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## Executive Summary

# Attitudes, Knowledge, and Expectations about Radiation Risk from Exposure to Radiation Emitting Devices

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Canada 

# Attitudes, Knowledge, and Expectations about Radiation Risk from Exposure to Radiation Emitting Devices

## Executive Summary

**Prepared for:** Health Canada

**Supplier Name:** The Strategic Counsel

This public opinion research report presents the results of an online survey conducted by The Strategic Counsel on behalf of Health Canada. The research study was conducted with 5,000 Canadians, aged 16 and older, in February 2022.

Cette publication est aussi disponible en français sous le titre: Attitudes, connaissances et attentes relatives aux risques radiologiques associées à l'exposition aux dispositifs émettant des radiations.

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## Executive Summary

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### A. Background and Objectives

Technological advances have led to an increase in the number and type of radiation emitting devices with applications across all sectors. A global marketplace, with e-commerce and direct-to-consumer sales, has resulted in a growing number of radiation emitting devices becoming more readily available to consumers and industry in Canada.

The emergence of these new radiation emitting technologies (e.g., 5G networks) has led to increased requests for information on human exposures, potential health risks, and regulatory oversight and guidance. It has also increased the dissemination of misinformation and disinformation regarding the health risks posed by these technologies.

Radiation emitting devices include any devices that emit radiation in the form of X-rays, ultraviolet (UV) light, visible light, infrared (IR), and radiofrequency (RF) waves or acoustical waves (audible sound, infrasound, ultrasound). Radiation emitting devices have a wide range of applications, including:

- Consumer products (e.g. microwaves, laser pointers, cell phones, lighting products, noisy toys, power tools)
- Medical devices (e.g. CT scanners, X-ray imaging, ultrasound, MRI)
- Pest management products (e.g. UV sterilizers, lasers, sound cannons, ultrasound)
- Industrial, commercial, security, and research devices (e.g. cell phone towers, wind turbines, full body security scanners, analytical X-ray devices)

The health effects from exposure to radiation depend on the type of radiation, intensity of radiation, duration of exposure, and where on the body a person is exposed.

For the purpose of this study, radiation emitting devices do not include devices that emit nuclear radiation or devices that contain radioactive materials.

The primary objective of this research study is to establish baseline data on Canadians' attitudes, beliefs, knowledge, and expectations about the radiation risks from exposure to radiation emitting devices. This information helps inform the development and implementation of effective knowledge mobilization plans and activities that can be adapted to specific target audiences.

Specifically, the survey was designed to:

- Understand how and when Canadians use radiation emitting devices;
- Explore Canadians' perceived risks related to exposure to radiation emitting devices, including which devices concern them the most;
- Evaluate Canadians' knowledge on the topic of radiation emitting devices and understand where gaps exist;

- Identify how and where Canadians would like to receive information on radiation emitting devices, including which sources they trust most; and
- Find out what level of knowledge Canadians have regarding the federal legislation that applies to radiation emitting devices, including the *Radiation Emitting Devices Act*.

Insights from this study, along with other related information gathered by Health Canada, will inform the Department in areas related to:

- Protecting the health and safety of Canadians;
- Providing accurate information to intermediaries and stakeholders which can be incorporated into policy, practice and programs at the community level; and
- Offering information to Canadians which will help enhance their understanding of risks and inform their decisions on how they use radiation emitting devices and their level of exposure.

## B. Methodology

This research was undertaken between February 3<sup>rd</sup> and 14<sup>th</sup>, 2022 among 5,000 Canadians, aged 16 and older. Respondents were profiled, selected, and screened through the use of a nationally representative online panel. Due to the opt-in nature of online polls, a margin of error cannot be calculated. As such, conclusions from these results are not generalizable to the population of Canadians, aged 16 and older. However, the robust sample sizes achieved for each age cohort, across genders and by region do permit sub-level analysis which yields valid and useful insights on key demographic and regional variations.

The survey employed a non-probability sampling procedure utilizing quota sampling. In order to obtain a final sample which was nationally representative, interlocking quotas for region, gender, and age were established as part of the sample design, based on the latest Statistics Canada Census data. This means that a target size for each combination of variables was defined at the outset of the project (e.g., young men, young women, older men, and older women in each province or region). The target quotas for each of these cells were closely monitored throughout the survey period. Due to simultaneous completions and the relatively short duration in field, some cells were not filled while others had too many completions. As such, a series of light weights were applied, again interlocking the three variables noted above (region, gender and age), to make final corrections to the data and ensure the final sample reflected the original distribution according to Census data. The weighting scheme is provided in Section IX – Detailed Methodology.

More information about the respondents to this survey, in terms of standard demographics such as gender, age, educational attainment, household income, employment status and type of work, ethnicity, language, region or province, and community size can be found in Section IX - Respondent Profile.

The tables shown throughout this report include both the totals for each question, as well as break-outs by gender and age:

- Gender: Male or female (for reporting purposes, the terms “male” and “female” refer to participants’ gender identity, unless otherwise noted). As the ‘other’ category contained very few respondents (<1%, n=14), this data is not shown in the tables; and
- Age: 16-34, 35-54, and 55 or over. The data tables include a further break-out for those 16-17, 18-24, 25-34, 35-44, 45-54, 55-64 and 65 or older. As relevant, the more precise age breaks are referred to in the analysis where statistically significant differences were evident and provide additional insight into age-related variations.

Other statistically significant regional and demographic variations are also described in the narrative, as relevant. The pertinent data can be found in the data tables which accompany this report.

Conducting the survey online was deemed to be the most appropriate approach for a range of reasons, including:

- The large sample size (n=5,000);
- A desire to include a component of Canadians aged 16 and 17 within the sample;
- The somewhat technical nature of the topic which would not lend itself particularly well to a telephone survey; and
- The need to include detailed explanations and descriptions within the survey to enhance clarity and respondent understanding, as well as to avoid any misinterpretation, which could then adversely affect the validity of the data.

Online surveys also provide respondents with more time to consider their responses, which improves the integrity of the data. The average length of this survey was 15 minutes, although some respondents completed the survey in less/more time, depending on their use of radiation emitting devices and their perspective on the issues explored.

All sub-group differences noted in the report are considered significant based on T-Test for Means and Z-Test for percentages.

More information about the survey methodology can be found in Section VIII – Detailed Methodology.

## C. Key Findings

Respondents to the survey were shown a list of 12 radiation emitting devices and asked whether or not they had used them in the last 12 months. The proportion of those who reported having used each device varied quite widely, depending on the device. For example, very few (2%) reported having used a tanning bed in the past year, while many (86%) have used wireless communications products such as Wi-Fi, Bluetooth, or cell phones within this timeframe (Table 1 in the Detailed Report).

Although usage of these devices was largely dependent on age, and to some extent socio-economic status (educational attainment, household income, and employment status), a relatively high proportion of the population reported having frequently used a variety of products. Daily use, among those who reported using the device within the past year (Table 2), was highest for:

- Wireless communications products (89%);
- 5G enabled products (87%);
- LED light bulbs (81%);
- Wearable technologies (76%); and
- Microwave ovens (58%).

Frequent usage (meaning use on either a daily or weekly basis) of other devices was also high. Of those who reported having used headphones or ear buds in the past 12 months (61% of respondents), many reported using them frequently (40% daily; 42% weekly). This is also the case for UV disinfection products (33% daily; 33% weekly), and noisy products (11% daily; 47% weekly), although very few respondents reported using these types of devices in the last year (9% and 11%, respectively).

A small proportion reported using tanning beds (2%), head mounted displays (6%), or handheld or other portable laser devices (11%) within the last year. Of these, one-third or more reported using them on a frequent basis – tanning beds (4% daily; 42% weekly), head mounted displays (8% daily; 29% weekly) and handheld or other portable lasers (10% daily; 25% weekly).

For those who have used a cell phone or smart phone within the past 12 months, talking in ‘hands-free’ mode or using headphones was not reported as a common practice (Table 4). Most reported holding the cell phone to text or to use apps (54% all of the time; 29% most of the time) and directly to their ear when talking (20% all of the time; 31% most of the time). Fewer respondents reported talking on ‘hands-free’ mode on a frequent basis (9% all of the time; 25% most of the time) or using headphones to talk, listen to music or podcasts, or to watch videos/play games (15% all of the time; 19% most of the time).

Among the few respondents (11%) who had used noisy products in the last year, defined as products which are so loud that you need to shout to communicate with someone next to you, use of hearing protection devices such as ear muffs and ear plugs was not particularly common (Table 5). About one-third of those who have used noisy products in the past 12 months reported using hearing protection either all of the time (12%) or most of the time (23%).

Overall, most survey respondents were not particularly concerned about daily or regular use of products discussed in the survey that emit various forms of radiation (Table 6) – two-thirds were either ‘not too concerned’ (42%) or ‘not concerned at all’ (24%).

When asked, however, to rate the level of harm associated with each of the 12 different types of products examined in this survey (Table 9), a majority of respondents rated two as ‘extremely/very harmful’ to health – tanning beds and noisy products (59% for each device). Most also indicated they would be ‘very/somewhat concerned’ about their own personal health and safety (Table 11) if using a tanning bed (74%) or noisy products (70%). The level of concern related to the use of all other product was considerably lower by comparison (ranging from 15% for LED light bulbs to 36% for the whole-body scanners used at airport security).

Many were uncertain regarding what forms of radiation are associated with each of the devices tested – those who indicated they ‘don’t know’ ranged from about one-quarter (23%) for microwave ovens to two-thirds (65%) for virtual reality goggles (Table 7). Notably, among those devices that are used more frequently, large proportions were uncertain as to what types of radiation are emitted by each, including: LED light bulbs (46% responded ‘don’t know’), Wi-Fi or Bluetooth devices (47%), computer monitors (46%), and cell phones (41%). Many were also unsure of the type of radiation emitted from smart watches (58%), although these were used with less regularity over the last 12 months, compared to the other products or devices. In addition, about half of the respondents acknowledged being unfamiliar with the type of radiation emitted from standard diagnostic or medical procedures, including CT scanners (52%) and MRIs (47%).

Respondents were generally aware of key facts and myths associated with the various devices, based on their responses to a series of statements which they were asked to evaluate as either true or false (Table 8):

- Medical doctors can reverse hearing damage caused by exposure to loud noises (89% correctly believed this to be false).
- Getting a base tan using a tanning bed does not protect against skin cancer from future exposure (82% correctly claimed this was true).
- Laser pointers are safe if the spot of light they make on a wall is not very bright (75% responded correctly that this is false).
- There is no convincing scientific evidence to date proving a link between cell phone use and cancer (62% correctly believed this to be true).
- The amount of radiation from an X-ray of the wrist is the same as for a chest X-ray (53% incorrectly reported this is true).
- You should receive an X-ray at least once every two years when visiting the dentist whether or not there is a dental concern (50% correctly believed this to be false).
- With respect to UV disinfecting products, just one in five (20%) incorrectly believe they are effective at killing 100% of germs.

Respondents reported learning about product safety from a wide range of sources (Table 14), including Google-based online searches (39%), various news sources (29%), health care providers (28%), the Health Canada website (26%) and manufacturers’ websites (25%). Internet messaging platforms and social media were less commonly referenced for this purpose (anywhere from 1% to 7% of respondents cited these as sources).

Official sources, responsible for public health and safety or with scientific expertise, were among the most trusted (Table 15). Asked to identify their three most trusted sources, respondents selected the Health Canada website (42%), scientists (30%), and health care providers (29%). The Government of Canada website followed these at 28%. Findings also suggest that Canadian sources were seen as far more trustworthy relative to U.S. or international sources (e.g., the U.S. Food and Drug Administration (FDA) and the World Health Organization (WHO)).

There were modest to low levels of awareness of the laws in place to protect the health and safety of Canadians (Table 16). Awareness of the Food and Drugs Act (49%) and the Canada Consumer Product Safety Act (39%) was higher relative to familiarity with other legislation such as the Pest Control Products Act (21%), the Radiocommunication Act (20%), and the Radiation Emitting Devices Act (15%).

Overwhelmingly, most respondents (90%) expected the federal government to continue to protect Canadians from radiation risk from products available in Canada (Table 18). Most were confident that the Government of Canada is effectively carrying out this function. A majority were of the view that the laws regulating radiation emitting devices in Canada are adequate (73%) and that the Government of Canada provides sufficient information on the safety of radiation emitting devices (60%).

Many believed the radiation emitting devices available to Canadians are safe (70%), although there was more doubt about products purchased online versus in-store. While almost half (47%) said they 'fully trust' that products purchased in-store or in-person meet Canadian safety laws, this number dropped to one-quarter (23%) for those purchasing products online (Table 17).

About one in five of those surveyed (21%, or n=1072 respondents) reported experiencing a safety issue with any of the devices discussed in the survey (Table 19). About equal numbers said they had:

- Encountered a defective product (6%);
- An issue with product labelling or instruction (4%); or
- Experienced an injury (4%).

Four device types appear to be linked to a higher number of the issues reported by respondents, including noisy, loud products (28%), tanning beds (28%), head mounted displays such as virtual reality goggles/smart glasses (22%) and UV disinfection products (19%).

Some respondents (16%) were aware of Health Canada's online reporting system (Table 20), which allows Canadians to report problems related to a product such as injury, death, product defects, or labelling concerns. Very few respondents (2% overall) recall having used it (Table 21).

## D. Conclusions

The use of radiation emitting devices by respondents within the last 12 months varied markedly depending on the type of device and age group. Wireless communications products, headphones or ear buds, and microwave ovens were used with a high degree of regularity.

In general, respondents expressed low to modest levels of concern about the regular use of these types of products and devices. While most were generally knowledgeable of select facts and myths associated with the use of certain radiation emitting devices, many acknowledged there was a lot they did not know about these products. In particular, many were unaware of the types of radiation emitted by these products.



Most believed that information related to product safety tends to be readily available and adequate. The results, however, also suggest that there are opportunities to raise levels of public awareness in regards to:

- The risks associated with radiation emitting products and devices;
- Safety tips and best practices for their use,
- The current regulatory framework to protect the health and safety of Canadians; and
- The Health Canada online reporting system for those who do experience an issue with these types of products.

#### Note to Reader

The results reported herein reflect the behaviours, attitudes, and perceptions of a sample of Canadians with respect to radiation emitting devices. Unless otherwise noted, results shown in this report are expressed as percentages and may not add up to 100% due to rounding and/or multiple responses to a given question.

#### MORE INFORMATION

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To obtain more information on this study, please e-mail [HC.cpab.por-rop.dgcap.SC@canada.ca](mailto:HC.cpab.por-rop.dgcap.SC@canada.ca)

#### Statement of Political Neutrality

I hereby certify as a Senior Officer of The Strategic Counsel that the deliverables fully comply with the Government of Canada political neutrality requirements outlined in the *Communications Policy* of the Government of Canada and Procedures for Planning and Contracting Public Opinion Research. Specifically, the deliverables do not include information on electoral voting intentions, political party preferences, standings with the electorate or ratings of the performance of a political party or its leaders.

Signed:

