

Thyroid cancer in Canada

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- The incidence of thyroid cancer is increasing more rapidly than that of any other cancer in Canada, while mortality has remained low and stable
- In the last 10 years the number of thyroid cancer cases has increased 144% from 1709 to 4172 cases per year
- Thyroid cancer is three times more common in females than males
- 40% of thyroid cancers are diagnosed in Canadians under 45 years of age
- Some of the apparent increase in incidence is likely due to improved and more widely available diagnostic techniques

Thyroid cancer is a cancer that forms in the thyroid gland (an organ at the base of the throat that makes hormones that help control heart rate, blood pressure, body temperature and weight).^{*} Although thyroid cancer is a relatively rare tumour, it is the most common endocrine malignancy worldwide¹ and the tenth most common cancer in Canada.²

More than 4000 Canadians were diagnosed with thyroid cancer in 2007, or nearly 12 per 100 000, accounting for approximately 2.5% of all malignant tumours.[†] Unlike most cancers, thyroid cancer is three times more common in females than males and is generally diagnosed at a younger age^{2,3} (Figure 1). Nearly 40% of all thyroid cancers are diagnosed before 45 years of age and three-quarters before age 60. Thyroid cancer ranks second in Canadians aged 15 to 44 years (Figure 2) and is the most common cancer diagnosis in those aged 15 to 29 years (Figure 3). The large majority of thyroid cancers are papillary carcinomas (86%), while others include follicular (6%), medullary (2%), anaplastic (1%) and other/unknown (5%).

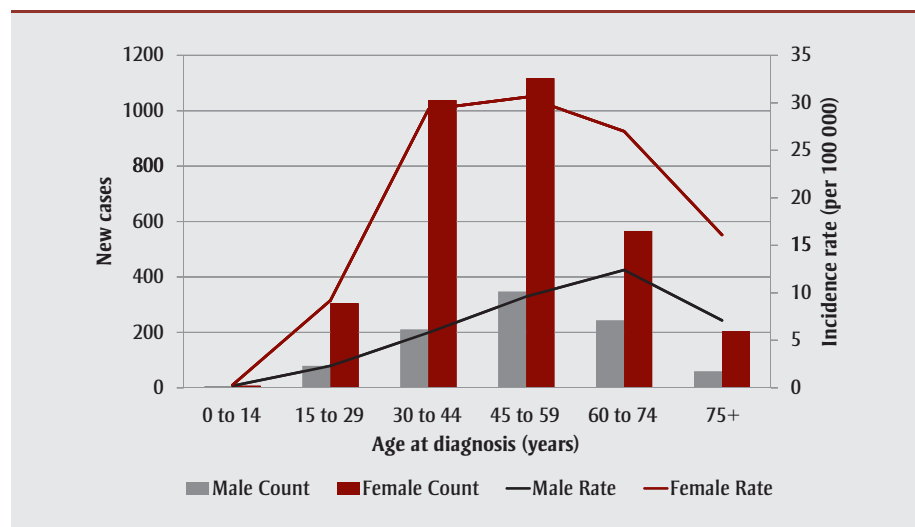
Trends in incidence and mortality

The incidence rate of thyroid cancer is increasing more rapidly than any other cancer in Canada.^{2,4,5} Between 1992 and 2007, the age-standardized incidence rate (ASIR) increased 5.7% per year in males,

from 2.0 to 5.2 per 100 000, and 7.3% per year in females, from 6.8 to 17.9 per 100 000 (Figure 4). The highest increase, 8.2% per year, was found in women aged 30 to 59 years. The increase in thyroid cancers has been particularly rapid in the last 10 years as the number of new cases diagnosed in Canada increased by 144%, from 1709 in 1998 to 4172 in 2007. Similar increases took place in Europe, North and South America, Oceania and parts of Asia.^{1,3,6-8} However, rates vary considerably between and within continents and are not consistently higher or lower in any region of the world except in Africa where rates are generally low.

The ASIR of thyroid cancer has increased in every province and territory in Canada over the last 16 years, but percent change

FIGURE 1
New thyroid cancer cases and incidence rates, by age and sex, Canada, 2007



Source: The Canadian Cancer Registry database at Statistics Canada;²³ Canadian population estimates provided by Statistics Canada.²⁴

* See The Canadian Cancer Society (www.cancer.ca) for more details on thyroid cancer biology and clinical treatment.

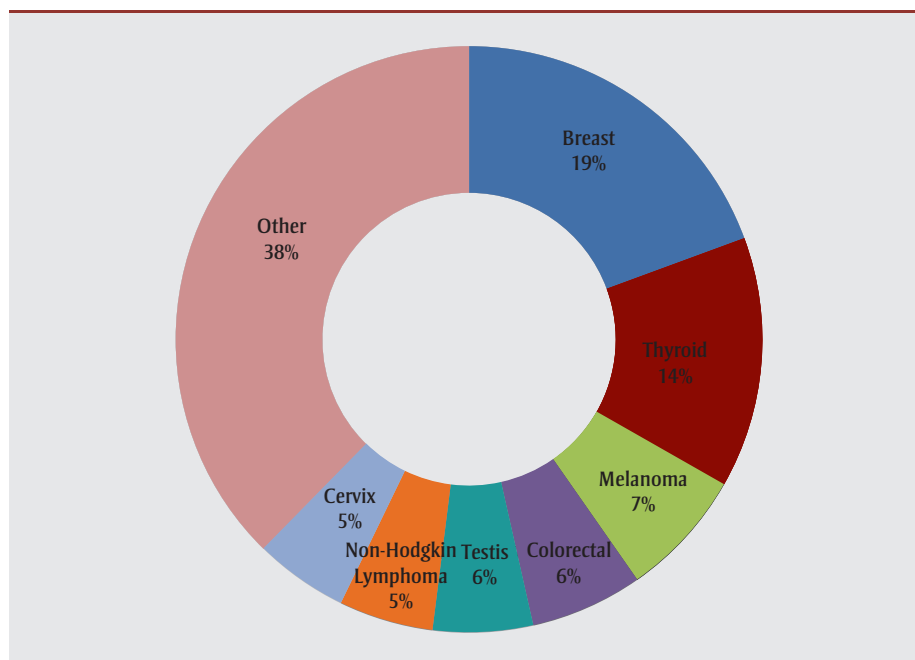
† Data definitions and statistical methods used in this analysis are outlined in the Canadian Cancer Statistics Annual Report.²

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FIGURE 2
Distribution of new cancer cases, aged 15–44 years, males and females, Canada, 2007 (N = 11 746)

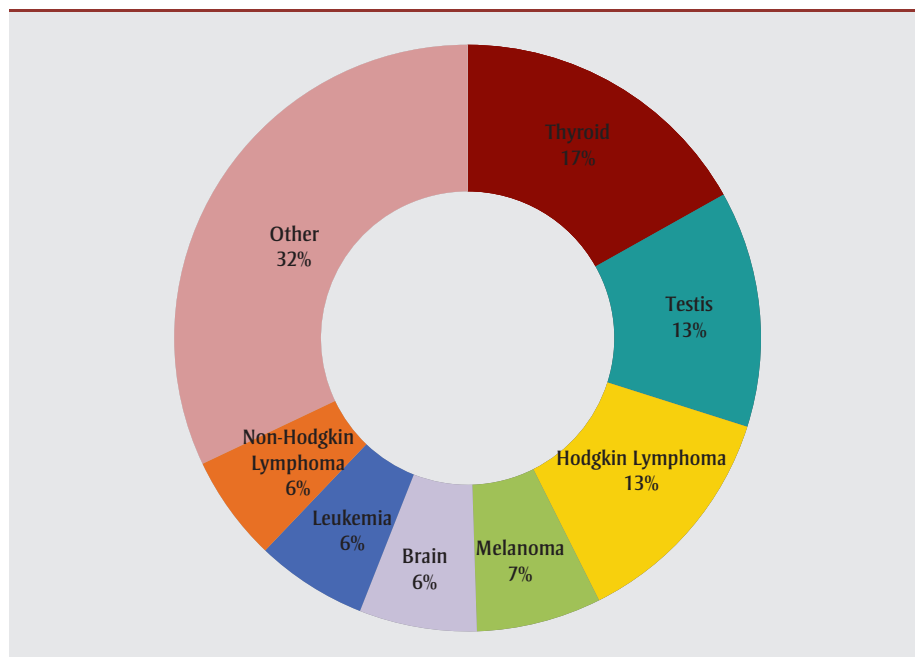


Source: The Canadian Cancer Registry database at Statistics Canada.²³

and rates vary widely across the country (Figure 5). In 2007, ASIR were highest in the most populous province, Ontario, at 15.2 per 100 000, and lowest in

Saskatchewan (5.2), British Columbia (5.8) and Manitoba (8.5). These rates were significantly different ($p < .05$) than the average Canadian ASIR of 11.6 per 100 000.

FIGURE 3
Distribution of new cancer cases, aged 15–29 years, males and females, Canada, 2007 (N = 2265)



Source: The Canadian Cancer Registry database at Statistics Canada.²³

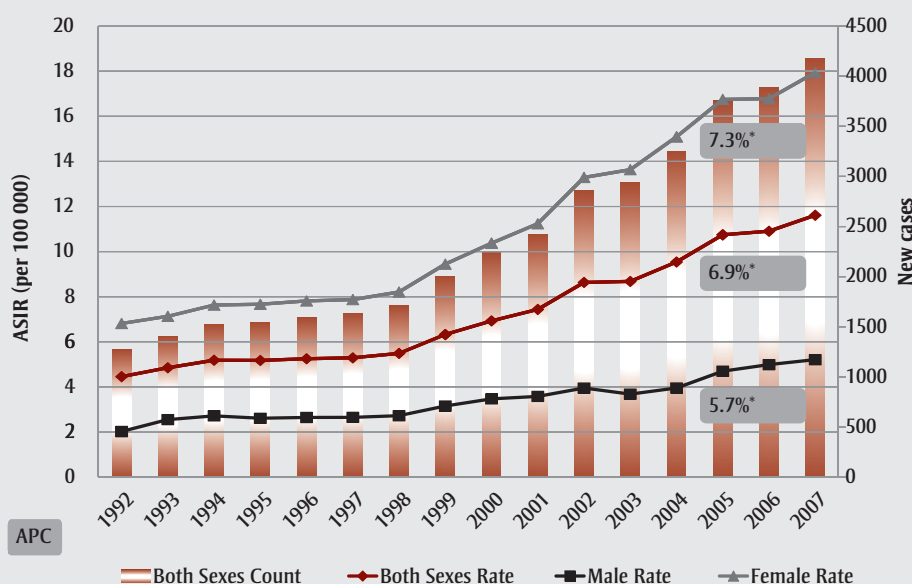
In contrast to incidence, mortality from thyroid cancer has remained exceptionally low and stable. Between 1992 and 2007 there was an average 142 deaths due to thyroid cancer each year in Canada and the age-standardized mortality rate (ASMR) decreased, on average, by less than 1% per year from 0.5 per 100 000 in 1992 to 0.4 per 100 000 in 2007 (Figure 6). The low and stable rate of thyroid cancer mortality in Canada is consistent with rates found in the US, Europe, Oceania and Asia.^{1,3} Accordingly, thyroid cancer has the highest five-year relative survival rate of all cancers in Canada, at 97% for the period 2001 to 2003.⁹

Risk factors

The most well-established risk factor for thyroid cancer is ionizing radiation from therapeutic radiation treatment or nuclear accidents/fallout.¹⁰ However, at a population level, this accounts for very few cases. The risk of developing thyroid cancer is also increased in those with benign thyroid conditions, such as goitre and thyroid nodules, and in those with a family history of thyroid cancer or some genetic conditions.¹⁰ Female reproductive factors, body mass index and iodine consumption have shown some association with thyroid cancer but results are inconsistent.^{11–13} The association between thyroid cancer risk and exposure to endocrine-disrupting chemicals is inconclusive, although research is limited.^{14–17}

Some of the increase in incidence of thyroid cancer is likely due to better detection as a result of improved and more widely available diagnostic techniques (primarily ultrasound and fine needle aspiration).^{4,6} A number of studies have shown the increase to be primarily restricted to small, asymptomatic tumours that may have had little clinical significance.^{4,6,7,18} which is supported by the fact that mortality from thyroid cancer has remained low and stable. However, other studies have found increased rates in all tumour sizes and across sex and racial/ethnic groups, suggesting a true increase in incidence.^{19–22} In addition, rates have not plateaued, which is what would be expected after new or improved diagnostic

FIGURE 4
New thyroid cancer cases, age-standardized incidence rates and annual percent change, Canada, 1992–2007



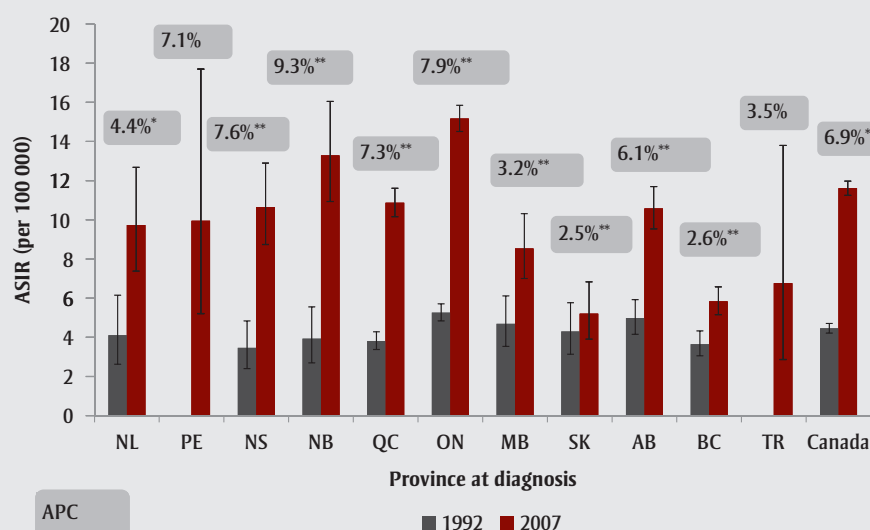
Source: The Canadian Cancer Registry database at Statistics Canada.²³

Abbreviations: APC, annual percent change; ASIR, age-standardized incidence rates.

Note: Rates are age-standardized to the 1991 Canadian population estimates provided by Statistics Canada.

* $p < .01$

FIGURE 5
Thyroid cancer age-standardized incidence rates,^a 95% confidence intervals^b and annual percent change, by province, 1992 and 2007, Canada



Source: The Canadian Cancer Registry database at Statistics Canada.²³

Abbreviations: AB, Alberta; APC, annual percent change; ASIR, age-standardized incidence rates; BC, British Columbia; MB, Manitoba; NB, New Brunswick; NL, Newfoundland and Labrador; NS, Nova Scotia; ON, Ontario; PE, Prince Edward Island; QC, Quebec; SK, Saskatchewan; TR, territories i.e. Yukon, North West Territory and Nunavut.

Note: Rates are age-standardized to the 1991 Canadian population estimates provided by Statistics Canada.

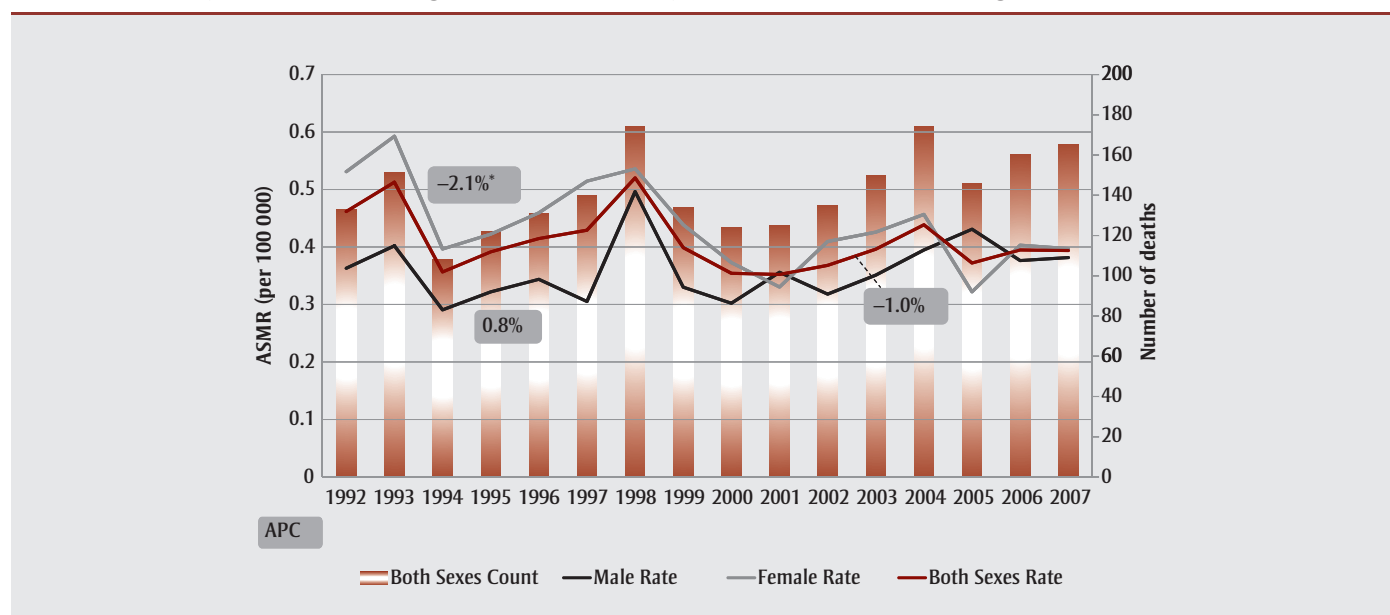
^a ASIR for PE and TR suppressed for 1992 due to small numbers.

^b 95% confidence intervals calculated using bootstrap variance estimates.

* $p < .05$

** $p < .01$

FIGURE 6
Thyroid cancer deaths, age-standardized mortality rates and annual percent change, 1992–2007, Canada



Source: Canadian Vital Statistics Death database at Statistics Canada.²⁵

Abbreviations: APC, annual percent change; ASMR, age-standardized mortality rates.

Note: Rates are age-standardized to the 1991 Canadian population estimates provided by Statistics Canada.

* $p < .05$

techniques have identified the prevalent cases in the population.

Summary

The incidence of thyroid cancer is increasing more rapidly than that of any other in Canada. The number of Canadians diagnosed with thyroid cancer has more than doubled over the past 10 years, particularly in young to middle-aged females. Part of the increase may be due to improved detection of small, indolent tumours, which is leading to the treatment of previously untreated or undiagnosed cases. Other potential risk factors, or a combination of factors, may also be associated with the rising rates. Further in-depth investigations are needed to elucidate the causes of this rapidly increasing cancer.

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