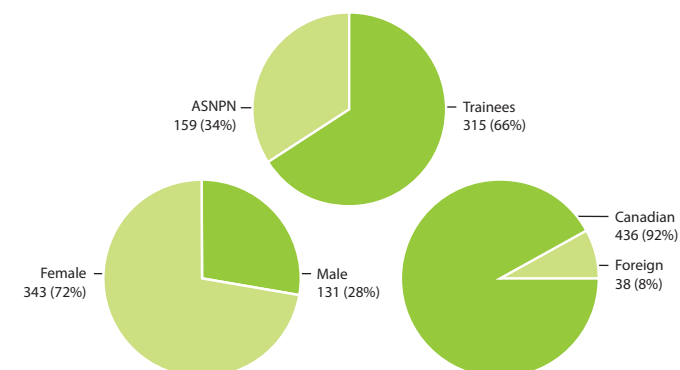
A Snapshot of AllerGen HQP 2012-2013

Trainees, New Professionals, Research Associates and Technicians by Province		
Ontario	162	34%
British Columbia	107	23%
Alberta	94	20%
Quebec	49	10%
Manitoba	42	9%
Nova Scotia	9	2%
Outside Canada	5	1%
Saskatchewan	3	0.63%
New Brunswick	3	0.63%
Total	474	100%

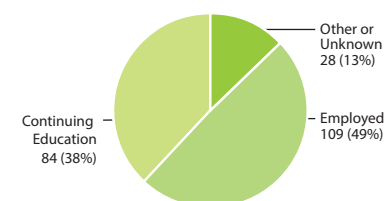


Trainees, New Professionals, Research Associates and Technicians by University		
The University of British Columbia	100	21%
McMaster University	79	16%
University of Alberta	68	14%
University of Toronto	57	12%
University of Manitoba	41	9%
McGill University	25	5%
University of Calgary	26	6%
Queen's University	19	4%
Université Laval	14	3%
Affiliated Institutions and Organizations	10	2%
Simon Fraser University	6	1%
Université de Montréal	5	1%
Outside Canada	4	0.84%
University of Saskatchewan	4	0.84%
Université du Québec à Chicoutimi	4	0.84%
University of Waterloo	4	0.84%
Dalhousie University	3	0.63%
University of New Brunswick	3	0.63%
University of Guelph	1	0.21%
University of Winnipeg	1	0.21%
Total	474	100%

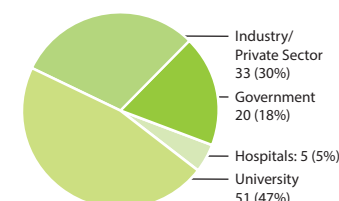
Trainees, New Professionals, Research Associates, Technicians and ASNPN Members (n=474)



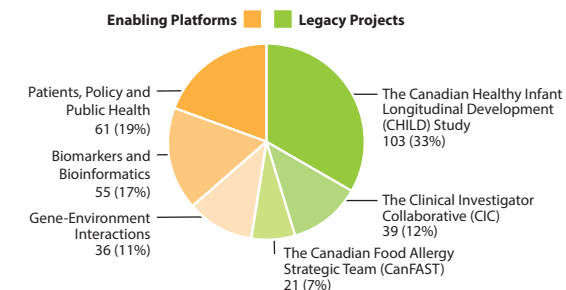
AllerGen HQP Graduates 2005-2013 (n=221)



AllerGen HQP Employment by Sector 2005-2013 (n=109)



AllerGen HQP by Research Program



A close-up photograph of a silver stethoscope lying diagonally across a black laptop keyboard. The stethoscope's chest piece is prominent in the lower right foreground, while its tubing extends towards the upper left. The background shows various keys like 'U', 'I', 'O', 'P' and 'Y', 'H', 'G'.

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2012 . 2013

Knowledge from the landmark CHILD Study, along with discoveries by AllerGen investigators studying the impact of gene-environment interactions, involving such elements as traffic-related air pollution and indoor exposure to phthalates and other chemicals, will influence our understanding of the development of complex, non-communicable illnesses.

A close-up, black and white photograph of a stethoscope resting on a laptop keyboard. The stethoscope's chest piece is in the foreground, and its tubing extends across the keyboard keys. The keyboard is a standard QWERTY layout with dark keys and light-colored lettering. The lighting creates highlights on the metallic parts of the stethoscope and the keys.

2012 . 2013

Knowledge from the landmark CHILD Study, along with discoveries by AllerGen investigators studying the impact of gene-environment interactions, involving such elements as traffic-related air pollution and indoor exposure to phthalates and other chemicals, will influence our understanding of the development of complex, non-communicable illnesses.

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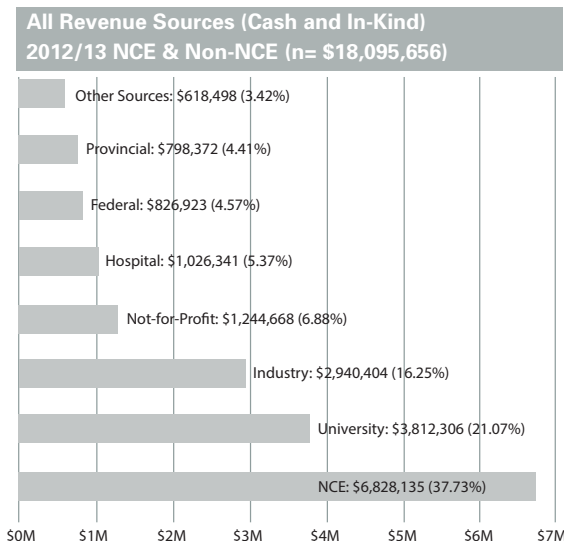
Financial Overview

AllerGen NCE Inc. Financial Summary 2012 - 2013

	2011-2012 (Year 7)	Percentage	2012-2013 (Year 8)	Percentage
Revenues (Cash)				
NCE Award	5,251,470	86.7%	6,828,135	92%
Health Canada Funding (CMP 3)	193,504	3.2%	182,966	2%
Non-NCE Funds for Administration*	129,892	2.1%	346,006	5%
Non-NCE Funds for Research*	484,753	8.0%	70,000	1%
	6,059,619	100.0%	7,427,107	100%
Expenditures (Cash)				
Research Programs	6,601,542	74.18%	4,639,700	74.66%
Networking	604,656	6.79%	27,314	0.44%
Training	447,525	5.03%	279,131	4.49%
Communications	27,748	0.31%	47,948	0.77%
Administration	1,218,066	13.69%	1,220,406	19.64%
	8,899,537	100.0%	6,214,500	100%
Committed Amounts for Future Research	1,474,270		1,789,000	
NCE and Non-NCE Cash Reserves	-55,023		1,302,607	

All Revenue Sources (Cash and In-Kind) 2012/13 NCE and Non-NCE				
	Cash	In-Kind	Total	Percentage
NCE (37.73%)	6,828,135	-	6,828,135	37.73%
University (21.07%)	142,332	3,669,973	3,812,306	21.07%
Industry (16.25%)	2,467,304	473,100	2,940,404	16.25%
Not-for-Profit (6.88%)	432,645	812,023	1,244,668	6.88%
Hospital (5.37%)	301,800	724,541	1,026,341	5.67%
Federal (4.57%)	680,333	146,600	826,933	4.57%
Provincial (4.41%)	198,427	599,945	798,372	4.41%
Other Sources (3.42%)	60,958	557,540	618,498	3.42%
Total	\$ 11,111,934	\$ 6,983,722	\$ 18,095,656	100%

* Includes cash and in-kind contributions

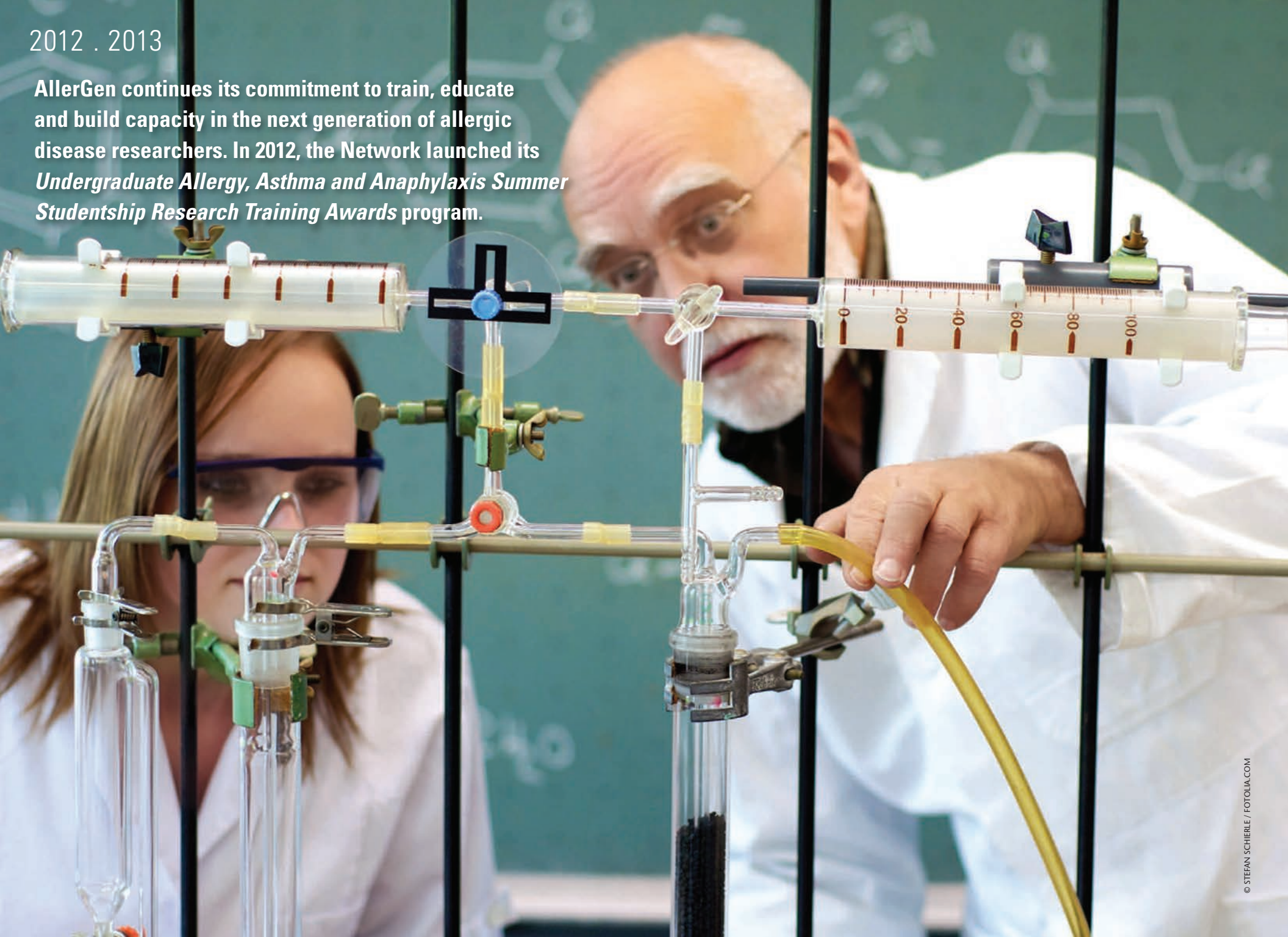


In 2012-13, AllerGen's income from all sources (cash and in-kind) was \$18,095,656. Of this amount, \$6,828,135 was received as a base grant from the NCE.

For every dollar that AllerGen received from the NCE program, it leveraged an additional \$1.65, resulting in an additional investment of \$11.3 million from the private, public and not-for-profit sectors.

2012 . 2013

AllerGen continues its commitment to train, educate and build capacity in the next generation of allergic disease researchers. In 2012, the Network launched its *Undergraduate Allergy, Asthma and Anaphylaxis Summer Studentship Research Training Awards* program.



Network Participants

Investigators (n=129)

Name	Affiliation
Arturas Petronis	Centre for Addiction and Mental Health
Heather Castleden	Dalhousie University
Jean Marshall	Dalhousie University
Jeff Brook	Environment Canada
Sébastien La Vieille	Health Canada
Chris Sarin	Health Canada
Wade Watson	IWK Health Centre
Diane Lougheed	Kingston General Hospital
Jennifer Olajos-Clow	Kingston General Hospital
Jeremy Scott	Lakehead University
Moshe Ben-Shoshan	McGill University
Ann Clarke	McGill University
Lawrence Joseph	McGill University
James Martin	McGill University
Bruce Mazer	McGill University
Danuta Radzioch	McGill University
Celia Greenwood	McGill University Health Centre
Ciriaco Piccirillo	McGill University Health Centre
Petra Arck	McMaster University
John Bienenstock	McMaster University
Michael Cyr	McMaster University
Judah Denburg	McMaster University
Paul Forsythe	McMaster University
Sarah Garside	McMaster University
Gail Gauvreau	McMaster University
Ted Haines	McMaster University
Mark Inman	McMaster University
Manel Jordana	McMaster University
Paul Keith	McMaster University
Mark Larché	McMaster University
Anthony Levinson	McMaster University
Joseph Macri	McMaster University
Parameswaran Nair	McMaster University

Name	Affiliation
Helen Neighbour	McMaster University
Paul O'Byrne	McMaster University
Jason Ohayon	McMaster University
Malcolm Sears	McMaster University
Susan Waserman	McMaster University
Greg Miller	Northwestern University
Anne Ellis	Queen's University
Jodan Ratz	Queen's University
George Agnes	Simon Fraser University
Ryan Allen	Simon Fraser University
Fiona Brinkman	Simon Fraser University
Timothy Takaro	Simon Fraser University
Sharon Dell	The Hospital for Sick Children
Colin McKerlie	The Hospital for Sick Children
Theo Moraes	The Hospital for Sick Children
Felix Ratjen	The Hospital for Sick Children
Susan Richardson	The Hospital for Sick Children
Sanja Stanojevic	The Hospital for Sick Children
Padmaja Subbarao	The Hospital for Sick Children
Teresa To	The Hospital for Sick Children
Wendy Ungar	The Hospital for Sick Children
Michael Brauer	The University of British Columbia
Chris Carlsten	The University of British Columbia
Edmond Chan	The University of British Columbia
Moiria Chan-Yeung	The University of British Columbia
Denise Daley	The University of British Columbia
Del Dorscheid	The University of British Columbia
Mark FitzGerald	The University of British Columbia
Michael Kobor	The University of British Columbia
Tobias Kollmann	The University of British Columbia
Larry Lynd	The University of British Columbia
Carlo Marra	The University of British Columbia
Kelly McNagny	The University of British Columbia

Name	Affiliation
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Legacy Projects and Associated Initiatives:		17
Canadian Healthy Infant Longitudinal Development (CHILD) Study	2	
Clinical Investigator Collaborative (CIC)	5	
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Strategic Initiatives in Knowledge Mobilization and Commercialization:		3
Network Publications:		2,066
Publications	1,624	
Scientific Posters	442	
Principal Investigators and Co-Investigators:		129
Highly Qualified Personnel (HQP):		1,126
Trainees, new professionals and research staff working on Network research	474	
HQP	315	
Other participating students & new professionals	159	
HQP participation in the Network since 2005	652	
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Universities:		50
Canadian	23	
International	27	
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