

**PUBLIC HEALTH FUNDING:**

**RESULTS OF A QUANTITATIVE ANALYSIS EXPLORING THE INFLUENCE OF LOCAL PUBLIC HEALTH  
UNIT CHARACTERISTICS ON THE PROVISION OF PROVINCIAL AND LOCAL FUNDING**

**MPA RESEARCH REPORT**

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*Abstract*

Almost twenty years have passed since the first of a series of reports was published that questioned the patterns and levels of funding to local public health units in Ontario. In 1997 the Auditor General noted that significant variations in funding levels had evolved over time, resulting in per capita funding levels for some boards being three times the rate for other boards. No explanation was found for these variations and there has been no substantial change in the public health funding model since those documents were published.

This report attempts to identify what local public health unit (PHU) characteristics, if any, may be contributing factors to the variations in provincial and local per capita funding levels between PHUs. Financial data was collected on the size of the grant provided to each health unit by the Province of Ontario, and the total expenditures spent by each PHU. This data was analyzed in relation to each of four health unit characteristics; the governance model of the board of health; the population density of the area overseen by each health unit; the economic health of the local communities; and the workload experienced by each PHU based on the health status of their local population. The research finds there is a strong relationship between the population density of a given PHU and the level of per capita funding provided by the local municipalities and the Province of Ontario, with areas of lower population density receiving greater levels of funding.

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Life is good.

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## 1. Introduction

This report attempts to identify what local public health unit (PHU) characteristics, if any, may be contributing factors to the variations in local and provincial funding levels between PHUs in the province of Ontario. Financial data was collected from the 36 PHUs in Ontario, gathering information on the total expenditure of each health unit and the total provincial contribution each received for the year 2013. The governance structure, population density, economic health and relative workload of each health unit were analyzed in relation to the levels of funding, to determine if there is an association between the funding available and these local characteristics. The research finds that there is a strong relationship between the population density of a given PHU and the level of funding provided by the constituent municipalities and the province.

This question of funding patterns arises as almost twenty years have passed since the first of a series of reports was published on the state of public health in Ontario (Auditor General of Ontario 1997; Auditor General of Ontario 2003; O'Connor and Government of Ontario 2002; Campbell 2004; Campbell 2005; Government of Ontario 2006). Amongst concerns for the structure and governance of public health as a whole, these reports specifically questioned the patterns and levels of funding in Ontario PHUs. The intervening decades have seen no substantial change in the funding arrangements for PHUs, and this program continues to be one of the very few in the province of Ontario that does not have an established funding formula in place (Ministry of Health and Long Term Care, personal email correspondence, June 2015; Government of Ontario 2013, 5). In 1997 the Auditor General noted that significant variations in funding levels have evolved over time, resulting in per capita funding levels for some boards being three times the rate for other boards. No explanation can be found for these variations other than that they appear to be based solely

on historical patterns (1997, 153). This report attempts to identify what, if any, may be contributing factors to these variations in funding levels between PHUs.

## **2. Local Public Health in Ontario**

### **a. The Funding Framework**

The Health Protection and Promotion Act (HPPA) is the provincial statute governing Ontario PHUs, and it clearly states that not only shall constituent municipalities pay “the expenses incurred by or on behalf of the board of health of the health unit in the performance of its functions and duties”, but also that this payment shall be sufficient to enable the board of health to provide the health programs and services required by the Act, its regulations and any accompanying guidelines (Section 72 (1,2) Health Protection and Promotion Act, R.S.O. 1990, Chapter H.7). Section 76 allows for the possibility of Ministerial funding grants, on conditions the Minister deems to be appropriate.

The Province of Ontario, through the Ministry of Health and Long Term Care (MOHLTC), provides an annual grant to each PHU in an amount they deem sufficient to meet 75% of the PHUs annual funding need for approved programs. The remaining balance is to be contributed by the local municipalities (Ministry of Health and Long Term Care 2012, 7). For the most part this grant has not been sufficient to meet 75% of the local PHU requirements for some time; as early as 2007 the MOHLTC recognized that some boards were paying greater than their 25% share in order to fully support the programming needs of their PHU (ibid.7).

There are currently 36 boards of health in Ontario, defined by the HPPA as being comprised of one of six regional local governments or the County of Oxford; or a single-tier municipality acting as a board of health or an agency; or a board or organization prescribed

by Regulation 559 of the HPPA (Government of Ontario 1990). The board of health is a special purpose body, intended to operate as a separately functioning business entity from the local municipality (Kitchen 2003, 267). The majority are autonomous, and do stand separate from their constituent municipalities. However the remainder are integrated to some degree, with a majority of board members drawn from one local or regional government, and operating within the administrative structure of a municipality (Lyons 2014, 96). This leads to a duality between the governance of local PHUs, as autonomous boards have a greater degree of independence to set their budgets based on the programming needs of the health unit and local communities. Autonomous boards are comprised of a mixture of provincial appointees and representation from all constituent municipalities within the PHUs jurisdiction, with no single council able to control the decision making process of the board. Integrated boards have single-tier or regional councils acting as the board of health (Pasut 2007, 16) which may find the lines blurring between their responsibility towards the public health needs and the budgetary concerns of their community (Lyons 2014).

Regardless of the degree of budgetary control that may be exerted by a board of health, it is the position of the Association of Municipalities Ontario (AMO) that municipalities simply do not have the capacity to fund any portion of the public health program in Ontario, nor is it appropriate for this program to be funded from the local property tax base (Campbell 2004, 183). Their concerns are justified, as there has been a trend toward the decentralization of expenses to the municipal level since the 1990s, with an increasing need for municipalities to generate higher levels of revenue to meet their growing expenditure commitments. Yet for none of these requirements, including public health, do the



municipalities have much or any say in determining the service standards they are required to achieve (Kitchen 2003, 28).

#### **b. Variations in Funding**

Human health is a complex and multifaceted field of study. The primary healthcare system addresses the health and treatment of individuals, whereas the public health system is designed to address the health of a community or population as a whole. Public health is both science and art, geared towards not only promoting health but also preventing disease. Factors in the social, economic, natural, built and political environments interact with each other, and with individuals, to create a complex web of causation, influencing health-related behaviours and health status (National Advisory Committee on SARS and Public Health 2003, 46). In order to attempt to understand, and have an impact upon, this web of influence the public health system in Canada is structured around six core components: health protection; health surveillance; disease and injury prevention; population health assessment; health promotion; and disaster response. Considerable work has taken place in these areas in the past 150 years, leading to broad societal changes and public health measures which deserve the bulk of the credit for the 25-year increase in life expectancy seen across most industrialized nations in that time (ibid.46).

The provinces have been given the responsibility for health care within the Canadian constitution. The transfer of funding responsibility for public health to local municipalities in Ontario is unique in Canada, as all other provinces retain responsibility for funding and most have formed regionalized structures for health system governance, including both acute care and public health (McIntosh et al. 2010, 46; aLPHa 2004, 6). There are a variety of reasons, both economic and political, why a provincial government might download responsibility for a program to a municipality. Through the use of conditional grants the

senior government is able to induce local governments to act as their agents in the delivery of a particular service. In this way the senior government receives the benefit of local management for the provision of services, and is able to set minimum service levels in an attempt to standardize service across regions with unequal levels of income while not being directly involved in the day to day provision of that service (Kitchen 2003, 159). Local PHUs, and their constituent municipalities, find themselves in the position of providing a provincial program, with provincially mandated standards and criteria, at the local level and supported by limited local funds.

2003 found the Ontario public health system dealing with an outbreak of SARS (Severe Acute Respiratory Syndrome), resulting in hundreds of cases of illness and 44 deaths in Ontario. The apparent inability of the public health system to deal with this outbreak resulted in a commission of enquiry being established by the provincial government in order to investigate how SARS was handled. The first line of the SARS Commission First Interim Report issued by Justice Archie Campbell rather alarmingly states that “SARS showed that Ontario’s public health system is broken and needs to be fixed” (2004, 1). Numerous issues were cause for concern, but chief amongst them was a lack of funding and adequate resources, and the anomalous situation of having local municipalities involved in the provision and funding of a service that is essential for the control of the spread of infectious diseases nationwide. Campbell made the perceptive observation that “infectious disease should not have to compete against potholes or hockey arenas for scarce municipal dollars” (2004, 17).

This lack of funding translated into the inability of some PHUs to perform their duties as required. In his 2005 report the Auditor General pointed out that none of the PHUs had

conducted all of the necessary food premise inspections within their areas, and only 65% of individuals requiring medical surveillance for tuberculosis had successfully been contacted. He reiterated his earlier 2003 concern that the Ministry of Health and Long Term Care had not analyzed the extent to which individuals were exposed to differing levels of service or risk depending on where in Ontario they lived (2005, 343). It was at this time that the MOHLTC committed to increase its voluntary grant from 50% to 75% of the PHU requirement for programming, putting an end to the “ping-pong game” of who paid what for public health between the province and the municipalities (Campbell 2004, 17).

Something was lost in the translation between the province and the municipalities when this funding increase took place. The MOHLTC expected municipalities to continue providing their current level of funding the 36 PHUs (Basrur 2004, 1) while AMO interpreted this increase in funding as an opportunity for local municipalities to reduce their share of contributions to their local PHU (Association of Municipalities Ontario 2006, 1). The end result was that some PHUs had their budgets remain relatively static, as their municipal partners took this opportunity to reduce some or all of their share of funding, while others saw an increase in the size of their budget as the municipal portion remained the same and they were able to benefit from the increase in funds provided by the enhanced provincial grant. Along with the historic variations in funding that had occurred in prior years and decades, this attempt to enhance funding may have inadvertently contributed to the inequitable provision of funds.

It is necessary to explain in some detail the nature of the 75/25 funding split between the province and the municipalities, as it is not as clear-cut as it sounds. First there is the question of mandatory versus optional programming. Through the HPPA and the Ontario

Public Health Standards (OPHS) the MOHLTC stipulates certain programs must be conducted, and for many of them there is considerable detail in the protocols that govern the administration of these programs. These are referred to as the “mandatory programs” and are funded jointly between the province and the municipalities, currently at a 75% to 25% ratio. Such work may include the inspection of food premises, follow-up of infectious disease reports, and work in the community around chronic disease, tobacco use or other lifestyle concerns that may adversely impact the health of the community. Then there are related programs that may be either 100% or 75% funded by the province. These are programs designed to address very specific provincial commitments, such as the provision of dental services to children, increased placement of nurses in public health units, or the provision of funds to cover expenses in unorganized territories (Ministry of Health and Long Term Care 2012, 5). If a local PHU chooses to provide a program or service that is outside the prescribed list of mandatory or related programs specifically funded by the MOHLTC, they are considered optional, and will not be considered in the budget review process <sup>1</sup>. If the local board of health determines that the program should be provided in their community, then the municipalities will be responsible to fully fund this program with no contribution from a provincial grant.

The funding ping-pong game to which Justice Campbell referred began in the late 1990s, when there was an abrupt and painful cut to provincial funding for PHUs in 1998 as part of the provincial government’s Local Services Restructuring initiative. Prior to 1998 the province had funded 75% of the local PHU budgets, although they began to restrict the size of local PHU budgets in 1996 and 1997 in an effort to address the growing provincial deficit (Ministry of Health and Long Term Care 2012, 7). In 1998 the provincial grant to PHUs was

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<sup>1</sup> *It is possible for PHUs to obtain “one-time” funding from the MOHLTC for some of these projects, but this is approved on a case-by-case basis, as provincial funds permit.*

eliminated, and the municipalities were required to fully fund all public health activities within their local PHU. This decision was reversed in 1999, with the reinstatement of 50% of provincial funding from the province, and the need for the municipalities to provide the remaining 50%. At this time the MOHLTC had no cap in place for the funding requests: 50% of the budget was provided, without any limits to the size of the budget increases from year to year. During this period between 1999 and 2004, the province provided 50% of funding, and the average increase in budget requests each year ranged from 9% to 11% (ibid.7). The MOHLTC began to incrementally increase their share of funding in 2005, working towards their goal of providing 75% to the PHUs by 2007. 2005 saw them provide 55% of the budget, and once again there was no cap to the size of the budget request. The average increase in budget between 2004 to 2005 was 9.5%.

For 2006 the provincial share increased to 65%, but a 5% growth cap was introduced on the size of the budget increases from the previous year. 75% of funding was provided in 2007, again with a 5% cap on budget increases. It was in 2007 that some boards of health began to note that they were now paying more than 25% of the PHU budget out of their municipal levies (ibid.8). This situation arose as the amount of the provincial grants were no longer sufficient to keep up with the budget increases required to continue to provide the mandatory and related programs. The funding cap began to decrease in 2010, dropping to 2% in 2012, where it currently remains. The MOHLTC reports that in 2012, 30 boards of health requested a funding increase greater than 2% for mandatory programs, with an average increase requested of 7.98% and with requests for increases ranging to over 25% (Government of Ontario 2013a, 4). They also noted that over 50% of boards of health were contributing greater than 25% of their local PHU budget.

*Table 1: Historical Funding for Mandatory Programs*

Budget Year	Provincial Contribution
<b>1995</b>	75%
<b>1996-1997</b>	75%, with reduced budgets
<b>1998</b>	0% - full downloading to the municipalities via Local Services Restructuring
<b>1999-2004</b>	50% - no cap on the size of budget increases. Average increase was 9% to 11%
<b>2005</b>	55% - no cap on the size of budget increases. Average increase was 9.5%
<b>2006</b>	65% - 5% cap on the size of budget increases
<b>2007</b>	75% - 5% cap on the size of budget increases. Boards began to identify that some municipalities were contributing more than 25% to the PHU budget
<b>2008-2009</b>	75% - 3% cap to all boards, with the possibility of up to 2% more for increasing populations or low incomes within the community
<b>2010-2011</b>	75% - 3% cap to all boards
<b>2012-2014</b>	75% - 2% cap to all boards

(Ministry of Health and Long Term Care 2012)

It is obvious from the difference between the size of the funding caps and the size of the requested funding increases that the provincial share of local PHU funding is not keeping up with the actual costs of providing the mandatory and related programs. This means either the local municipality has to pick up the additional cost, or the funding need is not met and services are being reduced to allow the PHU to continue to operate within budget.

It is this growing discrepancy between the unmet funding needs of local PHUs and the ability (or inability) of their constituent municipalities to fill the funding gap, along with the previously published reports identifying funding discrepancies that led this researcher to question what factors may be determining the size of PHU budgets today. As one who is currently working within a PHU in Ontario, I can see there is the appearance of some health units having a greater ability to fund programs than others. Is this appearance of more substantial funding illusory? Or is it a factor of local need for public health services driving

costs, the economies of scale available to PHUs located in larger communities, or the result of enhanced funding provision from certain local municipalities that cannot be matched by others?

### **3. Hypotheses**

Municipalities in Ontario are limited in their ability to raise revenue to cover the costs of running their communities, while at the same time they are required by the province to provide many specific services to very specific standards. The primary source of revenue in municipalities is property taxes, which are dependent upon the size of the population, the economic prosperity of the community and the willingness of the residents to pay before voting their elected leaders out of office as a political punishment for increasing taxes. The size of the budget needed to service their community is also dependent on these factors, causing the municipal budgeting process to become a delicate balancing act between the ability to raise funds and the need to spend them, without overburdening the local residents. Often these factors are in direct opposition with one another: the financial needs of the community that is prosperous enough to afford to pay increased taxes may not be as great as in economically depressed communities that incur higher costs for income redistribution programs such as social services or public health.

As was described above, the funding of local PHUs is a combination of municipal contributions and provincial grants. Increasingly greater demand is being placed on municipalities to meet these funding needs, and not all PHUs are being funded to the same level, or able to achieve the same degree of programming. Population density and the economic health of a community impact the local ability to raise taxes with which to fund a local PHU, and the health needs of the community impact the workload and expenditures of the PHU. In addition to these factors is the structure of the local board of health, which is the

body that approves the budget needs of their health unit. In the case of autonomous boards there is no direct link between the board and the municipalities providing the funds, giving them the potential ability to set budgets that are less influenced by the financial concerns of the constituent municipalities. Integrated boards are controlled by a local municipal council, and as such are possibly more heavily influenced by the council's municipal budgetary concerns. As a result, it is proposed that the variability of provincial and local funding in PHU budgets is a function of the governance structure of the board of health; local population density; the economic health of the community and the public health demands of the local population, which drive the workload of the PHU.

A survey was created, administered and the results analyzed to test the following four hypotheses:

1. If there is a difference in the governance model of the board of health then there is a corresponding impact on the amount of funding available to the public health unit, at both the provincial and local level. It is predicted that PHUs governed by autonomous boards, with their greater degree of independence from the municipal budget process, will receive higher amounts of per capita funding than those governed by integrated boards.
2. If there is a difference in the population density of the area supported by a local PHU then there is a corresponding impact on the amount of provincial or local funding available to the public health unit. It is predicted that PHUs in rural areas with low population densities receive greater levels of per capita funding to support the public health programming needs of their communities.



3. If there is a difference in the economic health of the communities supported by the board of health then there is a corresponding impact on the amount of provincial or local funding available to the public health unit. It is predicted that PHUs in areas with lesser levels of economic prosperity will receive greater amounts of per capita funding to support the public health needs of their jurisdiction.

4. If there is a difference in the local demand for public health services then there is a corresponding impact on the amount of provincial or local funding available to the public health unit. It is predicted that PHUs with a higher demand for services will receive more funding per capita than those with a lesser demand for service.

#### **4. Methodology**

The research project was designed to evaluate the level of provincial and local funding received by each health unit, based on the characteristics of each health unit, in order to determine if there is any significant difference in funding between units of differing characteristics. The characteristics to be compared are the governance model of the board of health, population density, economic health of the region and the local need for public health services that drive the workload of the PHU. The collection of financial data would provide the dependent variables in the analysis. Data to support the independent variables were gathered by the researcher from publicly available sources.

##### **i. Dependent Variable Data Collection**

###### **a. Survey Design**

A short survey was sent April 30, 2015 to 58 contacts within all 36 PHUs. The invitation to participate was sent via email, to the Business Manager and/or other financial contact within each PHU. (Please refer to Appendix 1 for the full text of the email and survey.) The list of recipients was derived from a distribution list developed by the MOHLTC for

correspondence with this group of financial contacts in early 2015. SurveyMonkey, an online survey creation tool, was used to facilitate the creation and distribution of this data collection. The survey was available online for participants to complete, with a link to the survey included in the email inviting participation. The survey was closed to further submissions on June 16, 2015.

No ethics review process was required to be undertaken as the information to be collected was financial data only, and did not require the respondents to voice an opinion or interpretation of the data. Most health units freely publish this data on the Internet, or it would be subject to release to the public should a Freedom of Information Request be submitted. Therefore there was no risk to the respondents by completing the survey as they were providing factual data that is publicly available, rather than providing personal opinions. However the survey did inform the respondents that “The financial information collected here will not be made public on an individual health unit level” to offset any concerns of the potential risk of unfavourable budget comparisons. Recipients were also provided with contact information for the researcher should they have questions or concerns about the data they were asked to provide.

The survey consisted of only three questions, and the option to provide contact information and comments, if desired. Two pieces of financial data for the year 2013 (January 1 – December 31, 2013) were requested. 2013 was the year chosen for study as this was the year for which the most recent financial reports were likely to be available on the Internet, should there be less than 100% rate of return for the survey questions and the researcher found it necessary to obtain publicly available financial reports.

### b. Financial Data Collected

The questions asked in the survey were:

1. *Which Ontario Public Health Unit do you represent?*
2. *What was the **total year-end financial expenditure** for your health unit in 2013? (For all programs and special projects, for the period of January 1, 2013 to December 31, 2013).*
3. *What was the **total funding received** by your health unit from the Province of Ontario (for all programs and special projects, from all Ministries) for expenses incurred during the period of January 1, 2013 to December 31, 2013?*

The questions were piloted prior to the survey being sent out with the Business Manager and Manager of Public Health in one local PHU. No difficulties with interpretation were identified at that time.

### c. Additional Financial Data Sources

The researcher also reviewed transfers to public health units in the Ontario Public Accounts for 2013 (Government of Ontario 2015). The Ontario Public Accounts did not identify by health unit any transfers under \$120,000, rendering this data incomplete as a number of health unit programs receive funds below this amount. A request was also submitted to the MOHLTLC for the total amount of provincial funding provided to each Ontario health unit. However the data received from the MOHLTLC in response to this request was not the actual dollar transfers calculated after the completion of the financial year-end, but were the approved amounts requested by the public health units at the beginning of the year. In addition, one time funding and funds provided by other Ministries (such as the Ministry of Children and Youth Services, which funds the Health Babies Healthy Children program) were not included in the data provided.

These two sources of financial data were not suitable for analysis with the actual PHU expenditures for the purposes of this research, as they did not capture all the funds transferred to each PHU from the Province of Ontario in 2013 for all programs. However this data did provide a means of triangulating the data provided by the survey respondents to verify if the data provided appeared to be similar to the incomplete data obtained from the provincial sources. It permitted the researcher to identify if any large discrepancies existed between provincial data and what was reported in the survey response by the PHU.

An Internet search was also conducted for 2013 Financial Statements for any PHU not responding to the survey request. For those health units that did not respond to the request for data, information from their published financial statements was used. However, where a health unit provided data in response to the survey request that was the data used in the analysis.

#### **d. Survey Response**

There was a 75% response rate, with 27 of the 36 health units surveyed providing responses to the request for financial data. All questions were answered in the surveys submitted.

For eight of the remaining nine health units, year-end financial data was available on the Internet. The total provincial revenues and PHU expenditures were obtained from these financial statements. For one health unit the only suitable financial data publicly available was the 2013 budget, rather than the year-end financial statements, as the financial statements included income and expenditures for a program outside the scope of public health (Emergency Medical Services) which were not categorized in the financial

statements in a manner that permitted their separation from the funding used for PHU programming. The budgeted revenue and expenditures for public health were itemized separately from the EMS data, enabling the use of the budget data in place of the actuals for this one PHU<sup>2</sup>.

The provincial revenue and expenditure figures provided by one of the 27 health units responding to the survey included items related to the capital cost of building a new facility. As this is an extraordinary and costly project, costs/revenues related to this project could not be included in the data for comparison purposes as they were of a significant size as to possibly skew the results of the analysis. Figures from the 2013 Financial Statements, which itemized the amounts associated with this project, were used instead of the survey response, with the endorsement of the Business Manager who provided the original survey data. The data used did not include the costs and revenues associated with this building project.

*Table 2: Source of 2013 Financial Data Used in Analysis*

<b>Survey Response</b>	<b>27</b>
<b>Published 2013 Year-End Financial Statements</b>	<b>8</b>
<b>Published 2013 Budget</b>	<b>1</b>
<b>Total</b>	<b>36</b>

In summary, financial data was obtained for all 36 PHUs in Ontario. This financial data would provide the dependent variables to be used in the analysis of funding patterns between PHUs.

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<sup>2</sup> Budget and actual revenue and expenditure data were obtained for six other health units in order to determine if there were large variations between the two. The mean difference in these six comparators was -2.4%. This confirms that the difference between the two is not large, and the use of the budgeted financial data for this one health unit was not likely to significantly impact the ensuing statistical analysis.

#### e. Comparability of Data

During the data collection period a number of respondents voiced concerns over the nature of the financial data requested. Their concerns centered on two main points:

1. Different programs may be run and funded in different health units, aside from the core mandatory programs and related programs, creating an inability to make direct comparisons of funding levels from one PHU to another.
2. The amortization of capital expenses may be reported differently due to a conflict in PSAB (Public Sector Accounting Board) rules for municipal financial reporting, and what expenditures are permissible under the MOHLTC financial reporting rules.

Regarding the first concern, the request asked for provincial funding for all PHU programs, not just mandatory and related provincially funded programs. The concern was raised that not all PHUs provide the same programming. For example, five PHUs are funded to provide Pre-School Speech and Language Services while others are not. As well, Northern PHUs receive additional funding for the provision of services in Unorganized Territories and enhanced nutritional programs that are not available to other PHUs. In addition, some PHUs may have received one-time funding for local initiatives unique to their community. Although the researcher recognizes the validity of this concern it was decided to continue with the data as requested for two reasons. The first is that due to the size and scope of this research project, resources were not available to permit a line-by-line comparison of the financial statements of all 36 PHUs, and the project would not have been completed in the allotted time.

Secondly, one of the purposes of this project was to determine what, if any, are the drivers between the total amounts of funding available to different health units with differing characteristics. Although the core mandatory and related programs are common across all PHUs, there are indeed differences in what each PHU has available in funding. Some of this

may be related to unique programs or special funding that may contribute to some of the historic variability in funding levels for which there is no explanation (Auditor General of Ontario 1997, 153). From this researchers personal experience working in local PHUs, once these funds are “in the door” of the PHU, although they may be intended for use on a specific program and indeed are used as such in most cases, these non-core program funds also have a way of supplementing gaps in funding for other programs. A meeting space provided for the use of one program may be put into use for another during off hours; support staff from one program may be seconded to provide support to another if there is a surge in demand. Without these supplemental funds, many health units would have to find other ways to fill these gaps, or not fill them at all. As a result these additional funds may in fact aid in enhancing the overall programming capacity of the recipient PHU beyond the specific program for which they were intended. The ability for small PHUs to access one-time funds can be difficult, if not impossible, at times. These funds are often used to start a local initiative, with the intention that the funding will end at the end of the financial year, and the cost of the program will continue to be borne by the municipal portion of the health unit budget. In smaller communities that additional cost may not be feasible, and so the PHU is not able to take advantage of these one-time funds. There are also special “pots” of funding available for related program, some funded at 100%, others at 75%. However the MOHLTC Financial Planning, Accountability and User Guide for program based grants stipulates what these funds may be used for, and often there is a requirement that they not be used for staff salaries, or conversely, they may provide for staff salaries but not for training or other operational costs such as equipment, phones or mileage (Government of Ontario 2013b). Recent research has confirmed the impact this funding can have on local PHUs: “100 per cent funded programs should have no impact on municipal spending, but as explained by a number of interviewees, funding has not kept up with the rate of inflation in recent

years...As a result, some cost-shared money has been spent on 100 percent funded programs” (Lyons 2014, 110). In summary, the ability for a PHU to take advantage of one-time funding, or maximize the benefit of related program funding may be dependent on the overall fiscal health of the PHU, as local contributions are required to support these funding opportunities. This of course leads back to the original question of what is driving differences in local PHU funding levels, so it was deemed suitable that these unique program funds be included in the financial data requested of PHUs.

Northern PHUs do have very different programming and funding needs from southern health units, as many are involved in the provision of services to local Aboriginal communities, and have both extraordinary revenues and expenses involved in accessing remote communities or the administration of services in unorganized territories. In recognition of this, the data analysis has been conducted on both the total population of all 36 PHUs, and also on just the 29 southern health units, with the northern removed from the data prior to some portions of the analysis. Seven PHUs are located in the northern region: Algoma Health Unit, North Bay Parry Sound District Health Unit, Northwestern Health Unit, Porcupine Health Unit, Sudbury and District Health Unit, Thunder Bay District Health Unit, and the Timiskaming Health Unit. These seven PHUs were removed from a portion of the data analysis due to the considerable variation in funding they receive.

The second concern raised by the survey respondents was the conflict in the accounting rules governing the reporting of capital costs and amortization. Since January 1, 2009, the Canadian Institute of Chartered Accountants (CICA) has required that capital assets be capitalized and depreciated by local governments. However, as detailed in the Financial Planning, Accountability and User Guide for program based grants the MOHLTC “has not



changed its method of funding tangible capital assets, and does not recognize the depreciation or amortization of capital assets as an allowable expense within the program based grant budget or year-end settlement process” (Government of Ontario 2013b, 23). The concern is that some PHUs may be including amortization amounts with their reported expenditures, while others may not. Once again, the resources available and the scope of this project precluded a detailed review of the financial statements to identify and adjust for amortization for each PHU. For those respondents who queried whether or not amortization should be included in their data, they were instructed to include it. For those data extracted from published financial records, amortization was included if available. The author believes the inclusion of amortization expenses within the collected data is justified as the setting aside of monies in reserve funds to replace aging capital assets is a valid use of funds (Kitchen 2003, 195) and it is also a required accounting practice for local municipalities as stipulated by the CICA.

## **ii. Independent Variable Data Collection**

All data used in the development of the independent variables were derived from publicly available data published by either the MOHLTC or Public Health Ontario (PHO)<sup>3</sup>. This enhanced the consistency of the data as it was collected by a reliable source, and was already aggregated to the PHU level, removing the need to assemble a range of complex data from a multitude of sources and ensure the adequate assignment to the correct PHU, given their large and varied geographic jurisdictions.

In 2004 the Association of Local Public Health Agencies (aLPHA) in Ontario identified the need for health units to be resourced based on their individual characteristics and the

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<sup>3</sup> PHO is a Crown corporation supported by the MOHLTC, whose mandate is to provide scientific and technical advice and support to clients working in government, public health, health care, and related sectors (Public Health Ontario 2015b).

different health needs found within their communities. Suggested community characteristics to be assessed at the PHU level include: “total population; total land area; seasonal variation of population; population density patterns; economic and cultural factors; special needs areas; transportation systems; communication systems and media; educational opportunities; research facilities; administrative boundaries of other political agencies (provincial, federal, municipal); governance structures (e.g. relationship of board of health to city councils); health status broken down by statistical indicators; emerging health issues.” Health unit characteristics also play a role in driving the need for resources, and these include staff levels, degree of program compliance; relative expenditures, number and type of regulated premises (aLPHa) 2004, 16). Using these community and health unit characteristics suggested as a basis for formulating resourcing decisions, four independent variables with readily available data were chosen for evaluation against the 2013 funding available to each health unit. These independent variables are the governance structure for the board of health; population density; the economic health of the community and the development of a ranking index to determine the level of community need for public health services which in turn influences the workload of the PHU.

#### **a. Board Structure**

The Health Protection and Promotion Act dictates that each PHU shall be governed by a Board of Health (R.S.O. 1990 Ch. H7, S.48). Boards are to be comprised of members of the obligated municipalities within the jurisdiction of each public health unit, usually municipal councilors, and may also include provincial or citizen appointees. In Ontario this results in public health units being governed by boards that can be considered either “autonomous” or “integrated”. Autonomous boards are comprised of members that are representative of all communities within the jurisdiction, and may include provincial and/or citizen appointees. Autonomous boards are freestanding, and operate at arms-length from their

obligated municipalities, although local municipal interests are taken into consideration through the participation of local councilors. Integrated boards operate as part of the administrative structure of a local government, which could be regional or single-tier. For the purposes of this research autonomous boards of health were determined to be those boards that are comprised of a representative group of members, with no single municipality in a position to obtain a majority vote during the proceedings. An integrated board is one where a single municipal or regional council has sufficient representation on the board to vote in the majority and control the decisions of the board.

The determination of whether or not a board is autonomous or integrated was initially based on the classification assigned to each PHU in the Health Unit Profiles published by the MOHLTC (Government of Ontario 2015). The five boards of health governance categories in this report were collapsed to two, based on the membership criteria discussed above. The resulting classification used in this report can be found in Appendix 2.

The governance model for the board of health is relevant as the HPPA requires the obligated municipalities to pay the expenses of the board of health in sufficient quantity to ensure adequate compliance with the program requirements of the HPPA and its accompanying standards and regulations (R.S.O. 1990. Ch. H7, S.72). If any one municipal board is in a position of majority on the board of health there is the potential that their local municipal interests may outweigh the funding requirements of the PHU they are required to support (Lyons 2014, 103) and subsequently result in a variation in the size of budgets between these two types of board structures.

### **b. Population and Population Density**

The population and population density figures were 2013 data obtained from the Health Unit Profiles published by the MOHLTC (Government of Ontario 2015). As is to be expected, there is a tremendous range in both of these figures across the PHUs in Ontario. Population sizes ranged from a low of 34,000 to a high of 2.7 million, with corresponding densities of 0.3 to 4399 people per square kilometer living within the jurisdictions of local health units.

Population size was used to determine per capita funding levels. Population density measures, however, provide a valuable means of comparing the nature of each PHU as they range from exceptionally remote to dense urban settings. The extreme range of densities contained in a small N of 36 raised the possibility of an analysis based on these densities being distorted by the outliers within the data. To compensate for this, interquartile ranges were established, permitting the grouping of the 36 PHUs in four density intervals, ranging from 1 (very low density) to 4 (very high density). These four interval groupings were used for the analysis with the dependent variables. The populations and population density for each health unit can be found in Table 2 in Appendix 2.

### **c. Economic Health**

The ability of local municipalities to generate enough revenue to pay for activities of their local PHU may vary with the economic health of the community (Kitchen 2003, 332) and impact their need for provincial funding for public health services. A measure of local economic health is a relevant variable for measuring the municipal administration's ability or willingness to pay. With limited economic data available in the two preferred data sources for PHU characteristics, the MOHLTC variable "% Persons Under 18 Years in Low Income Households (after tax)" (Government of Ontario 2015) was selected as the most representative measure to characterize the economic health of the PHU jurisdiction. This value ranged from 9.2% to 23.4% throughout the province. With no outliers to threaten the

validity of the analysis there was no need to convert this data to intervals. The relative ranking of economic health by PHU can be found in Table 3, Appendix 2.

#### **d. PHU Workload (local demand for services)**

It is an expectation of the MOHLTC in the provision of their grants to PHUs that “each board of health, when developing and delivering programs, will be guided by the health needs of its communities with appropriate consideration of local and provincial priorities” (Government of Ontario 2013b, 2). This means that the health needs of the residents, along with other characteristics which impact the workload of the PHU, must be taken into consideration and addressed as services are developed and delivered in the local communities.

In an effort to measure the local demand for public health service, it was necessary to create an index to measure the local public health need driving the workload of the PHUs and their corresponding need for funding to meet this demand. The health status of the local population is one driver of this demand, which can be measured using a wide variety of indicators, identified through the health promotion requirements of the Ontario Public Health Standards (OPHS), the foundational document which governs public health programming in Ontario (Government of Ontario 2014). Another driver of PHU workload is the demand for health protection services, also governed by the OPHS, and include, among other activities, the inspection of food premises for food safety standards; the monitoring of small drinking water systems for water quality; and the follow up of reports of communicable diseases to control and monitor their spread within the population. The poorer the health status, or the greater the number of health protection activities in a region, the higher the workload in the local PHU, which in turn drives a corresponding need

for resources to meet this demand. The point of developing this index is not to determine if these needs are being met, or if a PHU is making the most effective use of the funding provided, but rather to provide a ranking of which health units have a lesser or greater demand for service based on established indicators of health status of the population and service demand at the local health unit level.

Keeping with the decision to work with pre-existing data assembled at the health unit level, an index was built using twelve indicators compiled from one of three sources: the Initial Report on Public Health (Table 2) published by the MOHLTC in 2009 (Government of Ontario 2009); the updated Health Unit Profiles (Table 1) reissued in 2014 (Government of Ontario 2015); or from the PHO Snapshots website, an interactive database based upon the core public health indicators developed by the Association of Public Health Epidemiologists in Ontario (Public Health Ontario 2015a). The indicators selected are a representative cross-section of the mandatory public and related programs required under the OPHS: chronic disease and injury prevention; family health; infectious diseases and environmental health. These indicators measure the local population health status, and the local demand for public health protection services. In turn, these indicators therefore provide a measure of local PHU workload, as their mandate is to respond to these needs with appropriate services and programs <sup>4</sup>.

**Table 3: Indicators Forming Index of Local Demand for Public Health Services**

<b>Indicator</b>	<b>Measure</b>	<b>Year</b>	<b>Metric</b>
1. Incidence of All Malignant Cancers (per 100,000) (Chronic Disease)	Age Standardized Rate (Both Sexes Combined)	2009	Rate
PHO Snapshots Data File for Cancer Incidence Indicators (2003 to 2009) (Public Health Ontario 2015a)			
2. Hospitalization for Cardiovascular Disease (per 100,000) (Chronic Disease)	Age Standardized	2013	Rate

<sup>4</sup> No data was available at the PHU level on dental services or emergency preparedness and planning, so these were not included in the creation of the index.

<u>Indicator</u>	<u>Measure</u>	<u>Year</u>	<u>Metric</u>
PHO Snapshots Data File Chronic Disease Hospitalization Indicators (2003 to 2013) (Public Health Ontario 2015a)	Rate (Both Sexes Combined)		
3. Self-Reported Adult Daily Smoking Rate (%) (Chronic Disease)	Age Standardized Rate (Both Sexes Combined)	2011-12	Rate
PHO Snapshots Data File Self-Reported Smoking Status Snapshot (2003 to 2011-12) (Public Health Ontario 2015a)			
4. Self-Reported Adult Combined Overweight and Obese Rate (%) (Chronic Disease)	Age Standardized Rate (Both Sexes Combined)	2011-12	Rate
PHO Snapshots Data File Self-Reported Nutrition and Healthy Weights Snapshot (2003 to 2011-12) (Public Health Ontario 2015a)			
5. Emergency Department Visits for Injuries due to Bite by Dog or other Mammal (per 100,000) (Injury Prevention and Communicable Disease/Rabies)	Age Standardized Rate (Both Sexes Combined)	2013	Rate
PHO Snapshots Data File for Injury Emergency Department Visits Indicators (2003 to 2013) (Public Health Ontario 2015a)			
6. Fall Related hospitalizations among seniors aged 65 and older (per 100,000)	Age Standardized Rate (Both Sexes Combined)	2007	Rate
Source: Initial Report on Public Health 2009, Health Unit Profiles Table 2 (Government of Ontario 2009)			
7. Influenza Incidence (per 100,000) (Communicable Disease)	Age Standardized Rate (Both Sexes Combined)	2012-2013	Rate
PHO Snapshots Data File for Reportable Burdensome Infectious Diseases Indicators (2003 to 2013) (Public Health Ontario 2015a)			
8. Chlamydia Incidence (per 100,000) (Communicable Disease)	Age Standardized Rate (Both Sexes Combined)	2013	Rate
PHO Snapshots Data File for Reportable Burdensome Infectious Diseases Indicators (2003 to 2013) (Public Health Ontario 2015a)			
9. Number of Food Premises (Environmental Health)	Year round operation only, all risk levels	2012	Numeric
Source: Initial Report on Public Health 2009, Health Unit Profiles Table 1 (2014 update) (Government of Ontario 2015).			
10. Number of Small Drinking Water Systems (SDWS) (Environmental Health)		2014	Numeric
Source: Initial Report on Public Health 2009, Health Unit Profiles Table 1 (2014 update) (Government of Ontario 2015).			
11. Teen Pregnancy (per 1,000) (Family Health)	Age 15-19 (live births, stillbirths and abortions)	2007	Rate
Source: Initial Report on Public Health 2009, Health Unit Profiles Table 2 (Government of Ontario 2009)			

<b>Indicator</b>	<b>Measure</b>	<b>Year</b>	<b>Metric</b>
12. Low Birth Weight Babies (per 1,000) (Family Health)	500-2499 grams at singleton birth, based on mothers usual place of residence.	2007	Rate
Source: Initial Report on Public Health 2009, Health Unit Profiles Table 2 (Government of Ontario 2009)			

The measures for each of the twelve indicators were compiled for each health unit, and a z-score calculated for each PHU within each indicator. The mean of the twelve z-scores for each PHU was calculated, which provided the interval measure within the index. A z-score is a statistical measurement of a scores relationship to the mean in a group of scores. It provides a way to compare the means in a group. If the z-score equals zero, then that score is equal to the mean of the group. If it is above 0, it is higher than the mean; if below 0, it is lower than the mean.

The score indicates the relative demand for service in each PHU within the entire group of 36 PHUs. The twelve indicators used all measured in the same direction: the higher the value within the indicator, the higher the need for service or workload within the PHU, as the indicator showed there were greater incidences of the adverse health measure, or a higher number of events requiring health protection interventions such as food premise inspections or infectious disease investigations. Therefore, the higher the z-score, the higher the workload, in relation to the rest of the group. The lower the z-score, the lower the workload, or local need for service, relative to the rest of the group. A z-score of zero indicates that score is equal to the mean of the entire group. Those z-scores above zero (the positive scores) have a higher need for service, and the level of need increases the further away from 0 the score progresses. Those z-scores below zero (the negative scores) have a lesser demand for service, with the level of need decreasing the further from zero it is.



Table 4 in Appendix 2 provides the relative ranking of local workload by PHU, as determined by their mean z-score from the compiled index of indicators. Nothing about this ranking is meant to suggest that the work conducted by those health units with low z-scores, indicating a lower demand for their services, is not still necessary. This index is simply a means of ranking the relative need of each health unit for resources, based on the local workload, which is determined by the population health status and structural characteristics of their local communities.

## 5. Analysis

### i. Dependent Variables: Provincial and Local Per Capita Funding

Data was collected on the total amount of money spent by each PHU, and the total size of the provincial grant provided to each. However, direct comparisons of these figures are of little value as there is considerable variation in the sizes of the populations supported by each PHU. Instead, these data were used in conjunction with the population figures for each PHU to calculate per capita funding levels for both the local share of funding and the amount of funding provided by the province. This converts the data to a rate, dollars provided per person in the area serviced, which allows for a more ready comparison of funding between health units of varying population sizes.

The financial data provided by the 36 health units shows there continues to be a wide range of funding variability across the province. For 2013 the mean level of per capita expenditures by all local PHUs was \$98.28, ranging between \$55.18 to a high of \$177.99, a difference of \$122.82 in expenditure amounts. Much of this variance can be attributed to the high expenses faced by the northern PHUs required to meet their extraordinary needs. The mean per capita expenditure for southern health units is \$84.46, a 14% difference from all health units combined.

At the local level, for all health units and the southern health units, per capita municipal funding ranged from \$11.54 to \$42.00, with a mean level for all health units of \$24.33. The mean level of funding for southern health units is \$22.46. The seven northern health units had a narrower range of per capita funding (\$25.27 to \$39.35) but with a substantially higher mean of \$32.10<sup>5</sup>.

In 2003 the Auditor General found there to be a greater than three-fold difference in provincial funding to health units (2003, 220). Ten years later this has increased somewhat to almost four times the difference between the largest and smallest per capita grants, with total per capita provincial contributions ranging from \$39.97 to \$148.92, a difference of \$108.95. Much of this difference can be attributed to the magnitude of the provincial grants being provided to the northern PHUs for their extraordinary costs. Per capita provincial funding for the 29 health units in southern Ontario in 2013 sees a difference of just over 100% with a difference of \$74.38, ranging from a low of \$55.18 up to \$129.55, with a mean of \$62.00.

The mean provincial share of all PHU spending is close to the stated provincial target of 75%, but the range varies from 63.4% up to 83.7% across all health units. Again, the northern PHUs receive a greater overall contribution from the province towards their total expenditures, with a mean of 79.1% compared to the mean provincial share for southern health units at 73.7%.

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<sup>5</sup> *Per capita municipal funding amounts were calculated from the difference between the per capita provincial funding levels, and the total per capita expenditures of each health unit. Included in this municipal funding portion will be a small amount of funding from the Federal government for incidental programs performed by some health units, and fees collected for PHU services.*

**Table 4: 2013 Funding Levels, All PHUs**

Dependent Variables	N	Range	Minimum	Maximum	Mean	Std. Deviation
Total HU spending	36	\$234,325,463	\$6,098,637	\$240,424,100	\$30,056,176	\$40,084,807
Total HU spending per capita	36	\$122.82	\$55.18	\$177.99	\$98.28	\$34.75
Local \$ per capita	36	\$30.46	\$11.54	\$42.00	\$24.33	\$8.03
Total Prov. Grant	36	\$185,901,711	\$5,102,389	\$191,004,100	\$22,494,121	\$31,407,098
Prov. \$ per capita	36	\$108.95	\$39.97	\$148.92	\$73.94	\$28.87
Prov. % of HU total	36	20.3%	63.4%	83.7%	74.7%	4.9%

**Table 5: 2013 Funding Levels, Southern PHUs**

Dependent Variables	N	Range	Minimum	Maximum	Mean	Std. Deviation
Total HU spending	29	\$233,167,996	\$7,256,104	\$240,424,100	\$33,208,059	\$44,121,224
Total HU spending per capita	29	\$74.38	\$55.18	\$129.55	\$84.46	\$19.25
Local \$ per capita	29	\$30.46	\$11.54	\$42.00	\$22.46	\$7.55
Total Prov. Grant	29	\$185,574,847	\$5,429,253	\$191,004,100	\$24,714,835	\$34,671,898
Prov. \$ per capita	29	\$52.87	\$39.97	\$92.84	\$62.00	\$13.34
Prov. % of HU total	29	18.0%	63.4%	81.4%	73.7%	4.7%

**Table 6: 2013 Funding Levels, Northern PHUs**

Dependent Variables	N	Range	Minimum	Maximum	Mean	Std. Deviation
Total HU spending	7	\$20,835,157	\$6,098,637	\$26,933,794	\$16,998,378	\$6,441,613
Total HU spending per capita	7	\$62	\$116.38	\$177.99	\$155.53	\$23.81
Local \$ per capita	7	\$14.08	\$25.27	\$39.35	\$32.10	\$4.70
Total Prov. Grant	7	\$14,736,464	\$5,102,389	\$19,838,853	\$13,294,020	\$4,632,494
Prov. \$ per capita	7	\$57.81	\$91.11	\$148.92	\$123.43	\$22.01
Prov. % of HU total	7	10.00%	73.7%	83.7%	79.1%	3.2%

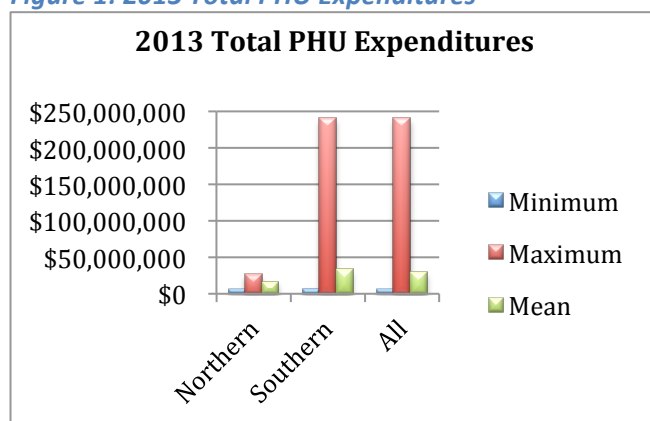
**Figure 1: 2013 Total PHU Expenditures**

Figure 2: 2013 PHU Per Capita Expenditures

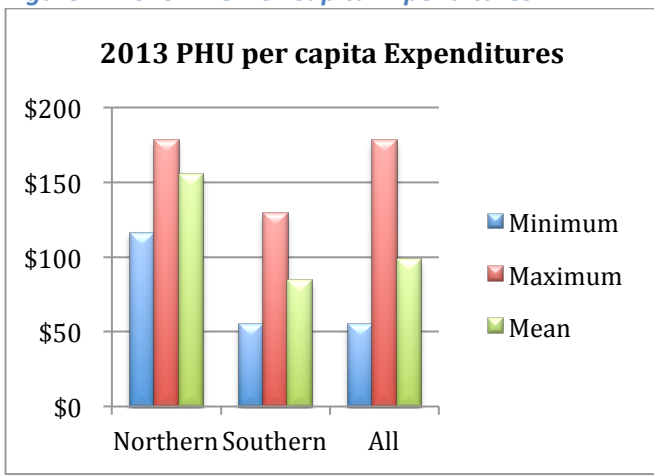


Figure 3: Total Ontario Public Health Grant, 2013

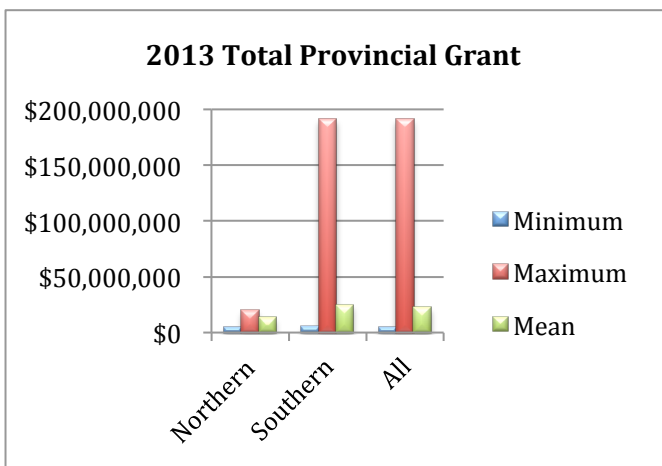
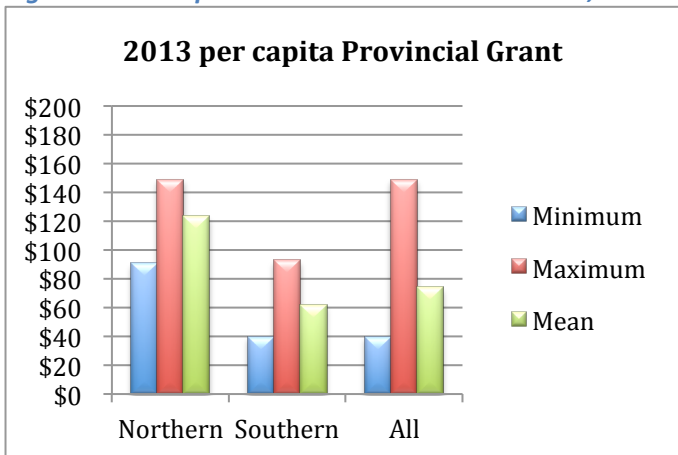


Figure 4: Per Capita Ontario Public Health Grant, 2013



## ii. Independent Variables

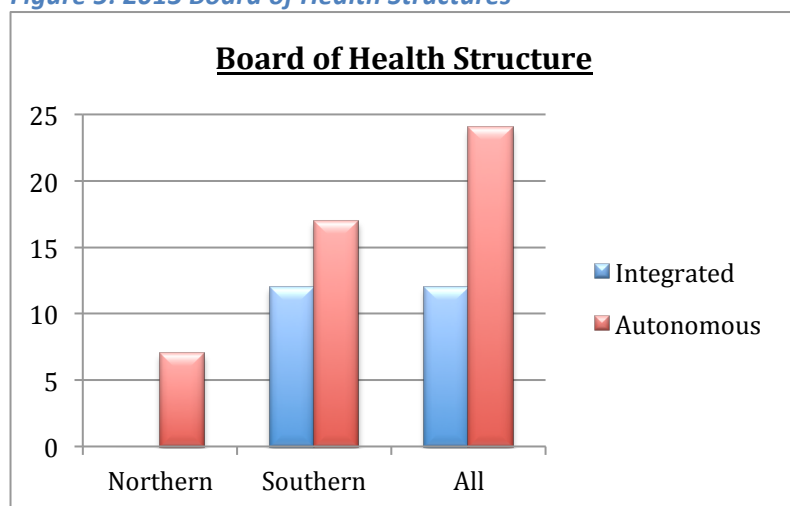
### a. Board of Health Governance Model

As previously discussed, there is the potential for the structure of the board of health, which can be either autonomous or integrated, to have bearing on the funding available to the local PHU due to the degree of independence the board has from municipal financial pressures. Of the 36 boards in Ontario, 24 are autonomous, and 12 are integrated. All seven of the northern boards are autonomous boards, leaving 17 autonomous and 12 integrated in the southern health units.

**Table 7: 2013 Board of Health Structures**

	Autonomous	Integrated	Total
Northern PHUs	7	0	7
Southern PHUs	17	12	29
All PHUs	24	12	36

**Figure 5: 2013 Board of Health Structures**



As shown in Table 8, the total mean per capita funding amount for all autonomous boards of health is \$30 greater than the mean funding level for integrated boards. At first glance it appears that integrated PHUs are receiving almost 30% less funding than their autonomous

counterparts. However this difference drops to only 12% once the northern health units are removed from the comparison: a less substantial, but not inconsequential, disparity.

**Table 8: Per Capita Funding Comparison by Board of Health Governance Model**

Board Structure		All PHUs		Southern PHUs	
		Total PHU \$ per capita	Prov. \$ per capita	Total PHU \$ per capita	Prov. \$ per capita
Integrated	N	12	12	12	12
	Minimum	\$56.23	\$39.97	\$56.23	\$39.97
	Maximum	\$129.55	\$92.84	\$129.55	\$92.84
	Mean	<b>\$77.94</b>	<b>\$57.05</b>	<b>\$77.94</b>	<b>\$57.05</b>
	Std. Deviation	\$20.56	\$15.51		
Autonomous	N	24	24	17	17
	Minimum	\$55.18	\$43.64	\$55.18	\$43.64
	Maximum	\$177.99	\$148.92	\$124.60	\$82.59
	Mean	<b>\$108.45</b>	<b>\$82.39</b>	<b>\$89.06</b>	<b>\$65.49</b>
	Std. Deviation	\$36.21	\$30.50	\$17.42	\$10.71
Total	N	36	36	29	29
	Minimum	\$55.18	\$39.97	\$55.18	\$39.97
	Maximum	\$177.99	\$148.92	\$129.55	\$92.84
	Mean	\$98.28	\$73.94	\$84.46	\$62.00
	Std. Deviation	\$34.75	\$28.87	\$19.25	\$13.34

#### b. Population Density

Tables 9 through 11 show the range of data for the remaining independent variables: population density, presented here in their raw form rather than interquartile intervals; the percentage of youth under the age of 18 living in low income households, used as a proxy measure for the economic health of the local communities (the higher the percentage, the less economically healthy is the region); and the ranking index describing the relative workload of a local PHU based on the public health demands of the community served (the higher the score, the greater the workload, which is driven by a higher local need for services).

**Table 9: 2013 Local PHU Characteristics, all PHUs**

<u>Independent Variables</u>	<u>N</u>	<u>Range</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Mean</u>	<u>Std. Deviation</u>
<b>Population Density</b>	36	4399.3	0.3	4399.6	264.6	746.9
<b>% Youth in Low Income Household</b>	36	14.2%	9.2%	23.4%	16.7%	3.3%
<b>HU Workload by local need</b>	36	1.68	-0.88	0.79	-0.02	0.41

**Table 10: 2013 Local PHU Characteristics, Southern PHUs**

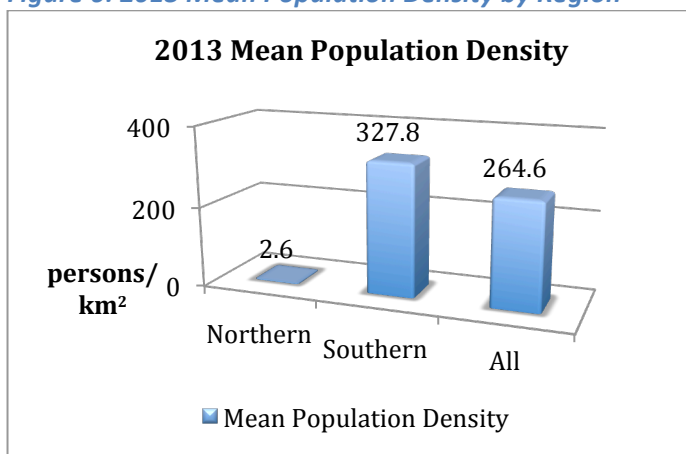
<u>Independent Variables</u>	<u>N</u>	<u>Range</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Mean</u>	<u>Std. Deviation</u>
<b>Population Density</b>	29	4392.6	7	4399.6	327.8	822.2
<b>% Youth in Low Income Household</b>	29	14.2%	9.2%	23.4%	16.3%	3.4%
<b>HU Workload by local need</b>	29	1.3	-0.88	0.42	-0.14	0.35

**Table 11: 2013 Local PHU Characteristics, Northern PHUs**

<u>Independent Variables</u>	<u>N</u>	<u>Range</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Mean</u>	<u>Std. Deviation</u>
<b>Population Density</b>	7	7.3	0.3	7.6	2.6	2.6
<b>% Youth in Low Income Household</b>	7	7.4%	15.2%	22.6%	18.2%	2.7%
<b>HU Workload by local need</b>	7	0.60	0.19	0.79	0.48	0.22

Most striking is the variation in population density, with a low of 0.3 persons per km<sup>2</sup> in northern areas, to a high of 4399 persons per km<sup>2</sup> in Toronto. Although less dramatic, there is still considerable variation in population densities within the southern health units, with a standard deviation of 822.2 persons per km<sup>2</sup> and a mean of 327.8 persons per km<sup>2</sup>.

Figure 6: 2013 Mean Population Density by Region

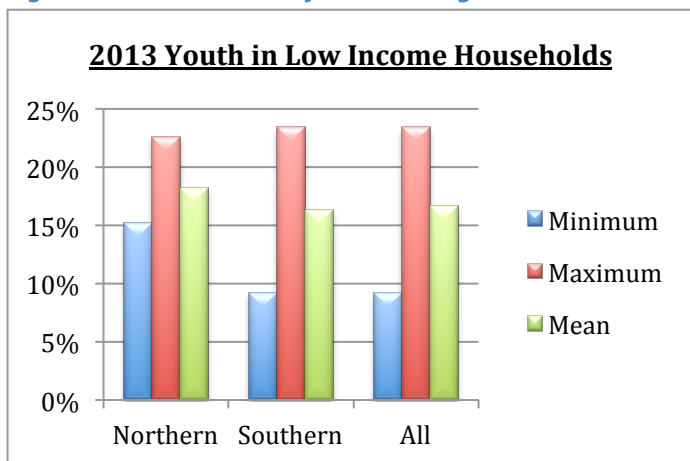


### c. Economic Health

In a province the size of Ontario, with diverse populations and levels of economic activity, it is not surprising to see that there is a notable difference in the economic health of communities, as measured by the percentage of youth living in low income households. With a low of 9.2% in the more prosperous communities, to a high of 23.4% in the poorer regions, this speaks to the difference in financial resources available to not only the residents of Ontario, but also to the resources of local municipalities who must fund local services, as their economic health is tied closely to that of their residents. This broad gap is lessened in the north, but for the worse, as overall a greater percentage of youth are living in low-income households throughout the region than in the south.



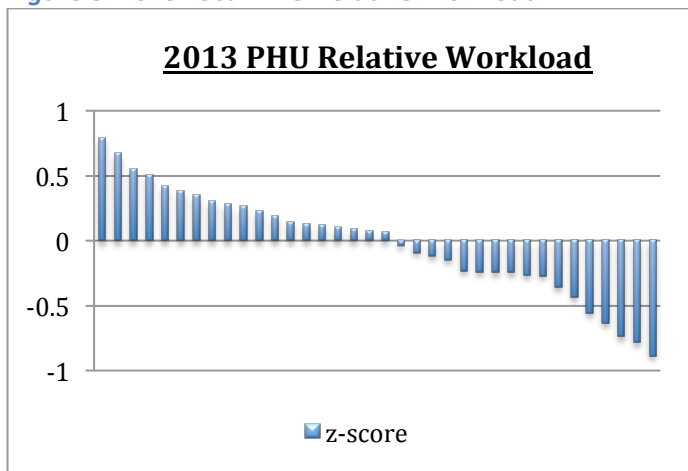
**Figure 7: 2013 Percent of Youth Living in Low-Income Households**



#### **d. Local Workload**

The local demand for services driving the workload for each PHU also differs dramatically across the province. As mentioned above, this is not an indicator of the value of the services provided, but rather the demand for services placed on each health unit by the needs of their local communities. Figure 8 clearly illustrates the variation in workload demand for each of the 36 health units. From left to right there is a decreasing level of local demand influencing the amount of work facing PHUs in each jurisdiction. The highest score, reflecting the greatest workload to be met, is 0.79, and again is found in the northern health units. Contrast this with a low score of -0.88, and it is evident that the requirement for public health services across the province differs considerably, placing unequal workload demands on health units.

**Figure 8: 2013 Local PHU Relative Workload**



### iii. Correlation Analyses

Correlation analyses were conducted to examine the relationship between the two dependent variables of interest; the amount of per capita funding at the local level (Local \$ per capita), and the provincial grant to each PHU (Prov. \$ per capita), with the four independent variables. The Pearson correlation co-efficient ( $r$ ) measures both the strength and direction of the association between two variables. The closer the value is to 1 or -1, the stronger the association. A positive value indicates the direction of the association is the same (as one value increases, so does the other) while a negative value indicates the direction is in opposition (as one value decreases, the other increases) (O'Sullivan, Rassel, and Berner 2010, 436). Tables 12 and 13 report the correlations between the levels of provincial funding for all 36 PHUs, and for the southern PHUs (where data from the seven northern health units has been excluded)<sup>6</sup>, respectively.

<sup>6</sup> Correlation and regression analyses were not conducted on the data for the seven northern health units as an  $N$  of 7 is too small to produce reliable results.

**Table 12: Correlation Matrix, Per Capita Provincial Funding, 2013, all PHUs**

		<u>Prov. \$ per capita</u>	<u>Board Structure</u>	<u>Density Quartile Low to High</u>	<u>Youth in Low Income Household</u>	<u>PHU Workload by local need</u>
<b>Prov. \$ per capita</b>	Pearson Correlation	1	<b>.420*</b>	<b>-.735**</b>	<b>.333*</b>	<b>.746**</b>
	Sig. (2-tailed)		0.011	.000	.047	.000
	N	36		36	36	36
<b>Board Structure</b>	Pearson Correlation	<b>.420*</b>	1	<b>-.580**</b>	<b>.391*</b>	<b>.497**</b>
	Sig. (2-tailed)	.011		.000	.018	.002
	N	36	36	36	36	36
<b>Density Quartile Low to High</b>	Pearson Correlation	<b>-.735**</b>	<b>-.580**</b>	1	-.152	<b>-.828**</b>
	Sig. (2-tailed)	.000	.000		.377	.000
	N	36	36	36	36	36
<b>Youth in Low Income Household</b>	Pearson Correlation	<b>.333*</b>	<b>.391*</b>	-.152	1	.315
	Sig. (2-tailed)	.047	.018	.377		.061
	N	36	36	36	36	36
<b>PHU Workload by local need</b>	Pearson Correlation	<b>.746**</b>	<b>.497**</b>	<b>-.828**</b>	.315	1
	Sig. (2-tailed)	.000	.002	.000	.061	
	N	36	36	36	36	36

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

**Table 13: Correlation Matrix, Per Capita Provincial Funding, 2013, Southern PHUs**

		<u>Prov. \$</u> <u>per</u> <u>capita</u>	<u>Board</u> <u>Structure</u>	<u>Density</u> <u>Quartile</u> <u>Low to</u> <u>High</u>	<u>Youth in Low</u> <u>Income</u> <u>Household</u>	<u>HU</u> <u>Workload</u> <u>by Local</u> <u>Need</u>
<b>Prov. \$ per capita</b>	Pearson Correlation	1	.317	<b>-.552**</b>	.295	<b>.610**</b>
	Sig. (2-tailed)		.094	.002	.121	.000
	N	29	29	29	29	29
<b>Board Structure</b>	Pearson Correlation	.317	1	<b>-.497**</b>	.366	<b>.399*</b>
	Sig. (2-tailed)	.094		.006	.051	.032
	N	29	29	29	29	29
<b>Density Quartile Low to High</b>	Pearson Correlation	<b>-.552**</b>	<b>-.497**</b>	1	-.008	<b>-.747**</b>
	Sig. (2-tailed)	.002	.006		.968	.000
	N	29	29	29	29	29
<b>Youth in Low Income Household</b>	Pearson Correlation	.295	.366	-.008	1	.212
	Sig. (2-tailed)	.121	.051	.968		.270
	N	29	29	29	29	29
<b>PHU Workload by local need</b>	Pearson Correlation	<b>.610**</b>	<b>.399*</b>	<b>-.747**</b>	.212	1
	Sig. (2-tailed)	.000	.032	.000	.270	
	N	29	29	29	29	29

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

#### **a. Workload, Population Density and Funding**

The strongest correlation is the relationship between the local PHU workload ranking (PHU Workload by Local Need) and population density, as measured by the interquartile ranges (Density Quartile Low to High). Within all PHUs there is an extremely strong association ( $r = -.828$ ,  $p = 0.00$ ) and only slightly less in the southern PHUs ( $r = -.747$ ,  $p = 0.00$ ). The negative value indicates that as the population density increases, the associated PHU workload decreases.

The next most significant correlation is between per capita provincial funding and PHU workload. This also has a very strong correlation ( $r = .746$ ,  $p = 0.00$ ) for all health units, and again slightly weaker, but still strong, for the southern PHUs ( $r = .610$ ,  $p = 0.00$ ). There is a similar pattern of correlation between provincial funding and population density (all health units,  $r = -.735$ ,  $p = 0.00$ ; southern health units  $r = -.552$ ,  $p = 0.002$ ). The negative value indicates that as the population density decreases the level of per capita provincial funding increases.

#### **b. Board Structure and Population Density**

The correlation analysis indicates that there is a relationship between the board structure and the population density (all PHUs,  $r = -.580$ ,  $p = 0.000$ ; southern PHUs  $r = -.497$ ,  $p = 0.006$ ). When running the analysis, autonomous PHUs were assigned a value of 0; integrated PHUs were assigned a value of 1. The negative  $r$  value therefore indicates that as the population density decreased, the value assigned to the board structure increased: meaning that health units with lower population densities are more strongly correlated with autonomous boards of health and populations with high densities correlate with integrated boards. This correlation weakens somewhat when the data for the northern health units are removed, as these are all health units with autonomous boards of health, and have some of the smallest population densities in the province.

#### **c. Provincial Funding and Youth in Low Income Households**

There is a weak correlation between per capita provincial funding and the percentage of youth living in low income households in all PHUs ( $r = .333$ ,  $p = 0.047$ ), but this does not continue when the northern health units are removed from the analysis ( $r = 0.295$ ,  $p = 0.121$ ).

#### **d. Local Per Capita Funding Correlations**

Tables 14 and 15 show the correlation analyses results between the local per capita amounts of PHU funding with the four independent variables. For all health units we also see a strong negative correlation between the amount contributed locally to fund the PHU

and population density ( $r=-.559$ ,  $p=0$ ) and a positive correlation to the demand for PHU services ( $r= .483$ ,  $p=0.003$ ). The same correlation analysis for southern health units produces only a moderate negative correlation to population density ( $r=-.381$ ,  $p= .041$ ), and no correlation with workload demand. As with provincial funding, the local communities with the lower densities and higher demand for services are contributing greater amounts of funding per capita than found in more urban communities with less density and demand.

**Table 14: Correlation Matrix, Local Per Capita Funding, 2013, all PHUs**

		<u>Local \$ per capita</u>	<u>Board Structure</u>	<u>Density Quartile Low to High</u>	<u>Youth in Low Income Household</u>	<u>PHU Workload by local need</u>
<b>Local \$ per capita</b>	Pearson Correlation	1	.308	-.559**	.071	.483**
	Sig. (2-tailed)		0.068	.000	.68	.003
	N	36		36	36	36

**Table 15: Correlation Matrix, Local Per Capita Funding, 2013, Southern PHUs**

		<u>Local \$ per capita</u>	<u>Board Structure</u>	<u>Density Quartile Low to High</u>	<u>Youth in Low Income Household</u>	<u>HU Workload by local need</u>
<b>Local \$ per capita</b>	Pearson Correlation	1	.178	-.381*	-.02	.333
	Sig. (2-tailed)		.355	.041	.916	.077
	N	29	29	29	29	29

#### iv. Regression Analyses

Regression analyses were performed to further measure which of the independent variables has an impact on the levels of funding, while controlling for the effect of the remaining independent variables. If a t-value greater than the critical value required for the associated degrees of freedom is generated, with a significance of less than 0.05, then that variable can be considered to have an independent effect on the dependent variable. Tables

16 and 17 show the regression results for the independent variables for all PHUs, and southern PHUs, on the amount of per capita provincial funding provided.

*Table 16: Regression Results for 2013 Per Capita Provincial Funding, all PHUs*

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error				Lower Bound	Upper Bound
<b>(Constant)</b>	81.803	19.882		4.114	0.000	41.252	122.353
<b>Board Structure</b>	-6.489	8.807	-0.107	-0.737	.467	-24.452	11.474
<b>Density Quartile Low to High</b>	-12.705	5.626	-0.499	<b>-2.258</b>	<b>.031</b>	-24.179	-1.23
<b>Youth in Low Income Household</b>	1.716	1.115	0.197	1.539	0.134	-0.558	3.989
<b>HU Workload by local need</b>	22.878	14.752	.324	1.551	0.131	-7.209	52.964
<b>Dependent Variable: per capita provincial funding</b>							
<b>df=35, p=.05, t=2.0301, two-tailed</b>							
<b>R</b>	<b>R Square</b>		<b>Adjusted R Square</b>		<b>Std. Error of the Estimate</b>		
<b>.793</b>	<b>.628</b>		<b>0.58</b>		<b>\$18.70</b>		

*Table 17: Regression Results for 2013 Per Capita Provincial Funding, Southern PHUs*

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
<b>(Constant)</b>	62.441	12.379		5.044	0	36.893	87.99
<b>Board Structure</b>	-2.013	5.178	-0.076	-0.389	0.701	-12.7	8.674
<b>Density Quartile Low to High</b>	-4.719	3.662	-0.337	-1.289	0.21	-12.277	2.838
<b>Youth in Low Income Household</b>	0.979	0.698	0.249	1.402	0.174	-0.462	2.42
<b>HU Workload by local need</b>	12.75	9.213	0.336	1.384	0.179	-6.265	31.764
<b>Dependent Variable: per capita Provincial funding</b>							
<b>df=28, p=.05, t=2.0484, two-tailed</b>							
<b>R</b>	<b>R Square</b>		<b>Adjusted R Square</b>		<b>Std. Error of the Estimate</b>		
<b>.663</b>	<b>0.44</b>		<b>0.347</b>		<b>\$10.78</b>		

Regression analysis upholds the correlation between the level of per capita provincial funding and population density ( $t=-2.258$ ,  $p=.031$ ) for all health units, but this effect does not continue when northern health units are removed from the analysis. With an  $R^2$  of 0.628, the population density of the health unit impacts 63% of the funding provided by the province to all PHUs. None of the other three variables considered in this analysis had any significant independent impact on provincial funding.

Tables 18 and 19 show the regression analyses results for the local per capita funding amounts. The analysis does not support the correlation to population density or workload for either of the groups of health units as none of the independent variables reached the critical t-value.



*Table 18: Regression Results for Local Per Capita Funding, 2013, all PHUs*

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error				Lower Bound	Upper Bound
<b>(Constant)</b>	34.482	7.506		4.594	0.000	19.173	49.792
<b>Board Structure</b>	-0.252	3.325	-0.015	-0.076	0.94	-7.034	6.529
<b>Density Quartile Low to High</b>	-3.582	2.123	-0.506	-1.686	0.102	-7.914	.75
<b>Youth in Low Income Household</b>	-0.06	0.421	-0.025	-0.142	0.888	-0.918	0.799
<b>HU Workload by local need</b>	1.556	5.569	0.079	0.279	0.782	-9.803	12.915
<b>Dependent Variable: local per capita funding</b>							
<b>df=35, p=.05, t=2.0301, two-tailed</b>							
<b>R</b>	<b>R Square</b>		<b>Adjusted R Square</b>		<b>Std. Error of the Estimate</b>		
<b>.561</b>	<b>.315</b>		<b>.226</b>		<b>\$7.06</b>		

*Table 19: Regression Results for Local Per Capita Funding, 2013, Southern PHUs*

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
<b>(Constant)</b>	31.063	8.619		3.604	0.001
<b>Board Structure</b>	0.074	3.605	0.005	0.021	0.984
<b>Density Quartile Low to High</b>	-2.215	2.55	-0.28	-0.869	0.394
<b>Youth in Low Income Household</b>	-0.117	0.486	-0.053	-0.241	0.811
<b>HU Workload by local need</b>	2.872	6.415	0.134	0.448	0.658
<b>Dependent Variable: local per capita funding</b>					
<b>df=28, p=.05, t=2.0484, two-tailed</b>					
<b>R</b>	<b>R Square</b>		<b>Adjusted R Square</b>		<b>Std. Error of the Estimate</b>
<b>.391</b>	<b>0.153</b>		<b>0.012</b>		<b>\$7.51</b>

## 6. Discussion

Of the four independent variables assessed for their relationships to the funding of health units, the strongest relationship is the link between per capita provincial funding and the local population density. Health units are impacted by their local population density, with a lower density requiring significantly higher per capita investment by rural health units than is necessary in more urban health units with higher population densities.

This is supported by the strong correlation found between population density and the health unit workload. In addition, there is also a strong correlation between the board structure and the population density quartile for all health units. A greater number of the autonomous boards of health are located in areas with lower population densities, which in turn have correspondingly higher workloads, and therefore require higher levels of per capita funding to meet this demand. Health units are confined to a particular jurisdiction, and thus many rural health units are not able to take advantage of the economies of scale offered to those located in more densely populated areas as they are unable to amortize their costs over a large population base (Deber 2002, 14). Integrated PHUs, with a strong association to higher density areas, have lesser workload demands based on the local health status of their populations, and hence have reduced demands for resources in comparison to their lower density counterparts, resulting in lesser amounts of per capita provincial funding. The provision of funding at the local level echoes the correlation to population density and workload, but is not supported by regression analysis for these factors to be considered to have a significant impact on local funding decisions.

The need for higher levels of public health funding in areas of low population density corresponds to the literature on the health status of rural residents, which has been found

to be lower than residents of urban areas (Rural and Northern Health Care Panel, N.D., 5), contributing to a greater local need for public health programming to address these population health concerns. The provision of services in rural areas also place greater demands on the resources of public health units as there are increased costs associated with program delivery as a result of the geography and distances involved (ibid, 5; Asthana et al. 2003, 488), increasing the amount of time and/or staff needed to provide services when compared to the provision of the same services in more urban environments.

There is no notable finding of association in either the correlation or regression analysis between the percentage of youth living in low-income households (Youth in Low Income Household) and provincial or local funding. Income has long been recognized as a significant determinant of health, and the level of community economic health would be expected to have some bearing on the resources expended to improve the health of the community in question. This variable, however, was being used as a proxy measure to evaluate the economic status of the local PHU environment, based on its availability as an economic indicator calculated at the health unit level. As such, it is not the strongest measure of economic prosperity, nor would it be a robust measure of the health of the community. It is not unexpected that this measure of the percentage of youth living in low-income households does not correlate with the provision of funding.

As discussed previously, one of the weaknesses of this analysis is that it may not be comparing precisely the same financial components between health units, considering there are selected amounts of funding available to some but not all. There is also a variance in accounting methods for reporting amortization due to the conflict between the rules for municipalities, which require the reporting of amortization on capital purchases, and the

financial reporting requirements of the MOHTLC, which do not allow for such reporting. A more detailed review of the financial statements of all health units may provide different expenditure and funding numbers than used here. However, given the strength of the association between the levels of per capita provincial funding and population density, it is doubtful that those results would vary sufficiently to nullify the associations identified here.

Although the analysis in this research was based on per capita funding levels it is important to note that while this rate provides an easy method for comparing funding levels, it is not to be suggested that it is appropriate to establish a funding formula based solely on a per capita rate. Per capita funding provides the same amount of revenue per capita to each municipality, resulting in larger municipalities receiving more funds than those with smaller populations. It is not an equitable distribution of funds, as it does not provide more financial assistance to communities with a small tax base, or who may have a greater expenditure need than those with a larger tax base. It also does not take into account the ability, or inability, for local municipalities to raise revenues locally (Kitchen 2003, 166). In short, per capita assessments provide a ready means of comparing funding across communities, but it is not a suitable tool for determining what those funding levels should be.

As PHU budgets and municipal funding levels are established prior to funding decisions made by the province (Government of Ontario 2013b, 4), it is likely that the per capita provincial funding provided is echoing the lead set by local municipalities when they establish the annual budget for their boards of health. If so, this means the financial decisions underpinning the stability of public health in Ontario is based almost exclusively on the willingness and/or ability of local municipalities to support the system out of their

limited financial resources. In fact, given the funding cap that has been in place since 2006, should local municipalities wish to fund their health units more robustly there will likely be no additional funds contributed from the provincial level to enhance the resources of local public health units.

## **7. Conclusion**

In the continued absence of an established funding formula for public health in Ontario an attempt was made to determine what local health unit characteristics, if any, determined the level of provincial and local funding available to public health units. A survey was distributed to collect financial data for the year 2013 from each of the 36 health units in Ontario, allowing for a study of the amount of funding provided to each health unit from the Province of Ontario and from their constituent municipalities. The dependent variables were evaluated for relationships with the governance structure of the board of health, the population density and economic health of each health unit and to the relative measure of workload in each health unit as determined by the health status of the resident population. Four hypotheses were developed to explore these relationships: That those PHUs with autonomous boards of health were more likely to have access to a greater amount of funding than those with integrated boards of health; that PHUs located in less densely populated areas received a higher level of funding than those in urban areas; that the weaker the local economic health of an area the greater the amount of funding required; and that those health units with a higher workload demand received more funding than those with lesser demands.

Correlation and regression analyses were performed, and it was found that there is no strong link between the governance model and the funding available to PHUs. The sole

factor of significance impacting the level of provincial funding is the population density of the local PHU, which has a substantial impact on the amount of funds needed for the provision of services. The economic health of a region did not show any significant correlation to the funding provided, although the independent variable chosen for this measure was not especially robust. The workload faced by each PHU shows a correlation to the local population density and per capita funding at the provincial and local levels, but regression analyses showed it ultimately did not contribute significantly to the levels of funding available to each board of health.

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## Appendix 1

### Text of email sent to survey recipients April 30, 2015:

Greetings,

I am a student in the Master of Public Administration program at the University of Western Ontario. I am also the manager of the Environmental Health Team at the Haldimand-Norfolk Health Unit, currently on a leave of absence while I complete my degree.

The subject of my final report for this graduate program is a research project investigating the levels of funding received by Ontario public health units. Throughout my career in public health I have often encountered the belief that there are the “have” and the “have not” health units when it comes to financial resources. This project is designed to investigate whether or not there are any significant differences in funding levels based on specific characteristics of Ontario health units.

To complete this research I need two pieces of financial data from your health unit: The total amount of funds spent by your health unit by the end of your 2013 financial year (December 31st, 2013), and the total amount of funding provided to your health unit by the Province of Ontario (all Ministries) for expenses incurred during the same financial year (2013).

The financial data you provide here will be used for statistical purposes, and will not be released in a manner that links it to individual health units. This request for data has been reviewed and approved by the UWO Department of Political Science Research Ethics Committee.

Please click on this link to complete a very short (3 questions) questionnaire to provide this data: <https://www.surveymonkey.com/s/WFBJL3L>

If you could complete the questionnaire by Friday May 8th it would be greatly appreciated.

As you are aware, with only 36 health units in the province of Ontario it is extremely important to obtain the necessary data from all health units in order to strengthen the findings of this project. I appreciate your assistance in providing data for this research.

If you wish to receive a copy of the report when it is completed, please indicate your request in the comments section within the survey, and I will be happy to send one to you.

Once again, thank you for your assistance. If you have any questions, please do not hesitate to get in touch.

Regards,

Sandy Stevens  
MPA Candidate 2015  
University of Western Ontario  
[sandystevens@rogers.com](mailto:sandystevens@rogers.com)

### Survey contents, as viewed by respondents:

#### Public Health Unit Funding 2013

Welcome!

Thank you for taking the time to provide some financial data for your health unit.

A research project is being conducted to analyze public health unit funding in Ontario. The year of analysis is 2013 (January 1, 2013 to December 31, 2013).

To complete this research two pieces of financial data are needed from each health unit:

The total amount of funds spent by your health unit by the end of your 2013 financial year (December 31st, 2013)

and

The total amount of funding provided to your health unit by the Province of Ontario (all Ministries) for expenses incurred during the same financial year (2013).

The following survey has space to provide this data, a request for contact information, and an opportunity to provide any comments you feel you would like to add. It should take less than 5 minutes to complete the survey.

The financial information collected here will not be made public on an individual health unit level.

\* 1. Which Ontario public health unit do you represent?

\* 2. What was the *total year-end* financial expenditure for your health unit in 2013? (For all programs and special projects, for the period of January 1, 2013 to December 31, 2013)

\* 3. What was the *total funding received* by your health unit from the Province of Ontario (for all programs and special projects, from all Ministries) for expenses incurred during the period of January 1, 2013 to December 31, 2013?

#### 4. Contact information

Name

Title

Email Address

Phone Number

5. Do you have any comments, questions, or concerns?



*That's it!*

Thank you,

## Appendix 2

**Table 1: Board of Health Governance Model, 2015**

<b>Public Health Unit</b>	<b>MOHLTC</b>	<b>Majority Model</b>
Algoma Health Unit	Autonomous	Autonomous
Brant County Health Unit	Autonomous	Autonomous
Chatham-Kent Health Unit	Autonomous/i	Autonomous
City of Hamilton Health Unit	Single-Tier	Integrated
City of Ottawa Health Unit	Semi-	Integrated
City of Toronto Health Unit	Semi-	Autonomous
Durham Regional Health Unit	Regional	Integrated
Eastern Ontario Health Unit	Autonomous	Autonomous
Elgin-St. Thomas Health Unit	Autonomous	Autonomous
Grey Bruce Health Unit	Autonomous	Autonomous
Haldimand-Norfolk Health Unit	Single-tier	Integrated
Haliburton, Kawartha, Pine Ridge District Health Unit	Autonomous	Autonomous
Halton Regional Health Unit	Regional	Integrated
Hastings and Prince Edward Counties Health Unit	Autonomous	Autonomous
Huron County Health Unit	Autonomous/i	Integrated
Kingston, Frontenac and Lennox and Addington Health Unit	Autonomous	Autonomous
Lambton Health Unit	Autonomous/i	Integrated
Leeds, Grenville and Lanark District Health Unit	Autonomous	Autonomous
Middlesex-London Health Unit	Autonomous	Autonomous
Niagara Regional Area Health Unit	Regional	Integrated
North Bay Parry Sound District Health Unit	Autonomous	Autonomous
Northwestern Health Unit	Autonomous	Autonomous
Oxford County Health Unit	Regional	Integrated
Peel Regional Health Unit	Regional	Integrated
Perth District Health Unit	Autonomous	Autonomous
Peterborough County-City Health Unit	Autonomous	Autonomous
Porcupine Health Unit	Autonomous	Autonomous
Region of Waterloo Health Unit	Regional	Integrated
Renfrew County and District Health Unit	Autonomous	Autonomous
Simcoe Muskoka District Health Unit	Autonomous	Autonomous
Sudbury and District Health Unit	Autonomous	Autonomous
Thunder Bay District Health Unit	Autonomous	Autonomous
Timiskaming Health Unit	Autonomous	Autonomous
Wellington-Dufferin-Guelph Health Unit	Autonomous	Autonomous
Windsor-Essex County Health Unit	Autonomous	Autonomous
York Regional Health Unit	Regional	Integrated
<b>Total</b>		<b>12/36 Integrated</b>

**Table 2: PHU Population Density, 2013**

<u>Public Health Unit</u>	<u>Population Density</u>	<u>Density Quartile</u>
Porcupine Health Unit	0.3	1
Northwestern Health Unit	0.5	1
Thunder Bay District Health Unit	0.6	1
Timiskaming Health Unit	2.4	1
Algoma Health Unit	2.6	1
Sudbury and District Health Unit	4.3	1
Renfrew County and District Health Unit	7.0	1
North Bay Parry Sound District Health Unit	7.6	1
Huron County Health Unit	17.2	1
Grey Bruce Health Unit	19.0	2
Haliburton, Kawartha, Pine Ridge District Health Unit	19.9	2
Hastings and Prince Edward Counties Health Unit	23.3	2
Leeds, Grenville and Lanark District Health Unit	26.7	2
Kingston, Frontenac and Lennox and Addington Health Unit	31.0	2
Perth District Health Unit	35.1	2
Peterborough County-City Health Unit	36.5	2
Haldimand-Norfolk Health Unit	38.4	2
Eastern Ontario Health Unit	38.6	2
Chatham-Kent Health Unit	42.8	3
Lambton Health Unit	43.4	3
Elgin-St. Thomas Health Unit	48.1	3
Oxford County Health Unit	54.3	3
Simcoe Muskoka District Health Unit	61.2	3
Wellington-Dufferin-Guelph Health Unit	67.2	3
Brant County Health Unit	126.5	3
Middlesex-London Health Unit	139.2	3
Windsor-Essex County Health Unit	217.2	3
Niagara Regional Area Health Unit	240.2	4
Durham Regional Health Unit	255.7	4
City of Ottawa Health Unit	336.3	4
Region of Waterloo Health Unit	390.6	4
City of Hamilton Health Unit	488.4	4
Halton Regional Health Unit (budget, not actual)	557.8	4
York Regional Health Unit	627.8	4
Peel Regional Health Unit	1117.4	4
City of Toronto Health Unit	4399.6	4

**Table 3: Relative Ranking of Economic Health by PHU**

<b>Public Health Unit</b>	<b>% of Persons Under 18 in Low Income Households</b>
Halton Regional Health Unit	9.2
Durham Regional Health Unit	12.4
York Regional Health Unit	12.4
Wellington-Dufferin-Guelph Health Unit	12.5
Perth District Health Unit	12.9
Renfrew County and District Health Unit	13.3
Haldimand-Norfolk Health Unit	14
Oxford County Health Unit	14.1
Simcoe Muskoka District Health Unit	14.1
Huron County Health Unit	14.2
City of Ottawa Health Unit	14.4
Kingston, Frontenac and Lennox and Addington Health Unit	15
Region of Waterloo Health Unit	15
Northwestern Health Unit	15.2
Sudbury and District Health Unit	15.4
Grey Bruce Health Unit	15.6
Eastern Ontario Health Unit	16.3
Peel Regional Health Unit	16.3
Leeds, Grenville and Lanark District Health Unit	16.4
Porcupine Health Unit	16.9
Niagara Regional Area Health Unit	16.9
Brant County Health Unit	17.2
North Bay Parry Sound District Health Unit	17.5
Haliburton, Kawartha, Pine Ridge District Health Unit	17.7
Peterborough County-City Health Unit	18.7
Lambton Health Unit	18.7
City of Toronto Health Unit	18.7
Thunder Bay District Health Unit	19.4
Middlesex-London Health Unit	19.5
Algoma Health Unit	20.1
Elgin-St. Thomas Health Unit	20.1
Hastings and Prince Edward Counties Health Unit	20.6
City of Hamilton Health Unit	20.9
Timiskaming Health Unit	22.6
Windsor-Essex County Health Unit	22.9
Chatham-Kent Health Unit	23.4

**Table 4: Relative Ranking of Local Workload Demand by PHU (sorted in order from greatest local need to least local need for service), 2015**

<b>Public Health Unit</b>	<b>Workload Demand Ranking (z-score)</b>
Timiskaming Health Unit	0.791
Northwestern Health Unit	0.670
Thunder Bay District Health Unit	0.547
Porcupine Health Unit	0.506
Renfrew County and District Health Unit	0.417
Huron County Health Unit	0.384
Algoma Health Unit	0.350
Grey Bruce Health Unit	0.301
North Bay Parry Sound District Health Unit	0.277
Hastings and Prince Edward Counties Health Unit	0.261
Oxford County Health Unit	0.226
Sudbury and District Health Unit	0.189
Peterborough County-City Health Unit	0.141
Chatham-Kent Health Unit	0.126
Simcoe Muskoka District Health Unit	0.121
Eastern Ontario Health Unit	0.099
Haliburton, Kawartha, Pine Ridge District Health Unit	0.092
Leeds, Grenville and Lanark District Health Unit	0.076
Brant County Health Unit	0.067
Haldimand-Norfolk Health Unit	-0.036
City of Hamilton Health Unit	-0.089
Lambton Health Unit	-0.114
Niagara Regional Area Health Unit	-0.147
Durham Regional Health Unit	-0.230
Perth District Health Unit	-0.238
Wellington-Dufferin-Guelph Health Unit	-0.245
Elgin-St. Thomas Health Unit	-0.246
Kingston, Frontenac and Lennox and Addington Health Unit	-0.266
Windsor-Essex County Health Unit	-0.267
City of Toronto Health Unit	-0.358
Middlesex-London Health Unit	-0.429
Region of Waterloo Health Unit	-0.557
Halton Regional Health Unit	-0.633
City of Ottawa Health Unit	-0.739
Peel Regional Health Unit	-0.783
York Regional Health Unit	-0.884