

Report on

Cancer

in the Algoma District (1984 - 1998)



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Highlights of Report



This report is intended to provide residents of the Algoma District with information about the risks they face from cancer and thereby to encourage them to take steps to reduce their risks.

- Cancer was the second leading cause of all mortalities in the Algoma District from 1986 to 1999 with an age standardized mortality rate of 2.4 cancer deaths per 1000 persons per year. The age standardized incidence rates for all cancers in the Algoma District between 1986 and 1998 was 414.2 new cases per 100,000 people – a rate 6 percent greater than the Ontario rate.

- As in the province as a whole, the most common types of cancer in the Algoma District are genital/urinary tract cancers, digestive tract and peritoneal cancers, and respiratory and intrathoracic cancers. The rates for these leading three cancers are slightly elevated in the Algoma District compared to the provincial rates but the rates for bone, connective tissue, skin and breast cancer in the Algoma District are lower than the provincial rates.

- Much of the increased risk of cancer in the Algoma District can be attributed to our relatively greater rate of lung cancer. The lung cancer rate for the Algoma District is 24 percent greater than the provincial rate for men and 16 percent greater than the provincial rate for women.

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- No increase or decrease in the cancer mortality rates were apparent in the Algoma District from 1986 to 1999. A slight upward trend may be apparent in incidence rates both in the Algoma District and in the province. The increases appear to be due mainly to increased rates of lung cancer in the elderly (especially among women). There is an apparent increase in prostate cancer rates but that is likely to be due to better diagnostic procedures, not an actual increase in risk.

- Overall, the residents of the Algoma District face a slightly greater risk of cancer, especially lung cancer. This rate can be reduced. Everyone can and should minimize their risk of cancer by making healthy lifestyle choices and becoming aware of possible routes of exposure through their workplace, home and environment.

- Community-based partnerships can also improve access to health information and support healthier lifestyles. We urge all residents of the Algoma District to learn more about cancer, to take part in cancer screenings and self-examinations, and to learn ways to reduce their risks.

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Cancer in Algoma



Everyone in the Algoma District is affected by cancer either directly as a cancer patient or as an immediate relative of a cancer patient, or indirectly by bearing the costs of cancer treatment. As the population ages, the total number of cancer cases will likely increase, affecting us all even more.

The purpose of this report is to inform residents of the Algoma District of the risks of cancer in our population as compared to Ontario. The cancer rates of a community can be useful to assess the health status of that community and to predict the resources that will be needed to manage current and future cancer cases in that community. We hope that this information will lead people to make more informed lifestyle choices and will lead community agencies and other interest groups to allocate resources to cancer prevention.

In reading this report, please keep in mind that cancer is a difficult subject to understand. First, causes of cancer are difficult to pinpoint partly because cancer has a very long latency period – the time between exposure to a potential cancer-causing agent and the time the cancer develops and is detected. Also, most cancer-causing agents don't cause cancer with a single exposure. Generally, an individual must be exposed to a cancer-causing agent for many years before cancer develops. Latency times for cancer are often more than 20 years. Once an individual develops cancer it may be difficult to work backwards in time to assess potential exposures.

Second, not all individuals develop cancer upon exposure to a potential cancer agent. Cancer is triggered by accumulated changes in the genetic makeup of an individual's cells and individuals vary in their ability to fight off these changes and their effects.

Because of this long latency and because each of us is subject to numerous potential risk factors, we generally do not speak of causes of cancer but rather of risk factors – conditions that increase the chances of developing cancer but may not by themselves cause cancer.

Finally, cancer is not a single disease. Each type of cancer has its own risk factors that increase the chances of developing that cancer. Cancer of the colon most likely has a different set of causes than breast cancer. Each type of cancer has its own sequence of events that occur in its development. Each has its own screening and diagnostic methods, treatment options, and prognosis at a given stage of detection.

While the biomedical community is certain about some risk factors, we remain uncertain about many others.

...cancer is not a single disease.

For example, smoking clearly increases the risk of lung cancer, but other risk factors such as the role of diet or most environmental exposures are not as clear. We know that family history plays a major role in determining cancer risk. Clearly, some risk factors are modifiable, others are not. Gender, age, and genetic background are not modifiable. Lifestyle choices such as smoking, physical activity, and nutrition are modifiable. In other words, if you have a family history of cancer, you can reduce your cancer risk by taking advantage of screening and other early detection options and by choosing a healthy lifestyle.

Please note that this report has a community health focus, that is we provide information that can be used to address cancer risks at a community level. We generally do not attempt to attribute the observed cancer rates to specific risk factors. That type of study is beyond the scope of a community health profile.

The report begins with the overall burden of cancer in the Algoma District. We then present detailed rates by gender and age group over time, compared to the provincial rates for all types of cancer and for specific types of cancer over the time period of 1986 to 1998. Information about cancer mortalities are available through 1999, but data about cancer incident rates are available only to 1998. To understand the report, you may need some background information about these rates.

General background on rates



To compare cancer risks from one community to the next or over time in a specific community, we need to compute the *cancer rate*. For example, suppose community A has a greater number of cancer cases than community B. That may not mean that the residents of community A face a greater average risk of cancer. It may simply mean that community A has more people and thus more “opportunities” for cancer to strike. To assess the average risk of cancer we compute a *cancer rate*, that is the number of cases divided by number of people. If community A has a greater cancer rate than community B we may be able to assess the underlying factors that put community A at higher risk compared to community B. Please note however, that risk of cancer varies by individual according to family history, specific lifestyle and other exposures. Cancer rates represent only the average risk for people in a given population.

Mortality rate is the number of deaths due to cancer divided by the population size. *Incidence rate* is the number of new cases of cancer divided by the population size. Incidence is a better measure of risk in a population since many factors other than the cancer risk factors affect whether individuals succumb to cancer once they contract it. Mortalities depend on the type of cancer, the availability of cancer treatment, the level of health of individuals being treated for cancer and several other factors. Although other rates such as prevalence rates and 5-year survivability rates provide valuable information for

determining the prognosis of cancer, this report focuses on incidence rates as they are most informative for assessing risks of cancer to the general population.

Since risk of cancer increases with age, mortality and incidence rates must take into account the age of the population. *Age-specific* cancer rates are computed by dividing the number of cases in a particular age group by the number of people in that age group, with rates reported separately for each age group. Note that if the number of people in that age group increases, the number of cancer cases will also increase even if the rate stays constant. So long as the number of cases increases only proportionally to the increase in number of people, the rate will remain steady (which we would interpret as no change in the underlying risk). Thus, rates are a more appropriate indicator of the health status of a community than just the number of new cases.

Because of the age dependency of cancer, comparing overall rates between geographic areas can be misleading. An overall cancer rate, one that combines age groups, can confuse the age-specific rate with the age structure of the population. In other words, community A may have a higher overall cancer rate than community B simply because community A has more elderly people. Likewise, as the proportion of elderly people increases over time in a population, the overall cancer rate will increase, but that may be simply due to the relatively

larger number of older people. *Age-standardized rates* take into account any differences in the age structure of two communities or changes in age structure of a population over time. Age standardized rates represent the overall cancer rate of a community if it had the same population structure as a reference population (for example, the population structure of Ontario as a whole). This standardization corrects for differences in age structures of the population. Thus only age-standardized rates, standardized with the same reference population should be used to compare communities.

The relatively small population of an area such as the Algoma District makes specific comparisons difficult. When the population is subdivided by age and gender or by geographic subregion, the number of people is so small that a few more or less cancer cases can cause a large change in the rates. For example, there are only about 3500 men aged 59 to 64 years in all of the Algoma District. A difference between 20 and 25 cancer cases changes the rate from 571 per 100,000 to 714 per 100,000. Plus or minus 5 cases may be simply random variation and not a real change in the underlying risk factors. Due to the resulting small numbers, we are not able to compare age-specific rates from one subregion to the next.

Cancer Mortalities

Cancer was the second leading cause of all mortalities in the Algoma District from 1986 to 1999 (Figure 1). Circulatory diseases (including heart disease and stroke) accounted for 36 percent of all mortalities over that time period, while cancers accounted for 27 percent.

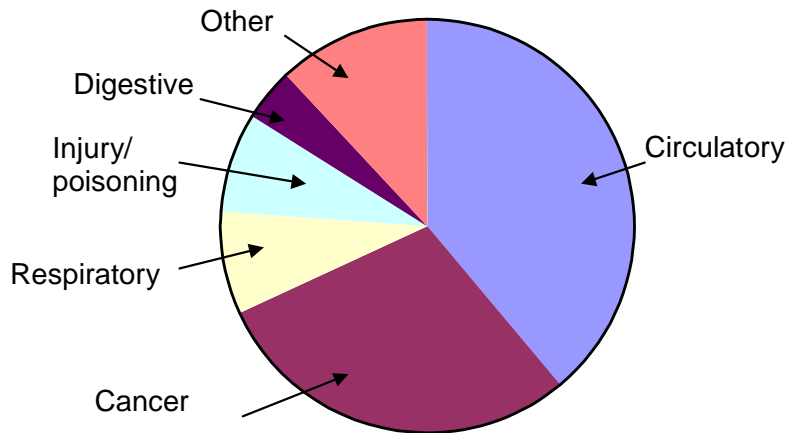


Figure 1. Causes of mortalities by disease classification in the Algoma District 1986 to 1999.

The age standardized mortality rate for cancer in the Algoma District is 2.4 per 1000 per year. In other words, if the proportion of people across age classes was the same in Algoma as it is across the province, each year, on average, 2.4 persons out of every 1000 persons would die from cancer in the Algoma District over the period between 1986 and 1999. This rate is 12 percent greater than the Ontario rate, specifically we are 95 percent confident that the rate is 8 to 17 percent greater.

The risk of cancer mortality of course, increases with age (Fig 2). Very few cancer mortalities occur until the 45 to 54 age group, then cancer mortalities steadily increase with age.

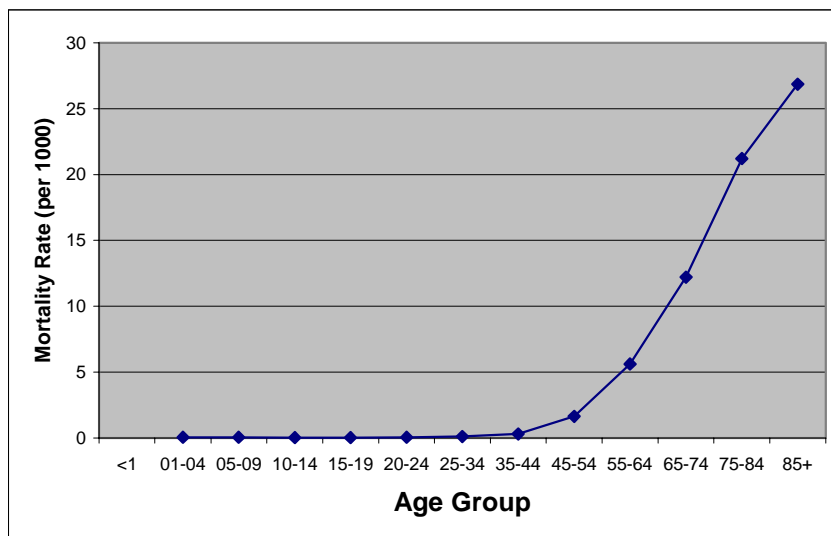


Figure 2. Cancer mortality by age group, Algoma District 1986 to 1999.

Cancer mortalities reflect the cancer incidence rate, the types of cancer involved, the stage of diagnosis, and the treatment available. For example, a community in which cancers, especially more deadly forms, are more frequent, are not diagnosed early and are not treated as aggressively will have a higher cancer mortality rate than a community with lower incidence, earlier detection, and more aggressive treatment. Thus, while mortality rates are an important public health issue, incidence rates may offer other information regarding possible risk factors that could be examined.

Cancer Incidence

The annual age standardized incidence rates for all cancers in the Algoma District between 1986 and 1998 was 414.2 new cases per 100,000 people in the population. That compares to a rate of 392.6 for Ontario overall (Figure 3). The rate for the Algoma District is about 6 percent greater than the Ontario rate. In statistical terms, the rate is 3.4 to 8 percent greater, based on a 95 percent confidence interval.

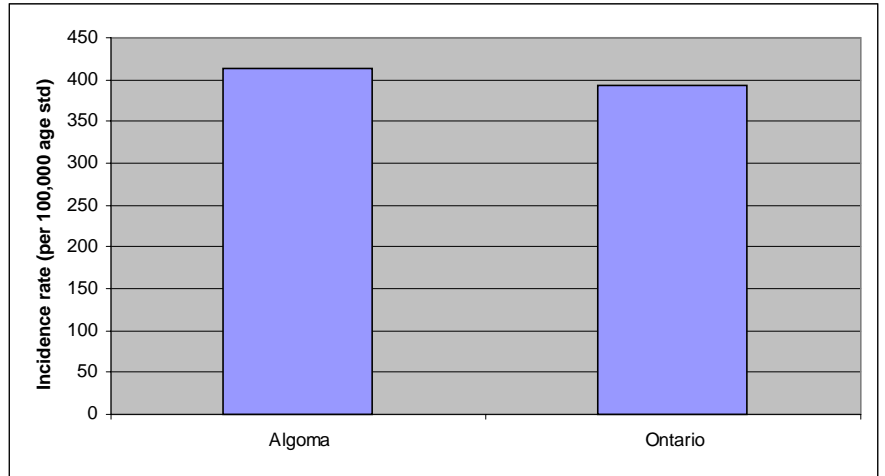


Figure 3. Incidence rates for all cancers, the Algoma District and Ontario.

The most common types of cancer in the Algoma District are genital/urinary tract cancers, digestive tract and peritoneum, and respiratory and intrathoracic cancers (Fig 4). The main type of genital/urinary cancer is prostate cancer of men, the main types of digestive and peritoneal cancers are colon and rectal cancer, and the main type of respiratory and intrathoracic cancer is lung cancer. We use the more general classifications to provide more statistically accurate rates. Note that the relative rankings of these types of cancer are the same for the Algoma District and the province. The rates for these leading three cancers are slightly elevated in the Algoma District compared to the provincial rates. The rates for bone, connective tissue, skin and breast cancer in the Algoma District are lower than the provincial rates.

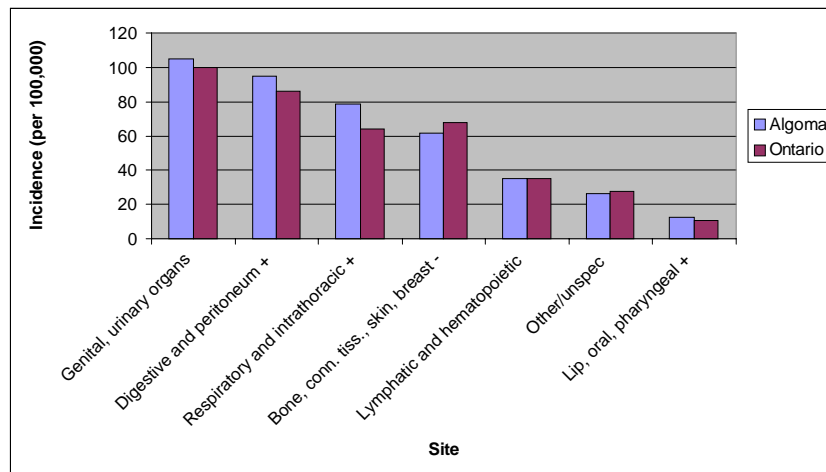


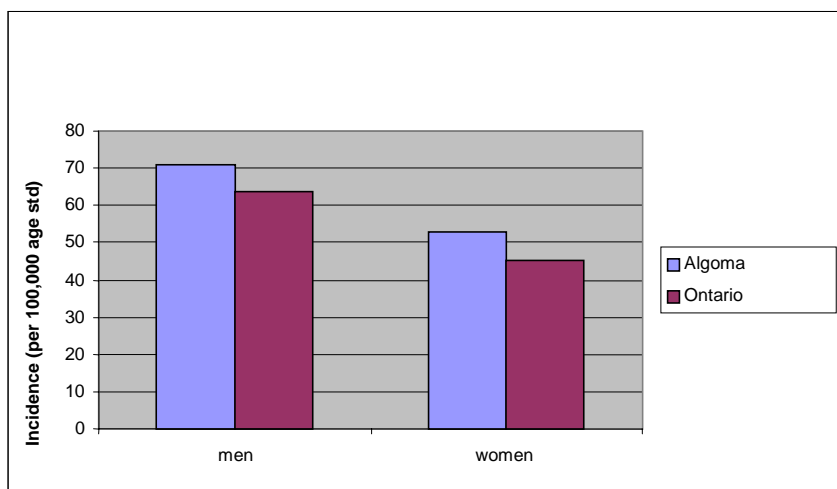
Figure 4. Cancer rates by site in the Algoma District and in Ontario 1986 to 1998.
 + Rates are statistically greater in the Algoma District than the overall Ontario rate.
 - Rates are statistically less in the Algoma District than the overall Ontario rate.

Urinary/genital tract cancers

For the study period, the rate for all genital and urinary cancers in the Algoma District was 105 per 100,000 compared to a rate of 100 per 100,000 for the province. The incidence rate for cervical cancer in the Algoma District was 11.9 per 100,000 for women compared to 10.3 for the province. The rates for prostate cancer were 111.4 in the Algoma District, 106.6 in the province. We cannot show that these differences are more than random variation, that is, the rates in the Algoma District do not appear to be different than the provincial rate.

Digestive and peritoneum cancers

For the study period, the rate for all digestive and peritoneum cancers was 94.8 per 100,000 compared to a provincial rate of 86.2 per 100,000. Thus the rate in the Algoma District is 10 percent greater than in the province. Men face 11 percent greater risk in the Algoma District than in the province; women a 17 percent greater rate (Fig 5).

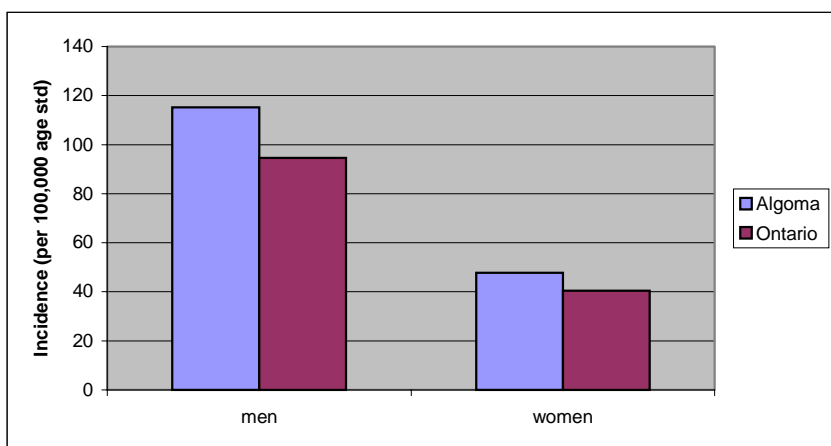


Statistically, the rate for men is between 2 and 21 percent higher in the Algoma District than for the province; the rate for women is 7 to 27 percent higher in the Algoma District than for the province.

Figure 5. Colon and rectal cancer incidence in the Algoma District and Ontario, 1986 to 1998.

Respiratory cancers

For the study period, the rate for respiratory cancers in the Algoma District was 115.2 per 100,000 for men and 47.8 per 100,000 for women, compared to rates of 94.7 and 40.5 for men and women in Ontario, respectively (Fig 6).



These rates translate for men into a 15 to 28 percent greater rate in the Algoma District than in Ontario and, for women, a 9 to 27 percent greater rate in the Algoma District than in Ontario.

Specifically for lung cancer, the rate for the Algoma District is 24 percent greater than the provincial rate for men, 16 percent greater than the provincial rate for women (Fig 7). Statistically, these rates are 16 to 32 percent greater than the provincial rate for men, 6 to 27 percent greater than the provincial rate for women. These rates are consistent with the fact that historically, smoking rates have been greater for men than women.

Figure 6. Respiratory cancer incidence rates in the Algoma District and Ontario, 1986 to 1998.



Figure 7. Relative risk of lung cancer for residents of the Algoma District, 1986 to 1998. A value of 1.0 indicates a rate equivalent to the provincial rate, values greater than 1.0 indicate a greater rate.

Lip, oral and pharyngeal cancers

The other general type of cancer for which rates in the Algoma District are statistically greater than the provincial rate is lip, oral and pharyngeal cancers. Over the study period, the rate for these cancers was 12.6 per 100,000 in the Algoma District and 10.95 in the province. This translates to a 15 percent increased risk in the Algoma District. Due to the small number of cases, we can only say that statistically the rate could be 2 to 30 percent greater for men and women combined. The small number of cases prevents us from being able to discern a greater or lower relative risk for men vs. women.

Time trends

The mortality rates for all cancers varied from year to year over the study period, but no trend of increase or decrease was apparent (Fig 8).

All cancers

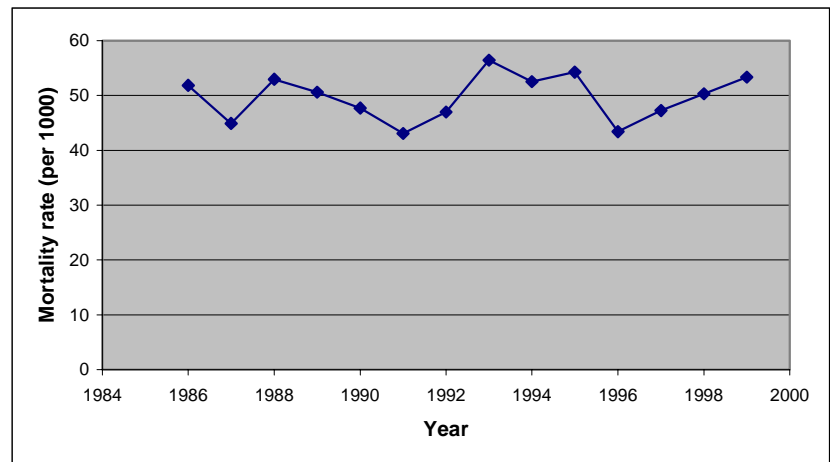
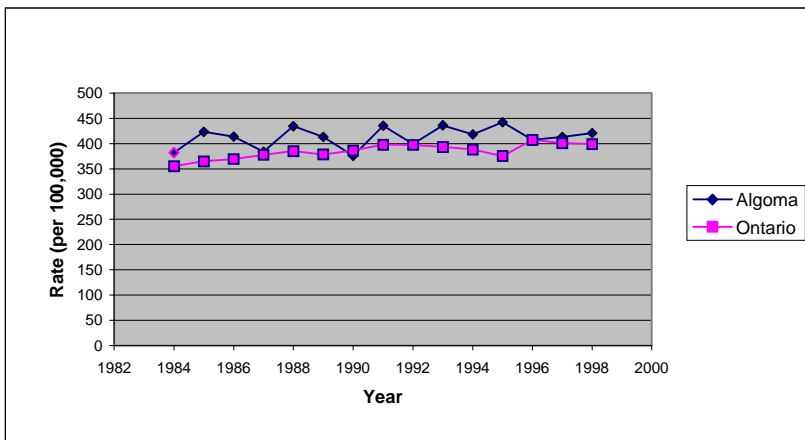


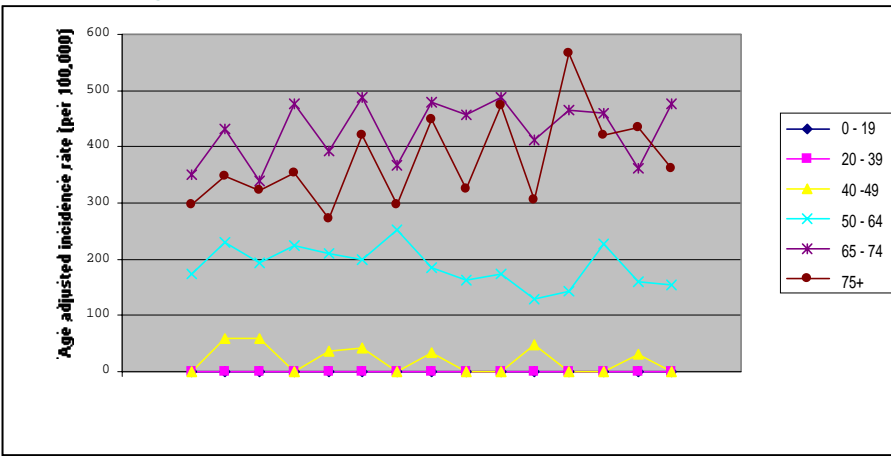
Figure 8. Yearly cancer mortality rates in the Algoma District.



A slight trend may be apparent in incidence rates both in the Algoma District and in the province (Fig 9).

Figure 9. Age standardized incidence rates for all cancers.

Respiratory cancers



We found no increase in rates for any specific cancer site other than respiratory cancers in the 75+ year old age group (Fig 10) and prostate cancer in men (Fig 12).

Figure 10. Incidence rates for respiratory cancers by age group Algoma District, 1984 to 1998

The majority of increased lung cancer cases occurred in women, especially in the 65 to 74 year age group (Fig11) perhaps reflecting increased smoking rates among women beginning a few decades ago.

Lung cancers - Men, Women

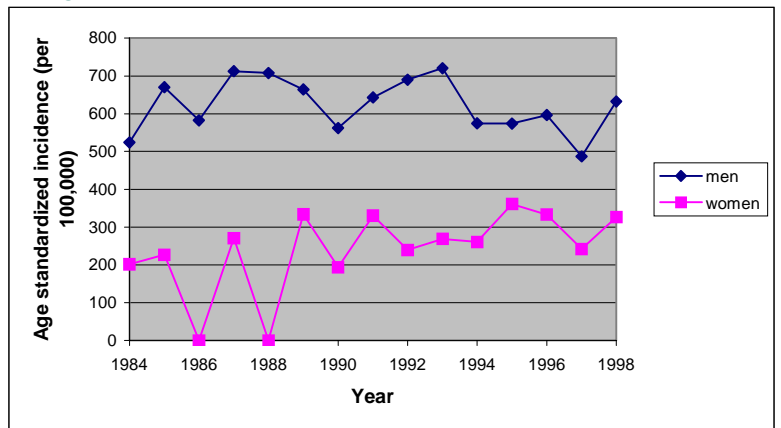


Figure 11. Age standardized incidence rates for lung cancer in men and women in the 65 to 74 year old age group, Algoma District

Prostate cancers

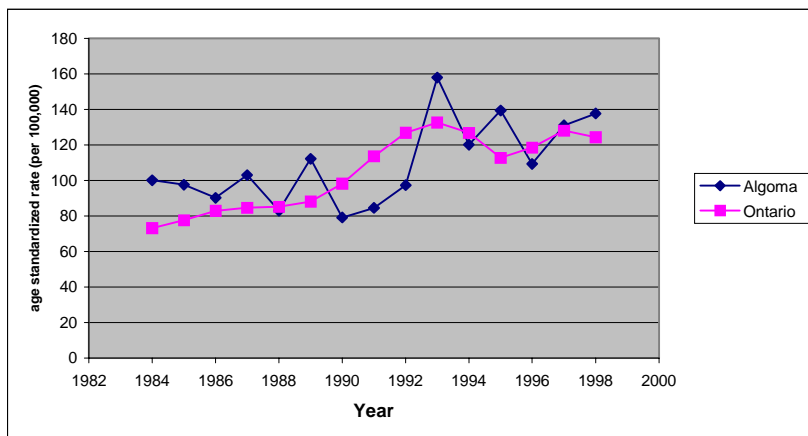


Figure 12. Prostate cancer rates, Algoma District and Ontario, 1984 to 1998

The apparent increase in prostate cancer rates is likely due to better diagnostic procedures (namely, prostate specific antigen tests), not an actual increase in risk.

Geographic Variation

Cancer rates are not constant across the district. Table 1 presents the rates for the most common types of cancer across census subdivisions in the Algoma District for the time period of 1984 to 1996 (the most recent data that is available by census subdivision). Caution should be used in interpreting these rates since the rates are subject to a wide degree of statistical variation given the small populations in these census subdivisions. (The *confidence intervals* shown in the tables illustrate the range of statistical variation. A confidence interval indicates that we are 95 percent certain that the true rate is represented within the stated range. We would therefore be unable to distinguish a difference in rates between two areas for which the confidence intervals overlap. Non-overlapping confidence intervals suggest a difference in the rates.) In a small population, two or three more cases or two or three fewer cases can make a large difference in the rates. The confidence intervals let us see past such "statistical variation" to try to look for overall patterns.



Table 1. Cancer rates in selected census subdivisions of the Algoma District 1984 to 1996. Other subdivisions had rates too small to report for overall cancer rates (i.e., less than 5 cases)

Census Subdivision	All Cancers			Genital/Urinary Cancers		
	CI Lo	CI Hi	Obs Rate	CI Lo	CI Hi	Obs Rate
Algoma, Unorg. N	287.97	377.45	332.71	59.11	105.91	82.51
Blind River	* 528.36	676.32	602.34	* 100.75	171.40	136.07
Bruce Mines	* 606.38	925.92	766.15	* 160.42	340.12	250.27
Dubreuilville	58.22	471.85	265.03	..	..	..
Elliot Lake	* 403.89	479.31	441.60	85.97	123.21	104.59
Garden River	113.90	449.05	281.48	..	..	..
Hilton Beach	354.26	790.36	572.31	..	..	..
Hornepayne	310.03	535.45	422.74	77.37	209.87	143.62
Iron Bridge	* 438.02	706.18	572.10	86.14	229.17	157.65
Johnson	332.93	599.90	466.41	71.65	219.34	145.50
Macd., Mered., Ab. Add.	* 498.12	763.94	631.03	86.63	225.63	156.13
Michipicoten	286.21	401.76	343.98	41.74	90.70	66.22
North Shore	* 871.38	1489.11	1180.25	89.74	291.12	190.43
Sault Ste. Marie	360.48	383.10	371.79	87.27	98.68	92.98
Serpent River	125.48	631.85	378.66	..	..	..
St. Joseph	283.95	460.62	372.28	52.35	138.51	95.43
Thessalon (Mun)	333.08	482.85	407.96	69.31	146.35	107.83
Thessalon (Twp)	* 406.81	695.29	551.05	* 121.75	304.41	213.08
White River	268.63	553.66	411.15	42.85	194.92	118.89
Algoma Total	* 403.91	423.46	413.69	98.10	107.99	103.04
ONTARIO	390.26	392.38	391.32	98.04	99.11	98.58

Data Sources

Much of the information in this report was obtained from "Northern Ontario Cancer Profile Report," a report from the Northern Health Information Partnership (NHIP) available from the website www.nhip.org/cancer. NHIP also provides data to public health researchers and provided the data for this report. For more specific information about cancer risk factors or other aspects of cancer, please visit the Canadian Cancer Society's website at www.cancer.ca.

Census Subdivision	Digestive Cancers			Respiratory Cancers		
	CI Lo	CI Hi	Obs Rate	CI Lo	CI Hi	Obs Rate
Algoma, Unorg. N	49.34	92.67	71.01	52.14	90.85	71.50
Blind River *	99.57	170.26	134.92	* 106.12	178.80	142.46
Bruce Mines *	93.47	241.08	167.28	48.77	165.89	107.33
Dubreuilville	..	..	..	..	..	..
Elliot Lake *	88.37	129.72	109.05	* 85.52	118.28	101.90
Garden River	..	..	..	28.17	307.74	167.96
Hilton Beach	14.19	216.16	115.18	50.87	310.41	180.64
Hornepayne	15.06	104.75	59.90	43.10	160.56	101.83
Iron Bridge	57.85	178.83	118.34	* 69.17	194.16	131.66
Johnson	46.78	184.67	115.72	23.36	129.73	76.54
Macd., Mered., Ab. Add.	67.53	189.95	128.74	* 73.59	198.61	136.10
Michipicoten	46.60	102.94	74.77	60.61	118.01	89.31
North Shore *	131.37	387.10	259.24	* 163.99	629.21	396.60
Sault Ste. Marie	83.92	95.05	89.49	59.08	68.39	63.73
Serpent River	..	..	..	..	..	..
St. Joseph	47.25	134.63	90.94	29.30	99.77	64.54
Thessalon (Mun)	47.00	113.57	80.28	42.23	103.76	73.00
Thessalon (Twp)	35.33	156.21	95.77	48.22	174.53	111.37
White River	31.69	189.58	110.63	15.00	146.20	80.60
Algoma Total *	90.73	100.23	95.48	* 75.36	83.91	79.64
ONTARIO	86.11	87.11	86.61	63.95	64.81	64.38

* signifies rate is statistically greater than the Ontario rate.

.. signifies numbers too small to report (i.e., less than 5 cases)

To put these elevated rates into perspective, the total cancer incidence rate for the North Shore census subdivision amounts to 7.25 cancer cases per year. If the North Shore had the same rate as the provincial average, we would expect 2 or 3 cases per year. The 7.25 cases we observe represent an average increase of 5 cases per year for all cancers. The fact that the confidence interval for North Shore doesn't overlap the confidence interval for Ontario lets us say that these 5 additional cases are not simply statistical variation. But while we are able to state that the cancer rate is elevated, tracking down any pattern in those 5 additional cases per year is difficult. There is unlikely to be a single cause. Rather, many factors determine a community's cancer risk, including genetic background of the population, lifestyle choices in the population (e.g., smoking, diet, exercise), occupational and environmental exposures and other sources of variation.

In terms of the communities with elevated rates in Algoma, we know of no ongoing environmental exposure that would explain these differences in cancer rates. Further, more detailed investigations could be undertaken by a research agency but it has proven difficult to pinpoint any specific cause for elevated rates, especially in areas of small populations. The search is made more difficult by the fact that cancer rates typically reflect levels of exposures from 20 to 30 years in the past. In fact, the US Centers for Disease Control, a prominent authority in public health research, no longer routinely investigates suspected cancer clusters based solely on geographic comparisons of rates. In all but a few situations, the CDC was unable to determine a cause for the elevated rates.

Regardless of other potential risk factors, everyone should minimize their risk of cancer by making healthy lifestyle choices and

becoming aware of possible routes of exposure through their workplaces and their homes and environment. While we have no reason to suspect any particular environmental or occupational exposure, homeowners can take particular precautions. Property owners on private wells can arrange to have their well water tested to be sure their well water does not exceed total daily limits that municipal supplies must meet. They can also have their homes tested for radon gas. Private contractors are available to provide these services and the Algoma Health Unit can provide further information about these issues. All citizens can contact the appropriate government agencies regarding occupational and environmental exposures. The Ministry of Labour is responsible for monitoring occupational exposures; the Ministry of the Environment is responsible for monitoring environmental exposures.



Conclusions / Recommendations

Cancer rates for prostate, lung and colo-rectal cancers are elevated in the Algoma District compared to the province-wide rates. We present this information with the hope that individuals will make improved lifestyle choices (such as quitting smoking) and that community-based partnerships will emerge to improve access to health information and to support healthier lifestyles. For example, the smoke-free public places by-laws recently passed in several communities illustrate the power that community members have in modifying their exposures to known carcinogens. The public can advocate for reducing industrial emissions and improving workplace safety, too, as shown throughout the province. For example, a coalition of labour unions and public health advocates in Windsor has begun a community-wide campaign aimed to reduce that city's high cancer rates.

We call on all levels of government from municipal to provincial to federal to provide information and support for lowering cancer risk. In particular, we call on Cancer Care Ontario to continue to provide up-to-date information regarding cancer rates for all communities, on the Ontario Ministry of Labour to protect workers from occupational exposures, and on the Ontario Ministry of the Environment to protect all residents from environmental exposures. We also urge all residents of the Algoma District to learn more about cancer, to take part in cancer screenings and self-examinations, and to learn ways to reduce their risks.

The Algoma Health Unit is committed to supporting healthy communities by providing a continuum of quality health services throughout the Algoma district.



Blind River

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(888) 211-4739

Elliot Lake

Algo Centre Mall
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Elliot Lake, ON
P5A 2T2
tel: (705) 848-2314
(888) 211-6749

Sault Ste. Marie

Civic Centre, 6th Floor
99 Foster Drive
Sault Ste. Marie, ON
P6A 5X6
tel: (705) 759-5287
(866) 892-0172

Wawa

18 Ganley Street
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