AllerGen NCE Inc.

Theme II: Environments, Populations and Society

Post-Workshop Report

Re: Workshop held

Tuesday October 24, 2006

Intercontinental Hotel

Montreal, Quebec

5 December 2006

FINAL REPORT

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Executive Summary

On October 24, 2006 AllerGen NCE Inc.'s (AllerGen) Theme II: Environments, Populations and Society research team held a strategic planning workshop in Montreal, Quebec. Fifteen researchers participated in the workshop. The workshop focused on sharing research results to date and the development of strategic priorities for research and knowledge translation to guide the development of Theme II's research agenda to 2009 within the context of AllerGen. AllerGen is one of 19 Networks of Centres of Excellence supported by the federal government to foster partnerships between university, government, industry and not-for-profit organizations that help turn Canadian research and entrepreneurial talent into economic and social benefits for Canadians.

Workshop participants developed six recommendations within five programmatic thrusts for future research and knowledge translation initiatives that would build on current activities within Theme II:

Knowledge and Technology Exchange and Exploitation

1. Develop knowledge translation tools for homeowners and housing policy-makers re: optimizing indoor air quality in the home

Understanding the Interaction of Airborne Pollutants and Allergens

2. Enhance understanding of the role of pollutants, e.g. particles, in the allergic response and related development of new/better environmental assessment and measurement tools

Novel Approaches to Diagnosis of School and Workplace Allergy/Asthma

3. Support AllerGen's current efforts to extend peanut allergy studies Canada-wide

The Effect of Early Life Experiences on the Development of Allergy/Asthma

4. Develop a cross-programmatic research programme on the effects of stress
5. Undertake research to increase understanding of the role of infection in early life development of allergy and asthma

Birth Cohort

6. Launch and evaluate a pilot phase of the Canadian Healthy Infant Longitudinal Study (CHILD Study).

Existing strengths upon which Theme II research teams can build future initiatives include highly networked multidisciplinary project teams; an array of multi-sectoral partnerships; access to innovative and emerging research platforms and databases; a strong evidence base that can be translated into products or services, for example tools for homeowners and policy makers; and strong trainee participation in Theme research projects.

Next steps for Theme II researchers and other investigators whose research is strategically linked to Theme II research priorities will include continuing to meet by teleconference over the next three months in order to further integrate and refine the strategic research and knowledge translation priorities within the context of the programmatic structure of AllerGen-supported research.

Between December 2006 and March 2007, these researchers must identify an integrated set of primarily applied, programmatically linked and interdisciplinary research projects aligned with the strategic research objectives for Theme II. It will be important to identify the applied outcomes that would be transferable to specific sectors, identify non-academic research partners, establish user advisory committees as appropriate, and suggest unique training opportunities for students, post-doctoral fellows, researchers, clinicians, and private, public and health sector learners in the context of this research plan.

The overall Theme II research priorities and strategy will be presented to AllerGen's Research Management Committee on December 14-15, 2006 for review and feedback. Individual programmes of research will then be refined and submitted to the AllerGen Research Management Committee and to the AllerGen International Scientific Advisory Committee for peer review on March 15, 2007 in order to determine funding eligibility for 2007-2009.

1. Introduction

On October 24, 2006 AllerGen NCE Inc's (AllerGen) Theme II: Environments, Populations and Society research team held a strategic planning workshop in Montreal, Quebec, to share research results and identify strategic directions for future research, development and knowledge translation.

The workshop was hosted by Theme Leaders Drs. Frances Silverman, University of Toronto/St. Michael's Hospital/Gage Occupational and Environmental Health Unit, and Malcolm Sears, Firestone Institute, St. Joseph's Hospital / McMaster University.

The workshop was attended by 15 researchers, two AllerGen research coordinators, and AllerGen Administrative Centre staff. The workshop agenda is provided in Appendix A. A participant's list is provided in Appendix B.

The workshop provided Theme II investigators with an opportunity to:

- Highlight research results relevant to AllerGen's mandate for social and economic impact.
- Identify existing and potential new research partners for which Theme II research results are relevant.
- Identify opportunities for collaboration among investigators and integration across projects.
- Identify options for the future development of Theme II to 2009, consistent with AllerGen's strategic objectives and the Networks of Centres of Excellence (NCE) programme mandate.

The NCE programme of which AllerGen is a part is supported by the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council (SSHRC) [the "Tri-Councils"]. AllerGen-supported research should not duplicate the kind of research that the Tri-Council funds in their open grant competitions or Institute-supported research programmes. While all NCEs support some basic research, NCEs typically undertake such research in a goal-oriented context wherein the translation of such research findings are essential to the realization of the broader social and economic impact of a Network in relation to its specific mission. Thus, the "framing" of the basic research undertaken within an NCE is different from projects funded through Tri-Council research programmes in that it may be curiosity driven but also has a compelling justification in terms of its contribution to the Network's social and/or economic impact, commercialization and knowledge translation objectives.

NCE research programmes also distinguish themselves from Tri-Council operating grant programmes by virtue of their interdependent, networked research teams working collaboratively across disciplines and institutions, and in partnership with potential end-users of the research results. Ideally, NCE researchers work in virtual teams on complex problems framed as programmes of research that would not otherwise be addressed by individual researchers working alone. These research teams act as transformational agents of innovation that develop, protect, translate and apply knowledge for economic and / or social benefit to Canada.

The balance of this report summarizes the presentations and recommendations arising from the Theme II workshop.

2. Network Objectives for Theme II: Environments, Populations and Society Research

The *AllerGen Strategic Plan, 2004* sets out the following five objectives for Theme II research:

1. Determine the "prime–candidate" environmental events and exposures in the development and perpetuation of the allergic diathesis (in collaboration with Theme 1).

2. Investigate the interaction of airborne pollutants and allergens.

3. Investigate novel approaches to diagnosis of school and workplace allergy/asthma.

4. Investigate the role of infection in allergy/asthma.

5. Study prevalence and expression of allergy/asthma in specific Canadian populations.

3. Theme II Research Overview

In pursuit of these objectives, Theme II currently consists of the following nine projects:

2.1 Gender-related biologic and sociologic impact of obesity
A. Becker, University of Manitoba

2.3 Is the prevalence of peanut allergy increasing? A five-year follow-up study on the prevalence of peanut allergy in Montreal school children, aged 5-9
A. Clarke, McGill University

2.5 A feasibility study to develop an exposure model for indoor air contaminants and to collect genetic data on an asthmatic cohort
C. Infante-Rivard, McGill University

2.6 Maternal stress in early childhood and the development of asthma
A. Kozyrskyj, University of Manitoba

2.7 Antenatal steroid therapy for fetal lung maturation: Is there an association with childhood asthma?
C. Mustard, University of Toronto

2.8 Cardiopulmonary consequences of air pollution in a murine model of allergic asthma
J. Scott, University of Toronto

2.9 Planning a Canadian longitudinal birth cohort study of asthma and allergy in childhood
M. Sears, McMaster University

2.10 Allergic asthma: Air pollution and allergen interactions
F. Silverman, University of Toronto

2.11 Development of objective measurement of airway inflammation and lung function in infants
P. Subbarao, University of Toronto

Each researcher was invited to present the goals, progress to date and implications for social and/or economic impact of their research to the group. In addition, Sharon Dell, MD, SickKids Hospital; Tim Takaro, Faculty of Health Science, Simon Fraser University; and James Scott, Gage Occupational and Environment Health Unit, Department of Public Health Sciences, University of Toronto were

invited to share their health/environment research results with Theme II investigators due to the relevance to and alignment of their research with Theme II strategic objectives.

The research findings and associated social and/or economic relevance of Theme II research projects are briefly summarized in Table 1 below.

Table 1: Theme II Research Project Overviews and Potential Impacts

Theme II Project	Potential Research Applications
2.1 Gender-related biologic and sociologic impact of obesity *A. Becker, University of Manitoba*	
• Looks at leptins and the development of asthma and obesity • Comparing the relationship between HOMA-IR and C13 to hyper-responsiveness	• New diagnostic tool to identify insulin resistance and obesity using non-invasive C13 breath test and relating this to the development of asthma • Great interest in a breath test as a diagnostic tool because it is non-invasive
2.3 Is the prevalence of peanut allergy increasing? A five-year follow-up study on the prevalence of peanut allergy in Montreal school children, aged 5-9 *A. Clarke, McGill University*	
• Study will determine the prevalence and rate of increase of peanut allergy – N=8,000 students on the Island of Montreal • Will characterize life with peanut allergy based on study of 40 families • Hypothesizes that prevalence has increased from 1.5% to 3% (doubled) in five years	• Understand the etiology of allergy to help develop preventive strategies (environmental vs. genetic factors) • Ensure evidence exists re: increase in prevalence • Facilitate appropriate resource allocation decisions for public education and prevention • Influence school policies • Influence food labeling industry
2.5 A feasibility study to develop an exposure model for indoor air contaminants and to collect genetic data on an asthmatic cohort C. Infante-Rivard, McGill University	
• Goal is to develop a model to estimate indoor ultra-fine particles (UFPs) that would be applicable to a birth cohort study to help identify causes of asthma • Gather DNA from 3-4 year old children who develop childhood asthma and their parents using a saliva kit and document and validate the clinical evolution of asthma	• Will develop a model applicable in large cohort study to validate home exposures, school exposures and transportation exposures to ultra-fine particles • Project will require additional funding to validate models, conduct genotyping and pooling with other cohorts • Project may evolve into research supported by Theme I: Genes and Early Life Determinants, Programme A, re: environmental assessments in population-based studies.

Table 1: Theme II Research Project Overviews and Potential Impacts	
Theme II Project	**Potential Research Applications**
2.6 Maternal stress in early childhood and the development of asthma A. Kozyrskyj, University of Manitoba	
• Study the impact of maternal stress on children at age 7 years • Database study of longitudinal healthcare and prescription records • Maternal stress and child asthma defined by physician diagnosis and prescription medication	• Found exposure to maternal stress increased risk of childhood asthma at age 7 • Can inform other database studies and the birth cohort study • Can inform the Manitoba Healthy Child Family First program (home visitation service by public health nurses to help new parents care for their infant and prevent child abuse and other health hazards for the child)
2.7 Antenatal steroid therapy for fetal lung maturation: Is there an association with childhood asthma? *C. Mustard, University of Toronto*	
• Examine corticosteroid therapy, administered during labour and delivery to accelerate fetal lung maturation as a potential risk factor for the development of asthma in 79,395 infants from 56,168 mothers • Test the hypothesis that fetal exposure to corticosteroids in the antenatal period is an independent risk factor for the development of asthma in childhood • A population based cohort study of all pregnant women who resided in Nova Scotia, Canada and gave birth to a singleton fetus between January 1, 1989 and December 31, 1998 and lived to discharge was undertaken using data from The Maternal-Child Health Database and linked health care utilization records	• Project is complete • Findings revealed that over 10 years corticosteroid therapy increased by 3 fold from a rate of 7.5 in 1989 to 23.2 births per 1,000 in 1998 • Although only a small but significant, elevated risk for childhood asthma with antenatal steroid exposure was demonstrated, antenatal steroid therapy appears to be an independent risk factor for the development of childhood asthma. • Further research into the smallest possible dose required of the steroid to achieve the desired post-natal effect could be undertaken potentially limiting the long-term consequences of exposure such as childhood asthma.
2.8 Cardiopulmonary consequences of air pollution in a murine model of allergic asthma *Jeremy. Scott, University of Toronto*	
• Establish a murine model of concentrated ambient particulate (CAP) and ozone (O3) exposure in allergic asthma • Determine such exposures on pulmonary function and lung injury • Determine novel toxicogenomic determinants of CAP + O3 – induced changes in allergic asthma • Examine the effects of exposure on	• Research will lead to a research platform that will support future research in the Network • Study and infrastructure will iterate with the human investigations (CHILD-related proposals (Takaro), and ongoing with project 2.10) to examine exposures mechanisms not otherwise able to be addressed.

Table 1: Theme II Research Project Overviews and Potential Impacts	
Theme II Project	**Potential Research Applications**
specific biochemical pathways in systemic and pulmonary blood vessels in vitro	
2.9 Planning a Canadian longitudinal birth cohort study of asthma and allergy in childhood *M. Sears, McMaster University*	
• Identify the underlying mechanisms by which genetic, immune and environmental factors interact to promote the development of allergy and asthma • Identify what determines the prevalence and natural history of allergy and asthma • Explain the sex difference in the expression of allergy and asthma in childhood • Explain the effects of the indoor environment on allergy and respiratory health outcomes	• CIHR declined to send the "big picture" proposal to peer review (N=10,000, 6 recruitment centres) due to discrepancy between the RFA budget ($12M) and the proposed budget ($83M) • Initial application is being scaled down to an "initially fundable project" (possibly N=1,200, 3 recruitment centres) • The other centers originally proposed can be phased in when additional funding is secured • Cost is less than $1,000 per child, per year, which is comparable to other birth cohort studies undertaken in other jurisdictions
2.10 Allergic asthma: Air pollution and allergen interactions *F. Silverman, University of Toronto*	
• Determine whether CAP and ozone increase airway reactivity to inhaled allergens in allergic asthmatics • Determine if this results in enhanced lung and systemic inflammatory responses	• Findings are important to setting air quality criteria and standards / laws • New facility coming on line to enable measurement of the effects of ultra-fine and coarse particles in addition to fine particles • Findings will inform the birth cohort and mechanisms
2.11 Development of objective measurement of airway inflammation and lung function in infants *P. Subbarao, University of Toronto*	
• Develop reliable and repeatable infant airway inflammatory measures • Ability of airway inflammatory and function measures to diagnose persistent asthma • Assess feasibility and acceptance of infant testing in a pilot cohort • Develop and implement a training programme for infant assessment	• This research is a pilot for the birth cohort regarding lung function testing and assessing the degree of acceptance of parents • This will result in a platform for lung function tests pre: 6 years of age • Platform will lead to diagnostic tests for asthma • Novel training will be provided for sites across Canada via multi-centre studies and trials • Findings also link to Programme B: Diagnostics and Therapeutics research

Table 2 provides a brief summary of the research presentations by invited guest researchers.

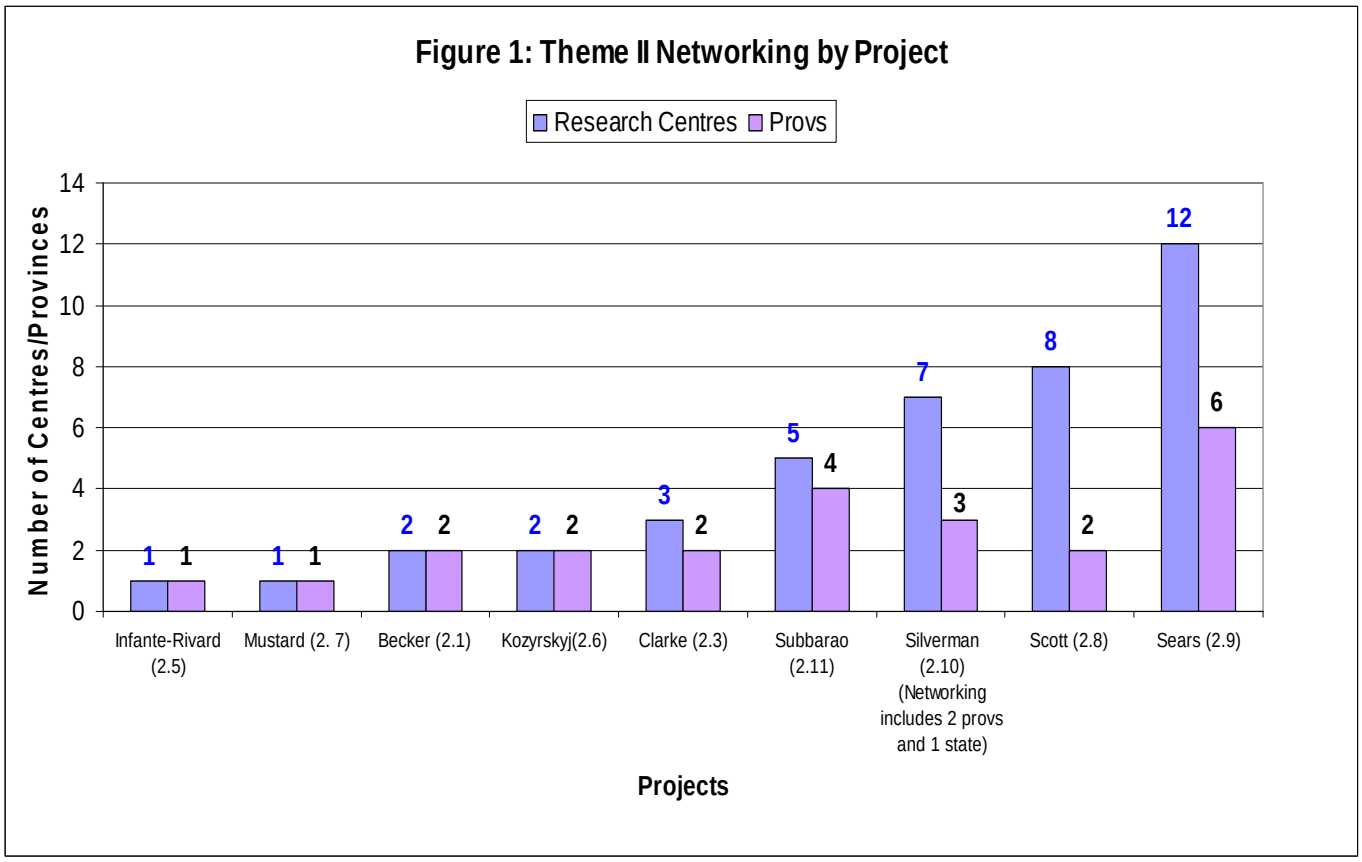
Table 2: Guest Project Overviews and Potential Impacts

Theme II Aligned Project	Potential Research Applications
T_H1 vs. T_H2. Is that REALLY the Question *Tim Takaro, Simon Fraser University*	
• Reported on study of Chronic Beryllium Disease (CBD,a Th1 dominated disease) and The Seattle Healthy Homes asthma home environmental interventions initiative	• In CBD found progression towards disease is in part genetically determined by polymorphisms involved in glutathione (protective in oxidative stress). • Education alone regarding indoor home maintenance may have some benefit in reducing asthma exacerbations • Reduction of home exposures to moisture, ETS, mites, mold and pests can reduce need for urgent health services and reduce asthma symptoms
T-CHEQ Study – Toronto Child Health Evaluation Questionnaire *Sharon Dell, SickKids*	
• Study of impact of long-term exposure to traffic-related air pollution to the incidence of asthma in young children • Measured level of pollutant (NO2) based on residential address using land use regression model and GIS systems	• Research is in progress • Next steps involve calculating exposures, analyzing effects, linking to Institute for Clinical Evaluative Sciences (ICES) administrative data and assessing feasibility of cohort follow-up
Evaluation and control of biological hazards in the workplace, community and environment *James Scott, University of Toronto*	
• Research focuses on evaluation and control of biological hazards in the workplace, community and environment Study A: • Research supported by WSIB examines microbial contaminants in metalworking fluids • Relationship between fluid contaminant levels and air contaminant levels is under study to determine if fluid hygiene provides adequate protection against the evolution of microbial air	• Research is relevant to the environmental measures required within the CHILD Study Study A: • Research will help explain why asthma rates in machinists increased substantially with the switch from neat oil to water-based synthetic and semisynthetic MWFs • Will confirm if water-based MWFs are involved in the etiology of asthma

Table 2: Guest Project Overviews and Potential Impacts	
Theme II Aligned Project	**Potential Research Applications**
contaminants in water-based synthetic and semisynthetic MWFs systems Study B: • Examines differences in indoor air quality (IAQ), particularly mould levels, between home-based health care and institutional health settings	 Study B: • Found much greater IAQ variation in homes versus institutional buildings • Approx 10% of homecare homes failed Health Canada guidelines for indoor mould set for occupational, non-industrial settings • Project outcomes will help clarify patient/provider safety issues and inform policy decisions re: site reallocation for healthcare services, particularly where patients have long-term care needs

4. Theme II Networking

The nine Theme II Principal Investigators are distributed across three provinces (Manitoba, Ontario and Quebec) and research project coinvestigators are networked across 16 centres in Canada and the United States. Figure 1, below, illustrates the number of research centres/organizations and the number of provinces (or states where noted) in which project participants are situated as a proxy for the degree of networking within Theme II. Overall, Theme II projects are highly networked with 56% of projects (5 of 9) spanning 3 or more provinces and centres; 22% are somewhat networked (2 of 9 where there are less than three centres/provinces involved) and 22% are not networked (2 of 9, where only one centre/province is involved in the project).

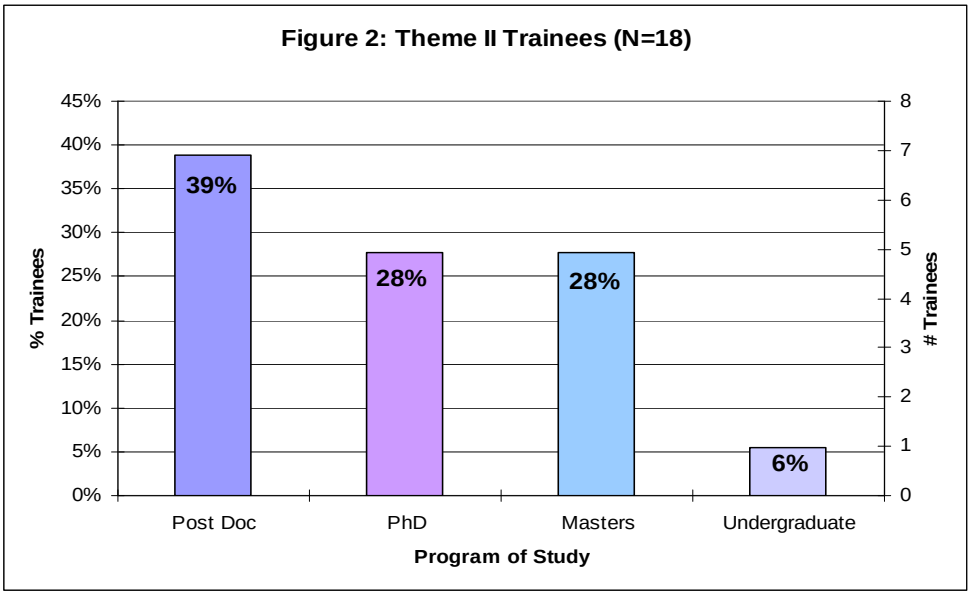


Of the 63 researchers activity participating in Theme II (9 PIs and 54 Co-investigators and Collaborators), 51 reside in Canada and three are international collaborators located either in the United Kingdom or the United States.

Workshop participants noted that information-sharing and collaboration among investigators and between projects has increased since the launch of the Network and has contributed to the excellence of current research as well as to the identification and development of new projects within the Theme.

5. Theme II Training of Highly Qualified Personnel (HQP)

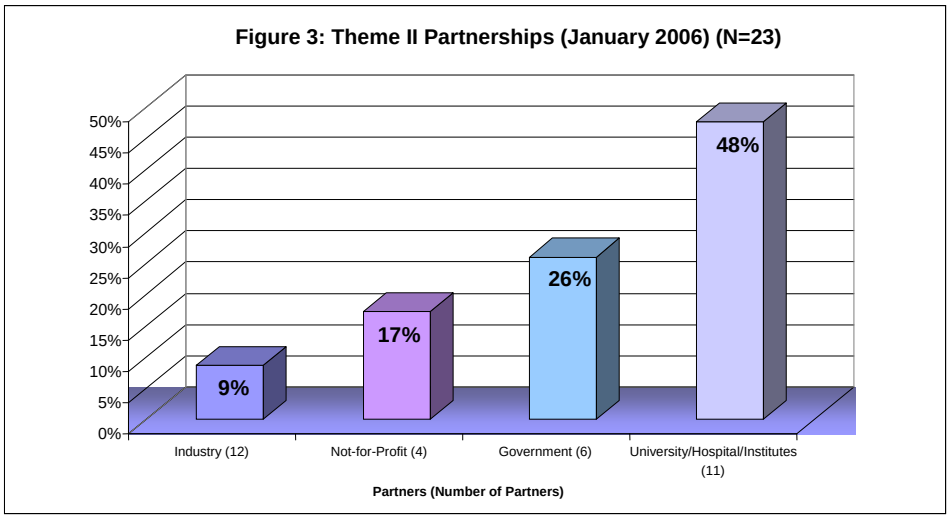
There are 18 research trainees engaged in Theme II research across all levels of study as illustrated in Figure 2 below.



Workshop participants noted that Theme II research trainees have been well represented at Network workshops and research poster presentations and have been directly involved in conducting Network-supported research.

6. Theme II Research Partnerships

Figure 3 highlights the sectors from which the 23 partner organizations involved in Theme II research projects are drawn. Close to 50% of all Theme II research partners are universities, hospitals and research institutes. Just over one quarter of Theme II partners are government organizations. Slightly less than 20% of Theme II research partners are not-for-profit organizations and just less than 10% are drawn from industry.



Current and prospective research partners identified by workshop participants with the potential to benefit from Theme II research include:

Government:
- Agriculture Canada
- Environment Canada
- Health Canada
- Manitoba Centre for Health Policy
- Manitoba Child and Family Services
- Manitoba Health

Hospitals:
- McGill University Health Centre

Schools:
- Public school system

Community-based Organizations:
- Multicultural organizations
- Neighbourhood organizations
- Non-profit Organizations:
  - Anaphylaxis Canada
  - Association Québécoise des Allergies Alimentaires (AQAA)
  - Canadian Allergy, Asthma and Immunology Foundation (CAAIF)
  - Lung Association
  - Southern Ontario Centre for Atmospheric Aerosol Research (SOCAAR)
- Patient advocacy groups
- School-based organizations

International Research Partners: (to leverage research expertise and research infrastructure)
- Harvard University
- University of North Carolina – Chapel Hill
- University of Washington
- Public Health Seattle and King County

Corporate Partnerships:
- Hoover Vacuums
- Intervention Technologies
- Novartis

7. Theme II: Environments, Populations & Society - Research Strengths to Build on to 2009

Overall, Theme II has catalyzed and facilitated new research and research platforms consistent with AllerGen's mission and vision. Intensive networking over the past year has resulted in a well-integrated team of researchers that are working collaboratively from sites located across Canada and have a range of research platforms and research technologies that are being utilized collaboratively. All nine projects are on track in terms of the achievement of their milestones and deliverables.

Specific strengths on which future Theme II research programmes can build on include:

Research Trainees:
Theme II has benefited from numerous research-development workshops and has the equivalent of two research trainees per project, representing nearly 20% of the AllerGen trainees Network-wide, thus contributing significantly to the capacity building goals of AllerGen.

Research Integration:
Theme II researchers have contributed significantly to the development of a highly networked and innovative team of birth cohort researchers. Theme II researcher contributions to the development of the birth cohort initiative (the Canadian Healthy Infant Longitudinal Development Study – "CHILD Study") has fostered extensive national networking within the Theme and between researchers in other Themes as well as with a number of new investigators not previously involved with AllerGen. Seven of the nine project PIs became involved in the CHILD Study cohort, and the CHILD Study research team has expanded to a pan-Canadian, multi-disciplinary team of 39 investigators. Although Theme II began in April 2005 as nine individual projects, almost all Theme II investigators are now linked into the CHILD Study, and linkages have developed with a range of other projects Network-wide.

Diagnostic Innovation:
Theme II research has significant potential for the development of new diagnostic tools and techniques. For example:

- Development of new techniques to test infant pulmonary function and airway inflammation
- Innovative use of the C13 breath test in children to diagnose insulin-resistance

Policy Relevance:
Much of Theme II research has significant policy relevance, i.e.

- Peanut allergy in schools (Clarke)
- Maternal stress, child health, child protection (Kozyrskyj)
- Nutritional policy for pre-teens (Becker)
- Air pollution standards, public and population health (Silverman)

Research Platforms:
Within the networked structure of AllerGen, a number of projects have made research platforms available to researchers Network-wide.

- Measurement of effects of ambient pollutants (Silverman)

In addition, a number of new research platforms have been enabled: i.e.

- Facility/infrastructure for exposure of animals to concentrated ambient particulate (CAP) and ozone exposures (Jeremy Scott)
- Exposure facilities to measure response to a broader suite of air pollutants (Silverman)
- Exhaled breath condensate, sputum and nitric oxide tests of lung function (Subbarao)
- Linked prescription drug and administrative health databases (Kozyrskyj)

Such research platforms are also highly relevant to other research programmes within the Network, namely Programme B: Diagnostics and Therapeutics research teams as well as other researchers in Programme A: Gene-Environment Interactions.

8. Strategic Priorities for the Future Development of Theme II: Environments, Populations and Society Research to 2009

Workshop participants developed six recommendations within five programmatic thrusts for future research and knowledge translation initiatives that would build on current activities within Theme II as well as further the Theme's pursuit of meaningful social and economic impacts arising from its research results:

Knowledge and Technology Exchange and Exploitation

1. Develop knowledge translation tools for homeowners and housing policy-makers re: optimizing indoor air quality in the home

Understanding the Interaction of Airborne Pollutants and Allergens

2. Enhance understanding of the role of pollutants, e.g. particles, in the allergic response (at the cellular level, in *in vivo* murine models and controlled human exposures) and related development of new/better environmental assessment and measurement tools

Novel Approaches to Diagnosis of School and Workplace Allergy/Asthma

3. Support AllerGen's current efforts to extend peanut allergy studies Canada-wide

The Effect of Early Life Experiences on the Development of Allergy/Asthma

4. Develop a cross-programmatic research programme on the effects of stress
5. Undertake research to increase understanding of the role of infection in early life development of allergy and asthma

Birth Cohort

6. Launch and evaluate a pilot phase of the CHILD Study

These programmatic thrusts are fleshed out in more detail below:

Knowledge and Technology Exchange and Exploitation

1. *Research Synthesis, Knowledge Translation and Transfer Initiatives: Knowledge translation tools for homeowners and housing policy-makers re: optimizing indoor air quality in the home*

A workshop was recommended to plan the development of documents or guides that provide the public and housing policy makers with specific, evidence-based strategies to reduce allergens in the home and improve the quality of indoor air. A tool tailored to homeowners will enable the average person to implement best practices known to reduce exposures to allergens in the home.

As part of the process of synthesizing the existing evidence base, Theme II should initiate an international symposium on best practices to ensure indoor air quality from which both an academic proceedings publication and a lay-language manual tailored to the needs of home-owners can be developed.

A separate tool that informs Canadian housing policy – especially specific land-use policies – possibly in partnership with Scandinavian countries could be developed by AllerGen

researchers to improve the quality of indoor environments and reduce the symptoms of allergic and related immune disease sufferers.

It was noted that there are a number of high quality studies in existence that were undertaken in Canada, the Netherlands and Scandinavia which could inform this initiative, as well as the experience of the Healthy Housing Coalition in the United States. The results of these studies, if pooled together, would form a strong foundation for knowledge translation tools for homeowners and policy-makers

Understanding the Interaction of Airborne Pollutants and Allergens

2. Enhance understanding of the role of pollutants, e.g. particles, in the allergic response and related development of new/better environmental assessment and measurement tools

It was recommended that Theme II build on existing research by continuing to study the ultra-fine, fine and coarse particles and biologically active species in ambient air in order to better characterize them and understand their effects on the respiratory and immune systems. One of the current challenges in this area of research is the difficulty of measuring particles and their impact. As a result, Theme II should place increased emphasis on modeling particle exposures in homes.

Theme II participants noted that new and/or better environmental assessment and measurement tools are needed to more easily measure environmental exposures in real world environments such as the home. In relation to the CHILD Study, home visits / indoor air assessments would be greatly simplified if a few questions could be identified and validated in order to provide researchers with as much information as a four-hour home visit.

Theme II recognizes that environmental assessments go beyond the assessment of indoor air quality. Undertaking research that acknowledges this perspective was recommended as a strategic direction that Theme II should pursue in the future. Recognizing that environmental assessments go beyond indoor air, it was deemed strategically important for Theme II to focus on:

- Developing new models of particles based on proxies for outdoor and indoor air**;**
- Building stronger links between population-based cohorts and animal models to characterize impact**;**
- Complementing the approach above, explaining what particles do and developing ways of measuring what is happening in real life exposures**;** and
- Refining indoor air survey methods and tools.

A symposium on “Developing processes for environmental assessments for population studies” was strongly recommended, which would involve health scientists, chemists, environmentalists, environmental engineers and other scientists open to applying epidemiology outside the laboratory and researchers undertaking mechanistic studies.

Novel Approaches to Diagnosis of School and Workplace Allergy/Asthma

3. *Support AllerGen’s current efforts to extend peanut allergy studies Canada-wide*

It was recommended that building on current research related to the prevalence of peanut allergy, a pan-Canadian study could be mounted. Such a study would link to initiatives in Theme V: Prevention, Control and Public Policy and Theme III: Mechanisms and Biomarkers, e.g. the proposed CanGoFar research programme, and could include policy evaluation and screening research. A pan-Canadian perspective would facilitate research on the impact of legislation versus guidelines in protecting peanut allergic citizens. Findings could also lead to the development of recommendations for food labeling policy and practice.

The Effect of Early Life Experiences on the Development of Allergy/Asthma

4. Develop a cross-programmatic research programme on the effects of stress

Building on the foundation of stress-related research in Theme II, new research questions could be mounted to test questions re: stress in the context of Theme III: Mechanisms and Biomarkers animal models and mind/body research.

5. ***Undertake research to increase understanding of the role of infection in early life development of allergy and asthma***

Studying the role of infection in early life in the development of allergy and asthma (within the birth cohort) could be done with existing tools, but would require more funding for the birth cohort.

Birth Cohort

6. Launch and evaluate a pilot phase of the CHILD Study

AllerGen, in collaboration with a range of partners, would continue to support the planning, development, piloting and evaluation phase of the CHILD study in 2007 and beyond. Implementation of the full project will be dependent upon available resources.

Workshop participants indicated that overall, future Theme II research initiatives would be enriched by recruiting environmentalists, chemists (e.g. Spengler, Leoy, Koutrakis), environmental engineers, epidemiologists (e.g. Brunekreef, Netherlands; Schwartz, Harvard; Gold, Harvard), and representatives from the Healthy Housing Coalition, USA, to collaborate on future Theme II research projects and programmes.

9. Next Steps and Milestones for Implementation

Table 3: Key Action Items	Milestone
1. Theme II Leaders issue workshop report including processes and timeframes for development of strategic programmatically integrated research plans consistent with AllerGen's research mission for presentation to the AllerGen Research Management Committee (RMC) on December 14-15, 2006.	November 24, 2006
2. Draft strategic plans for all Programmes / Themes to be submitted by Theme Leaders to the AllerGen Administrative Centre	December 7, 2006
3. RMC Meeting to review and select strategic, programmatic research thrusts for support 2007-2009 for approval to develop funding submissions for 2007-2009	December 14-15, 2006
4. RMC Feedback to Programme/Theme Leaders re: strategic directions, thrusts for further development toward submission of funding requests	By December 25, 2006
5. In a series of teleconference meetings, Theme II researchers will work to confirm, modify and flesh out priority programmatic research initiatives for 2007-2009 within the strategic areas identified by workshop participants.	Dec. 15 – March 15, 2007
6. For each strategic initiative, working groups can be struck to interact on-line and via teleconference to: a. Identify integrated and primarily applied, programmatically linked and multi/interdisciplinary research projects and knowledge translation initiatives that leverage the AllerGen Network structure, technology platforms and research infrastructure b. Identify applied outcomes for each programmatic thrust that could be transferred to industry, the health system, policy makers and/or the public c. Identify industry, government or not-for-profit sector partners (potential research users) and, where appropriate, consider establishing a user-committee to advise on the development of research projects within each strategic research thrust d. Identify unique and needed training opportunities related to each research thrust (consider students, post-docs, researchers, clinicians and government, private sector and not-for-profit professionals as learners) e. Identify the need for and propose data-sharing protocols and processes f. Identify related databases that can be mounted and shared on the AllerGen secure web-site g. Recruit new researchers to the teams as appropriate	
7. Prepare research and knowledge translation proposals and associated budgets containing "driving research questions" consistent with AllerGen's mission and mandate and	February 15, 2007

Table 3: Key Action Items	Milestone
demonstrating potential for a lasting AllerGen legacy, for review and comment by the Theme II Leaders	
8. Submission of written programmatic proposals to AllerGen's Research Management Committee for funding consideration within the Network's research budget 2007-2009	March 15, 2007
9. Peer review by the AllerGen International Scientific Advisory Committee (ISEAC)	April 2007
10. RMC meeting to approve research funding 2007-08	May 2007
11. Board approval of RMC recommendations and funding released	June 2007

10. Concluding Remarks

NCE research programmes distinguish themselves from CIHR by virtue of their interdependent, networked research teams working collaboratively across disciplines and institutions, and in partnership with potential end-users of the research results. Ideally, NCE researchers work in virtual teams on complex problems that would not and could not be addressed by individual researchers working alone. These research teams are funded to be transformational agents of innovation that develop, protect, translate and apply knowledge for economic and / or social benefit to Canada.

NCE research is typically undertaken in a goal-oriented context that assumes the translation of such research findings are essential to the realization of the broader social and economic impact of a Network in relation to its specific mission. Thus, the "framing" of the basic research undertaken within an NCE is different from CIHR research in that it may be curiosity driven but also has a compelling justification in terms of its contribution to the Network's social and/or economic impact and development objectives.

Over the half-day spent in Montreal, Theme II researchers and their invited guests shared their research accomplishments and identified a number of potential avenues for strengthening and further developing Network-supported research and knowledge translation initiatives that build upon existing research strengths and respond to societal needs for information, diagnosis and know-how.

Over the next few months, Theme II investigators have an opportunity to engage in an internally led, bottom-up strategic research programme and associated projects development exercise. Expected outcomes are high impact and translationally oriented research programmes conducted in partnership with potential research users, utilizing and developing a range of research platforms and expertise. New partners and new research collaborators will be recruited to the Network over the coming months in order to bring the strategic targets for Theme II research to fruition.

By strategically focusing future research proposals on initiatives that will generate opportunities for social and economic impacts, investigators can contribute to initiatives that have enduring value. By integrating existing projects into larger programmatic thrusts that cut across AllerGen research themes, are nationally networked across centres and disciplines, and partnered with organizations that have a stake in the application of research results, Theme II investigators will position themselves for success within the next AllerGen funding cycle, 2007-2009.

Frances Silverman, Leader, AllerGen Theme II
St. Michael's Hospital
5 December 2006

Appendix A: Workshop Agenda
Participants Agenda

AllerGen Theme II Workshop
October 24th, 2006

10:00 a.m. – 3:00 p.m.

Intercontinental Montreal, St. Laurent Room
360 Saint-Antoine Street West
Montreal, QC
514-987-9900

On-site Contact – Pearl Davis, Theme II Coordinator – Cell phone: 905-580-2227 (D. Royce)

Speaker	Time	St. Laurent Room
Frances Silverman	10:00 a.m.	**Opening remarks**
Diana Royce	10:05 – 10:15	**Introductions**
Theme II PIs	10:15 – 11:15	**Theme II Research Projects – Progress Reports / Updates** (Becker, Clarke, Infante-Rivard, Kozyrskyj, Mustard, Scott, Silverman, Subbaro, Sears)
Invited guests	11:15 – 12:00	**Presentations from invited environmental researchers** • Tim Takaro (dial-in); • James Scott • Sharon Dell
All	12:00 – 12:30	***Theme II Overview, AllerGen Mission*** ***Brainstorming:*** **What has Theme II accomplished in relation to the AllerGen mission?** 1. What are the strengths of Theme II's research projects in terms of potential for applied outcomes that will positively impact Canadians? 2. How might Theme II focus or cluster its research efforts and/or research results to ensure AllerGen's Theme II research in this area is differentiated from research that could be done without a network structure and with funding from other sources?

Speaker	Time	St. Laurent Room
All	12:30 – 1:15	**LUNCH - Brief updates from 12:50 to 1:15 re: Theme I and Theme III**
All	1:15 – 2:30	***Brainstorming:*** **In the context of the AllerGen research programme:** 1. What are the gaps and opportunities within Theme II - including the CHILD Study - in terms of: a. Research foci? b. Research platforms? c. People/expertise? d. Partners? e. Knowledge and technology exchange and exploitation? f. Capacity building? 2. What are the most important research questions that Theme II research teams could pursue over the next 3 years in terms of academic, social and economic impact? 3. How could Theme II researchers organize themselves to address such questions? 4. What additional expertise and infrastructure would be required, if any? 5. Which organizations would be potential research partners and what might be the value propositions motivating partner involvement?
All	2:30 – 3:00	**Next steps:** • What key messages about Theme II should be presented at the Network-wide research workshop in terms of: • Accomplishments to date • Future initiatives, priorities • Key contributions to Network development 2007 to 2009 • Process of developing integrated, programmatic research proposals • Meeting follow-up and next steps
Frances Silverman	3:00 p.m.	**Adjournment**

Appendix B: Workshop Participants

Theme II: Environments, Populations and Society Workshop Participants October 24, 2006		
	Name	**Affiliation**
1.	Becker, Allan	RMC, Theme V Leader
2.	Befus, Dean	RMC, Theme III Leader
Regrets	Brook, Jeff	RMC, Theme II Co-investigator
3.	Clarke, Ann	Theme II Investigator
4.	Dell, Sharon	Invited guest speaker
5.	Denburg, Judah	Scientific Director/CEO AllerGen NCE
6.	Infante-Rivard, Claire	Theme II Investigator
7.	Kozyrskyj, Anita	Theme II Investigator
8.	Sandford, Andrew	Theme I representative
9.	Scott, James	Invited guest speaker
10.	Scott, Jeremy	Theme II Investigator
11.	Sears, Malcolm	Theme II Leader
12.	Silverman, Frances	Alternate Theme II Leader
13.	Subbarao, Padmaja	Theme II Investigator
14.	Takaro, Tim	Invited guest speaker
15.	Urch, Bruce	AllerGen PhD Candidate
Staff:		
16.	Davis, Pearl	Theme II Coordinator
17.	Royce, Diana	Meeting Facilitator
18.	Pattison, Judi	AllerGen Marketing and Communications Officer
19.	McDonald, Treena	Theme I Coordinator