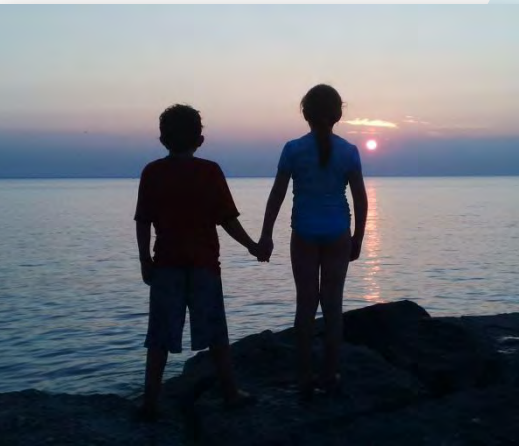




LAMBTON COMMUNITY HEALTH STUDY

PEOPLE • ENVIRONMENT • INDUSTRY



Report to the Community

June 2016

www.lambtonhealthstudy.ca

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Association

Ada Lockridge
Victims of
Chemical Valley



To the People of Lambton County

June 1, 2016

Dear Residents,

Since 2007, a small group of dedicated people has been working diligently to shed light on a serious question that affects all of us who live, work and play in Lambton County. The question - how does our proximity to the petrochemical industry affect the health of the residents of Lambton County?

There is no easy answer. The following report to the community will outline the progress that has been made, what we know now, what researchers are working on, and what questions remain.

After 8 years, the Board of the Lambton Community Health Study has decided to discontinue its activities. This decision was not made in haste, and not before every opportunity and possibility of securing funding was explored.

I feel strongly that through the efforts of this group, significant progress has been made. Since 2007:

- We established a governing body with representation from municipalities, occupational health, business, labour, industry, public health and the community at large.
- We completed and published our Phase II reports, including Literature Review and Community Engagement reports. These reports provide direction and insight to anyone interested in the health of Sarnia Lambton residents as it relates to the local industry.
- We have established relationships with, and captured the attention of leading researchers in the areas of cancer, aboriginal, occupational and community health.

The following report documents the successes, and the challenges, faced by the LCHS. I'm very proud to have been able to serve in this role, and I would like to thank the board, our funders - including the County of Lambton, the Province of Ontario, Health Canada, the Sarnia Lambton Environmental Association, the Sarnia Lambton Chamber of Commerce - our academic partners, and especially the community for their ongoing interest and commitment to a healthier Sarnia-Lambton for future generations.

Sincerely,

Anne Marie Gillis, Chair

BACKGROUND

With its vast network of petrochemical and refining complexes, Lambton County is internationally known as a significant industrial centre. While industry brings economic benefits to the region, some by-products produced by industrial processes are known to cause adverse health impacts at sufficient concentrations (e.g. benzene, 1,3-butadiene, PAH's, mercury).

Residents of Lambton County, particularly those living in close proximity to industrial areas, have expressed concerns about potential health effects associated with environmental exposures. In 2005, a study found that the proportion of male live births of the Aamjiwnaang First Nation had been declining continuously since the early 1990s.¹ The authors suggested that changes in the sex ratio were associated with exposure to emissions from local industries and recommended further assessment into the types of chemical exposures for this population. In 2007, another study found higher rates of hospital admissions in the Lambton area compared to both Windsor and London. The authors hypothesized that the differences were related to pollution.² In addition, several popular media articles were published which raised questions about the impact of local industry on residents' health.

While these studies suggested that environmental exposures may be linked to certain health outcomes, a clear relationship had not been demonstrated. In 2007, a meeting of community leaders and stakeholders took place and it was agreed that a comprehensive study of the potential health effects associated with exposure to emissions from petrochemical industries was needed to address concerns raised by the community.

The Lambton Community Health Study (LCHS) Board of Directors was formalized in 2008. The Board has representation from a diverse group of local stakeholders including municipalities, First Nations, business, labour, industry, occupational health, victims of occupational illness, and public health. The County of Lambton committed in-kind support for the health study group.

The function of the Board was to obtain funding and oversee the development of a study that would examine the impacts of the local petrochemical industry on the health of Lambton County residents. The Board also appointed an Independent Process Observer (IPO). The Independent Observer was put in place to ensure transparency, that the Board was acting within its mandate and its Terms of Reference and [report to the community](#) on a regular basis.

The Health Study Board developed a multi-year plan which involved three distinct phases. The Board was able to complete Phases I and II, but could not complete Phase III due to a lack of funding.

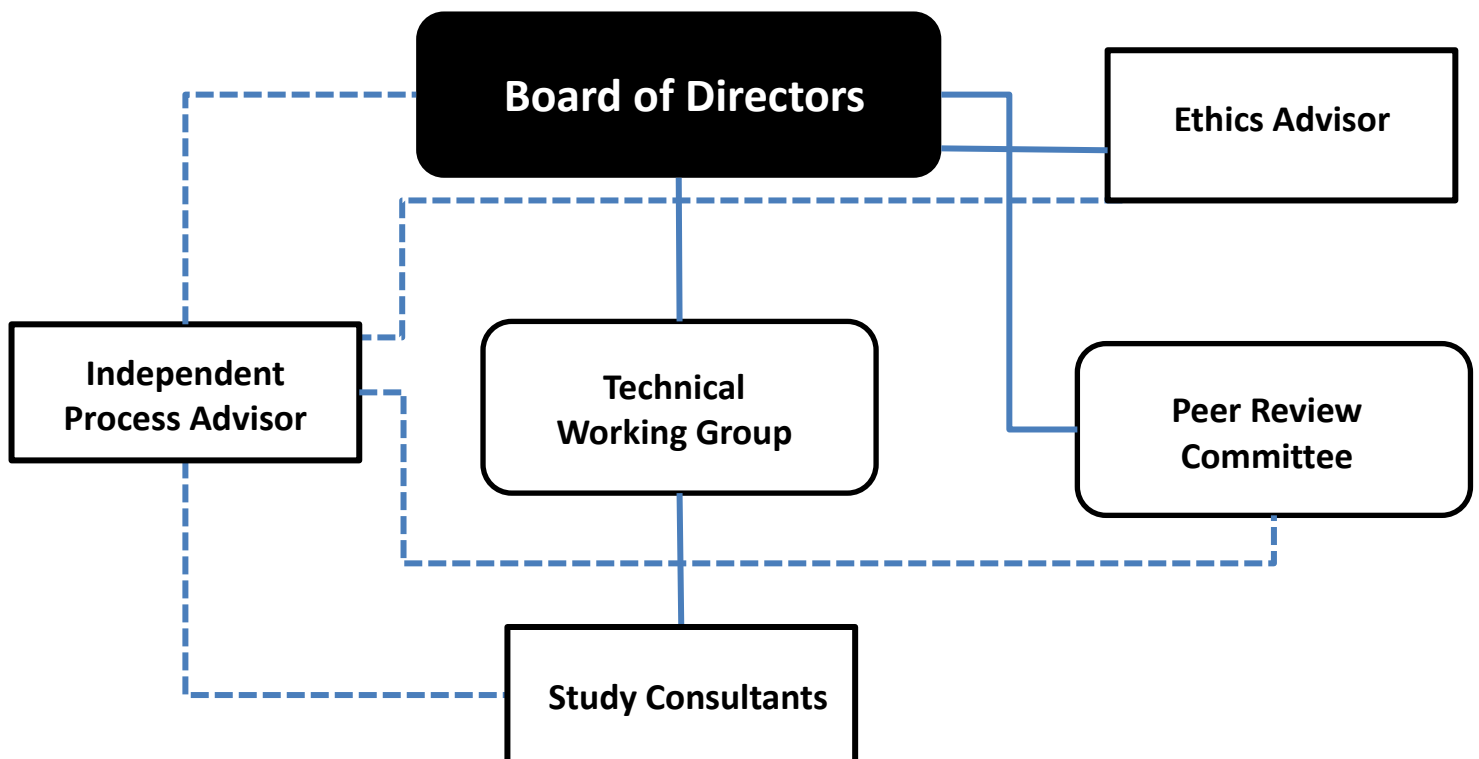
¹ Mackenzie, C. A., Lockridge, A., & Keith, M. (2005). Declining Sex Ratio in a First Nation Community. *Environmental Health Perspectives*, 113(10), 1295–1298.

² Fung, K.Y., Luginaah, I.N., & Gorey, K.M. (2007). Impact of Air Pollution on Hospital Admissions in Southwestern Ontario, Canada: Generating Hypotheses in Sentinel High-Exposure Places. *Environmental Health*, 6: 18.

- Phase I involved the establishment of a community based governance structure and the identification of a Board of Directors to oversee the project.
- Phase II included a comprehensive literature review, community engagement, and the development of research questions.
- Phase III was to include undertaking the identified study(ies), communication of the results to Lambton residents and stakeholder groups, identification of next steps and remedial initiatives, if required.

A schematic of the organizational structure is provided in Figure 1:

Figure 1: Organizational Structure



Additional background information is available at the [Lambton Community Health Study](http://www.lambtonhealthstudy.ca) website.

PROGRESS REPORT

Phase I Summary

In Phase 1, the following objectives were accomplished:

- Establishment of a Board, with defined stakeholders and roles;
- A detailed [Board Manual](#) was created, which included terms of reference, decision making process, reporting structure, etc.;
- Secured an in-kind contribution from the County of Lambton to:
 - act as the banker for the Board - to hold and be accountable for any funds received;
 - function as the secretariat to the board, setting meeting agendas, distributing meeting materials; and
 - develop and host a [web site](#) for the LCHS, as a means of making information and publications accessible to the public.

Phase II Summary

Funding to support Phase II activities was obtained from the Ontario Ministry of Health and Long-Term Care (\$50,000), the Sarnia-Lambton Environmental Association (\$15,000) and the Sarnia-Lambton Chamber of Commerce (\$10,000). The County of Lambton continued to provide in-kind support and additional in-kind support was provided by Health Canada. Dr. Pierre Band from Health Canada provided epidemiological expertise and reviewed Phase II documents for the Board.

Phase II included:

1. A systematic literature review of health outcomes associated with living in proximity to petrochemical industries. ([Link](#) to report)
2. A random telephone survey of 500 Lambton residents designed to collect information regarding the views of residents on potential health impacts related to industrial pollution. ([Link](#) to report)
3. An online survey duplicating the telephone survey, but open to all residents of Lambton County. ([Link](#) to report)
4. A series of five open houses held throughout Lambton County to gather questions, comments and concerns about the health impacts of local industry on health. ([Link](#) to report)

Phase II provided insight into the concerns of Lambton residents. Based on telephone and online surveys, respondents expressed high levels of concern about not having clear answers to health risks, but were equally likely to express concern about unemployment and the local economy. Approximately 50% of respondents were most concerned about industrial air pollution, followed by industrial accidents and surface/groundwater pollution. Odours and cumulative impacts of multiple exposures were also commonly raised concerns.

Approximately 80% of respondents felt that pollution from local industries was causing health problems for themselves or their families. Respondents were most likely to select cancer or respiratory health as primary health concerns that should be studied in Lambton County. When asked which types of cancer should be studied, many stated that all types should be studied. Lung, breast, brain and leukemia were among the most common sites specified by those who selected a single cancer site. While not as prominent as cancer or respiratory health, reproductive health (e.g. infertility, miscarriages, birth defects) was a concern among many.

Survey respondents and participants in the open houses wanted to know what Lambton residents are exposed to, how this compares with other communities across Ontario, and how this affects our health. There was a perception by many that disease rates (particularly cancers) are higher in Lambton/Sarnia compared to the province/country. Many considered the area to be a “hot spot” for cancers.

Finally, a predominant theme throughout the surveys and open houses was a need for better communication and increased transparency on the part of industry.

The literature review "did not identify any specific disease or health outcome that was unique to exposure and/or proximity to petrochemical complexes" (Page 4-11). Based upon the available evidence, expert opinion, as well as information about concerns in the community, the Board decided that the following health outcomes should be addressed in a proposed health study in Lambton County: lung cancer; cancer of the lymph, blood and related sites; brain cancer; pancreatic cancer; bladder cancer; and asthma/upper respiratory disease in children. Given this information, the Board identified potential research questions for a community health study. Recognizing the variety of concerns and perspectives raised in Phase II, this was an attempt to address the commonalities that were expressed by community members, while incorporating scientific evidence presented in the literature review.

Research Questions:

1. Exposure & Risk Assessment

- a. What chemicals are Lambton residents exposed to?
- b. Are the levels higher than those in reference populations?
- c. Are the levels considered harmful?
- d. What health effects are expected at these levels?

2. Cancer

- a. Are cancer rates higher in Lambton County compared to reference population rates?
- b. Do cancer rates in Lambton County vary by municipality or neighbourhood?
- c. If variation is present, is this associated with environmental petrochemical exposures?

3. Respiratory Health

- a. Are childhood asthma rates higher in Lambton County compared to reference population rates?
- b. Do childhood asthma rates in Lambton County vary by municipality or neighbourhood?
- c. If variation is present, is this associated with environmental petrochemical exposures?

4. Reproductive Health

- a. What is the current picture of reproductive health in Aamjiwnaang First Nation and surrounding areas, particularly with respect to the sex ratio at birth?

Other opportunities that were identified at the conclusion of Phase II included:

- Encourage participation in the Ontario Health Study, a long-term study to help us understand the causes of chronic diseases like cancer, heart disease and diabetes, and to develop new ways to prevent and treat them.
- Continue to support studies in the community and look for opportunities to collaborate with academic researchers to answer specific research questions. Several key partnerships with researchers were established in Phase II.
- Consider investigating ways to improve communication within Lambton County regarding industrial accidents, exposure levels, etc. or designate appropriate body to do so.

Phase III Summary

Though fundraising efforts existed during the first two phases, the third phase involved sustained and intense efforts to secure funding for the studies. A strategic planning meeting of the Board was held on February 28, 2013, at which the Board decided to focus on seeking full funding for the Lambton Community Health Study. The overall cost was estimated at \$5,000,000.

In May 2014, the Sarnia Lambton Environmental Association pledged to fund up to 30% of the study, a value of \$1,453,650. This commitment was contingent upon securing the remaining 70% of the funds from other sources including federal and provincial governments.

With this significant commitment secured by the stakeholder representing industry, the LCHS Board sought matching funding from provincial and federal governments. Board members had several face-to-face meetings with representatives of both governments, but the Board was ultimately unable to secure a funding commitment from either level of government. At the suggestion of Health Canada, the Board was invited to join with academic researchers at a forum sponsored by the Canadian Institute for Health Research for matching community partners to government-funded research. After attending this forum, we recognized that none of the proposed research projects fit with the goals of the Lambton Community Health Study.

Current Status

While the Board did not secure funding to direct a single comprehensive health study, we have established relationships with researchers at Cancer Care Ontario, the University of Toronto, the University of Ottawa, and the Ontario Health Study. These researchers have plans to continue research efforts in order to increase knowledge of health impacts related to cancer, reproductive health and respiratory health with a focus on our geographic region.

The following section describes the progress and status of efforts to address the original research questions.

1. Exposure & Risk Assessment

Questions related to exposure and risk assessment have not been addressed to date. See Recommendation 1, on page 11.

2. Cancer

a. *Are cancer rates higher in Lambton County compared to reference population rates?*

Lambton Public Health published a comprehensive health status report on cancer rates in Lambton County in 2007. They have continued to monitor cancer rates and presented updated data to various stakeholders in 2015, including the LCHS Board.

Overall conclusions:

- After accounting for age, the overall incidence rate for all cancer types was slightly elevated in Lambton compared to the provincial average. Lambton ranked 11th out of the 36 Ontario health units based on the most recent three year period (2007 to 2009). Although adjusted for age, these incidence rates do not account for the prevalence of other known risk factors for cancer (use of tobacco smoke, use of alcohol, physical inactivity, and eating habits).
- Examining site-specific cancer incidence data for the ten-year period, 2000 to 2009, incidence rates in Lambton were:
 - Similar to or lower than Ontario rates for several cancer sites;
 - Slightly elevated for the following sites: lung, colorectal (males) and prostate; and
 - Significantly higher than provincial rates for the following sites: mesothelioma, melanoma and larynx (females).

For more information, please see the [2007 report](#) and [2015 presentation](#).

b. Do cancer rates in Lambton County vary by municipality or neighbourhood?

In 2011, researchers from Cancer Care Ontario and the University of Toronto received funding from the Cancer Research Society to conduct a study entitled "Advanced spatial analyses to characterize environmental impacts on cancer risk: Phase I" (See [Research Summary](#)). The study focused on the Erie-St. Clair LHIN and involved mapping cancer incidence and known behavioural risk factors at the dissemination area (DA) level using advanced spatial statistics. Lambton Public Health has collaborated with Dr. Eric Holowaty, Dr. John McLaughlin and research staff at Cancer Care Ontario throughout the project. Preliminary results were presented to the Board in December 2014 and final results will be available once the results are peer-reviewed and published in a scientific journal.

The Erie-St Clair region was studied because of: concerns about the potential adverse effects of environmental exposures; a recognized need for further research to address these concerns; higher than expected rates for certain cancers across the region as a whole; and collaborative relationships that exist between the researchers, community leaders and stakeholder agencies.

c. If variation is present, is this associated with environmental petrochemical exposures?

While the results of the study described above will show geographic patterns of cancer incidence and reveal whether these patterns still exist after accounting for known risk factors (e.g. smoking, obesity), the study will not be able to show whether higher rates of cancer are caused by environmental exposures. For example, if there is a higher incidence of a certain type of cancer near industrial sources, even after accounting for known risk factors, this would suggest that further study is needed to determine whether local petrochemical exposures are responsible for this increase.

3. Respiratory Health

a. Are childhood asthma rates higher in Lambton County compared to reference population rates?

Lambton Public Health has investigated hospitalization rates for asthma in Lambton County. They found that between 2009 and 2014, there has been a higher rate of hospitalizations among Lambton residents ages 0-19 years compared to the provincial average. Rates are similar to or lower than the provincial average for adults 20 years and older.³

However, prevalence estimates require data that represent more than one type of health service (e.g., hospitalizations). In 2012, a study was published that used a population-based asthma registry, based on emergency department visits, hospitalizations and physician visit data, to better assess spatial patterns of asthma prevalence in Ontario. During the 5-year period (2002 to 2006), this study found clusters of asthma cases throughout Ontario, including one in Lambton County among children 10 to 14 years of age.⁴

³ Public Health Ontario. Snapshots: Lambton Public Health: Hospitalization for asthma - age specific rates (both sexes combined) 2014. Toronto, ON: Ontario Agency for Health Protection and Promotion; 2016 Feb 1 [cited 2016 Mar 30]. Available from: <http://www.publichealthontario.ca/en/DataAndAnalytics/Snapshots/Pages/Chronic-Disease-Hospitalization.aspx#.Vvw1tPkrKUK>

⁴ Crighton EJ, Feng J, Gershon A, Guan, J., To, T. A spatial analysis of asthma prevalence in Ontario. *Canadian Journal of Public Health* 2012; 103(5): e384-9.

b. Do childhood asthma rates in Lambton County vary by municipality or neighbourhood?

Lambton Public Health has developed an informal connection with Dr. Teresa To, senior author of the paper mentioned above. Dr. To is an epidemiologist affiliated with the Dalla Lana School of Public Health, University of Toronto, The Hospital for Sick Children and the Institute for Clinical Evaluative Sciences. Her research focuses on respiratory disorders, environmental issues and pediatric health.

Dr. To has provided preliminary asthma prevalence data at the municipality level, based on the same asthma registry used in the study mentioned above. While the data suggest that asthma prevalence varies within Lambton County, further analysis is required to make statistical comparisons to Ontario and other jurisdictions.

c. If variation is present, is this associated with environmental petrochemical exposures?

While it has been suggested that the higher prevalence rates of asthma among children and youth in Lambton may be due to environmental exposures, there has not been a study to examine this to date. Lambton Public Health will continue to work with academic partners to examine this issue and report any progress to stakeholders and the community.

4. Reproductive Health

Dr. Michel Camus, an epidemiologist providing in-kind support on behalf of Health Canada, initiated conversations between the Board and Dr. Laurie Chan from the University of Ottawa. Dr. Chan, a professor and holder of the Canada Research Chair in Toxicology and Environmental Health, agreed to work with the Aamjiwnaang First Nation to further explore and update the original study of sex ratios at birth that was done in 2005. This work is currently ongoing and results will be shared with stakeholders once the study is complete.

Ontario Health Study Partnership

The Lambton Community Health Study Board established a relationship with the Ontario Health Study in 2012. The Ontario Health Study is one of the largest longitudinal health studies ever conducted in Canada. In March 2016, Lambton Public Health hosted a Local Study Centre host to allow the Ontario Health Study to collect blood samples from Lambton participants. To date, participation from Lambton residents has been very strong, and these results may be used by future researchers.

- To date, over 3100 Lambton residents have registered for the Ontario Health Study by completing a comprehensive health survey questionnaire.
- Over 150 Lambton residents attended the March 2016 Local Study Centre to provide a blood sample.
- To date, a total of about 400 Lambton residents have provided blood samples that will be stored for future population health research.
- The survey data and the blood samples will be used by researchers to help gain a better understanding of chronic disease and its associated risk factors in the population.

CONCLUSIONS

The Lambton Community Health Study was able to achieve a number of goals since it formed in 2008.

1. The LCHS established a strong model of community-based participation to achieve a collective health-related goal. The governance model, our consensus-based decision making, and our inclusion of multiple stakeholders brought many skills, resources and viewpoints to the table.
2. The political will that was generated through the Board enabled connections to researchers who are studying the environmental impacts of industry in other parts of Canada and the world.
3. The LCHS board was able to engage Cancer Care Ontario, Health Canada, and academic researchers in support of our investigation. We were able to secure a funding commitment from industrial partners toward a study.
4. The LCHS board was able to commission a literature review of possible health effects and to engage the community to narrow our focus into suitable research questions for a community health study.
5. Finally, the LCHS board built strong relationships and connections between multiple stakeholders in pursuit of one goal - to understand the impact of proximity to the petrochemical industry on our health.

Though we were ultimately not able to secure enough dedicated funding to conduct and direct a community health study, we believe our efforts demonstrated a sincere commitment to realise this goal. We also hope our governance model will be helpful to other communities who seek to address a common question. We value the partnerships that we have built with each other and we have a better collective understanding of the factors that impact our health. We hope that the research partnerships developed as a result of the study will continue to yield information and insight to our community about factors that affect our health.



RECOMMENDATIONS FOR THE FUTURE

At its final meeting, the Lambton Community Health Study Board supported the following recommendations:

1. Recommend that the County of Lambton, Aamjiwnaang First Nation and Kettle and Stony Point First Nation jointly request the Ontario Ministry of Environment and Climate Change to conduct a screening human health risk assessment with regards to air, water and soil contaminants in the region based upon available data.
2. Lambton Public Health will continue its engagement with researchers conducting studies that were previously affiliated with the Lambton Community Health Study. When these study results are published, Lambton Public Health will communicate the information to community stakeholders including the former LCHS Board.
3. In recognition of the strength of the relationships that have been built between the stakeholders, the Board agrees to continue informal collaboration among its members.
4. The Board thanks the community-at-large for its support, advice and encouragement to the Lambton Community Health Study. Specifically, we recognize the financial and operational support provided by the Corporation of the County of Lambton.

STAKEHOLDER COMMENTS*

*The following stakeholder comments have been edited for clarity and brevity with permission.

The Lambton Community Health Study was a very worthwhile endeavor as it brought a broad cross section of the community together in an attempt to address health issues which may be related to environmental impacts. Working with individuals invested in the community, the study was able to make connections with researchers who will help advance our understanding of cancer outcomes, respiratory health and birth sex ratios. We look forward to learning more about this research in the future.

Dean Edwardson, Sarnia-Lambton Environmental Association

The LCHS successfully united different sectors to help the public identify concerns regarding environmental health. It is unfortunate that we could not secure funds for a comprehensive study. However, we look forward to our continued partnership in exploring opportunities to examine the priority areas of concern.

Sara Plain, Aamjiwnaang

With attending, then being on the board for the LCHS on behalf of the Victims of Chemical Valley since the beginning, I met some very influential people from the Lambton area. This board was created because of the Peer Reviewed Birth Ratio Study of Aamjiwnaang that I am a co-author to. I was pleased to learn there are many more people concerned about their health and safety living near Chemical Industries through our efforts to ask residents of Lambton through our online, telephone survey, and community meetings. I am so happy that I was there and able to stand up and speak up to make sure things were on the up and up, as best as I could. Thank you.

Ada Lockridge, Vice-Chair, Victims of Chemical Valley

I have enjoyed my time on the Health Study Board. I was invited to become the IPO in the Fall of 2008. I feel that the direction that the Health Board is about to embark on is the correct one. I wish the committee well in planning for the future advisory committee and winding down the full Board. We have all learned a great deal as we progressed through the various steps of planning for a completed scientific health study. Thank you for the opportunity.

Jane Marsh, Independent Process Observer

I believe that 8 years ago, when this committee was formed - the intentions of trying to seek out Health Problem Answers was predominant. However, funding became the #1 component to the exploration of these questions. It is rewarding to know that the Ontario Health Study has finally noticed Sarnia-Lambton and hopefully will carry on our quest for answers.

Janice Robson, Village of Point Edward

On behalf of the Community Round Table, I appreciated the opportunity to be a member of the Community Health Study Board. From my perspective, a turning point for the Board was when we brought together researchers from Cancer Care Ontario, Public Health Ontario, University of Toronto, and Health Canada to discuss the concerns about potential health effects associated with environmental exposures. I consider the Community Health Study Board to have been a great example of the collaborative partnerships that exist across Lambton County to address issues of concern. I look forward to the upcoming results of the Aamjiwnaang birth ratio review, Cancer Care Ontario's report, respiratory health outcomes through ICES and Lambton Public Health, and a possible human health risk assessment.

Alison Mahon, Sarnia Community Roundtable

The Lambton Community Health Study is a good example of how multiple stakeholders in a community can work collaboratively to understand a health issue. With broad participation from organizations representing the interests of governments, industries, workers, scientists and citizens, we established a consensus-based governance model that can serve as a framework for future efforts to understand determinants of our health. Second, we consulted with the community and looked to available scientific evidence and experts to shape the questions that would guide a research study. Though we were not successful in obtaining funding for the last phase of the study, I have been very impressed at the cooperation that has been generated between people with very different perspectives on the issue of health impacts of petrochemical activities in Lambton County. At Lambton Public Health, we will continue to perform our roles of population health assessment and surveillance, health protection and health promotion to understand and improve the health of people in Lambton County.

Dr. Sudit Ranade, Medical Officer of Health

Passion and commitment towards the Lambton Community Health Study was demonstrated by each and every dedicated participant who committed to this project. Local efforts resulted in important conversations being undertaken with senior levels of government, along with research that I believe will be useful to broader health study efforts that can learn from experiences in our Sarnia Lambton Community. As Warden I am grateful for the time people put into this effort. I am equally honoured to thank each and every participant on behalf of Lambton County residents.

Warden Bev MacDougall



ACKNOWLEDGEMENTS

Board of Directors - Past and Present

Aamjiwnaang First Nation	Sharilyn Johnston, Sara Plain
County of Lambton.....	Jim Burns, Ian Veen
City of Sarnia	Anne Marie Gillis, Terry Burrell, Bev MacDougall
Kettle and Stony Point First Nation.....	Janet George, Dianne George
Township of St. Clair	Steve Arnold, Pete Gilliland
Village of Point Edward	John Romlewski, Larry Mackenzie, Janice Robson
Labour	Keith MacMillan, Ray Fillion
Lambton Public Health.....	Dr. Chris Greensmith, Dr. Sudit Ranade
Sarnia Community Round Table	Alison Mahon
Sarnia Lambton Chamber of Commerce.....	Gary MacDonald, Rory Ring, David McPhail
Sarnia Lambton Environmental Association	Dean Edwardson
Victims of Chemical Valley	Ada Lockridge, Margaret Buist
Occupational Health Clinic for Ontario Workers	Jim Brophy, Dr. Jim Mackenzie, Nora Maher, Mary Falconer, Mark Parent, Jenny Schieman

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Intrinsic Environmental Science, Inc.....	Elliot Sigal, Chris Ollson
2WA Consulting	Michael Howes

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Sarnia Lambton Chamber of Commerce
Sarnia Lambton Environmental Association
The County of Lambton
Ontario Ministry of Health and Long-Term Care
Health Canada: Dr. Sheryl Bartlett, Dr. Pierre Band, Dr. Michél Camus



*Lastly, the LCHS Board would also like to acknowledge the support of MP Pat Davidson
and her staff for their efforts to secure support from Health Canada and to
raise the profile of the LCHS at the Federal level.*