

Appendix A – Promotion examples



INFORMATION - COMMUNIQUÉ

For Immediate Release
Friday, October 9, 2020

Winnipeggers invited to provide feedback on small cell implementation

Winnipeg, MB – As wireless carriers begin to roll out 5G networks across the country, the City of Winnipeg is inviting residents to provide feedback, beginning with their awareness and views on small cell technology.

The [Winnipeg Antenna System Policy](#) (WASP) currently includes guidelines for large antennas and towers that support existing cellular networks. Small cells are smaller versions of those towers that can complement larger radio installations to improve coverage, add capacity, and support new services and user experiences, including 5G networks.

Beginning this year, the City expects cellular providers will be conducting trials of 5G infrastructure in Winnipeg. The City will be coordinating with carriers during their trials to see how our existing policies, processes, and procedures regarding antenna systems apply to 5G, and determine what, if any, updates and amendments need to be made to ensure that installations on applicable structures are carried out with minimal impact on the surrounding community.

The City is not responsible for the regulation or monitoring of radio communications. [Canada's Radiofrequency Exposure Guidelines](#) are developed at the federal level by Health Canada (Safety Code 6) and regulated by Innovation, Science and Economic Development (ISED). Any company operating 5G or small cell technologies in Winnipeg would be required to adhere to these guidelines.

For more and information on the City's role in small cell implementation and to get involved, visit: winnipeg.ca/smallcelltechnology.

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Media inquiries should be directed to the City of Winnipeg Media Inquiry Line at 204-986-6000 or via email at city-mediainquiry@winnipeg.ca.

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City of Winnipeg – Municipal Government

...

October 28 at 7:15 PM · 🌐

Small cells will carry new 5G networks across Winnipeg. We're looking for your feedback on these new antenna systems:

<http://ow.ly/vkqU50BODIB> #wpgengage

Les petites cellules alimenteront les nouveaux réseaux 5G dans tout Winnipeg. Nous voulons savoir ce que vous pensez de ces nouveaux systèmes d'antennes : <http://ow.ly/L1cC50BODIA> #wpgengage

See Translation



City of Winnipeg ✓ @cityofwinnipeg · Nov 6

...

C'est le dernier jour pour s'exprimer sur la nouvelle technologie des petites cellules qui permettra la mise en place des réseaux 5G à Winnipeg :

ow.ly/5eDe50BODKz #wpgengage



Appendix B – Research omnibus report



AWARENESS AND SUPPORT FOR 5G TECHNOLOGIES

SEPTEMBER 2020

CITY OF WINNIPEG



PROBE RESEARCH INC.

FOR MORE
INFORMATION:

Mary Agnes Welch
Principal

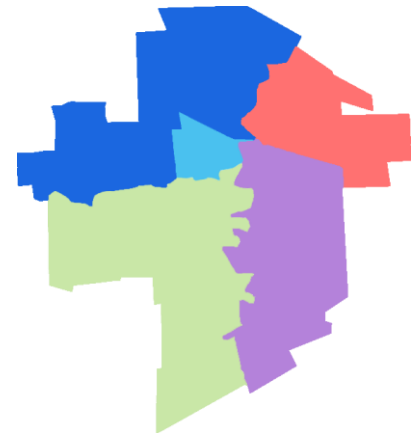
PROBE RESEARCH INC.

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www.probe-research.com



KEY FINDINGS

- For such a new technology, there are reasonably broad levels of familiarity with 5G among Winnipeggers. One-half have at least some understanding of 5G. Men and younger adults are most likely to feel well-versed in the technology.
- Support for small cell and 5G technologies is broad and strong among Winnipeggers. Three-quarters support the roll-out of this next-gen wireless service, and four-in-ten *strongly support* it. Here again, men and younger adults are more likely to be intensely supportive of 5G, along with those with higher levels of education.
- Interestingly, residents of the Core area (in light blue, at right) are just as likely as other Winnipeggers to favour 5G. In fact, Core area residents are slightly more likely than residents of the southeast and northwest quadrants to *strongly support* the introduction of 5G and small cell antennae.
- Among those who oppose or only somewhat support 5G, a lack of knowledge is the key reason for their position. More than one-half say they simply don't know enough about 5G to strongly support the introduction of this technology. Another one-third say current wireless service is fine as is. Only 16 per cent of those who do not strongly favour 5G cite safety as a reason.



ABOUT THE PROBE RESEARCH OMNIBUS

For more than two decades, Probe Research Inc. has undertaken quarterly omnibus surveys of random and representative samples of Manitoba adults. These scientific telephone surveys have provided strategic and proprietary insights to hundreds of public, private and not-for-profit clients on a range of social, cultural and public policy topics. The Probe Research Omnibus Survey is the province's largest and most trusted general population survey.

SURVEY INSTRUMENT

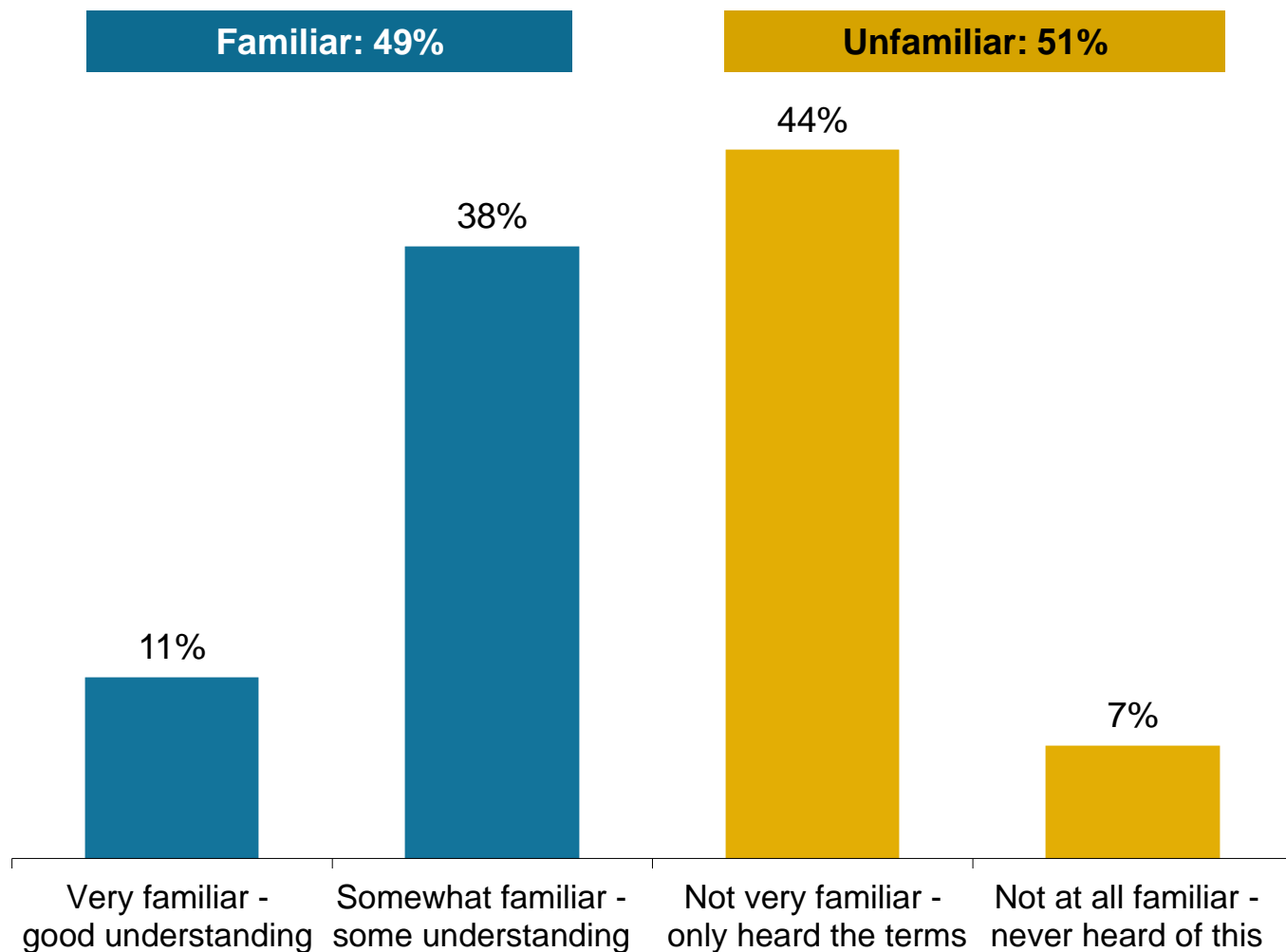
The survey instrument was designed by Probe Research in close consultation with the City of Winnipeg.

METHODOLOGY

- Between September 8th and 17th, 2020, Probe Research surveyed a random and representative sampling of 600 adults residing in Winnipeg.
- With a sample of 600, one can say with 95 percent certainty that the results are within ± 4.0 percentage points of what they would have been if the entire adult population of Winnipeg had been surveyed. The margin of error is higher within each of the survey's population sub-groups.
- Modified random digit dialing, including both landline and wireless numbers, ensured all Winnipeg adults had an equal opportunity to participate in this Probe Research survey. A CATI-to-web approach was employed whereby a live-voice operator randomly recruited respondents by telephone, inviting them to complete the survey via a secure online questionnaire. In addition, 214 randomly recruited Probe Research panel members were included in this general population adult sampling.
- Minor statistical weighting has been applied to this sample based on known age, gender and previous provincial vote intention attributes of the province's population. All data analysis was performed using SPSS statistical analysis software.

MIXED FAMILIARITY WITH 5G TECHNOLOGIES AMONG WINNIPEGGERS

COW1. "How familiar are you with small cell and 5G technologies?"



Those most likely be **familiar** with 5G include:

- Men (60% vs. 39% among women)
- Younger adults (65% among those 18-34 vs. 36% among those 55+)

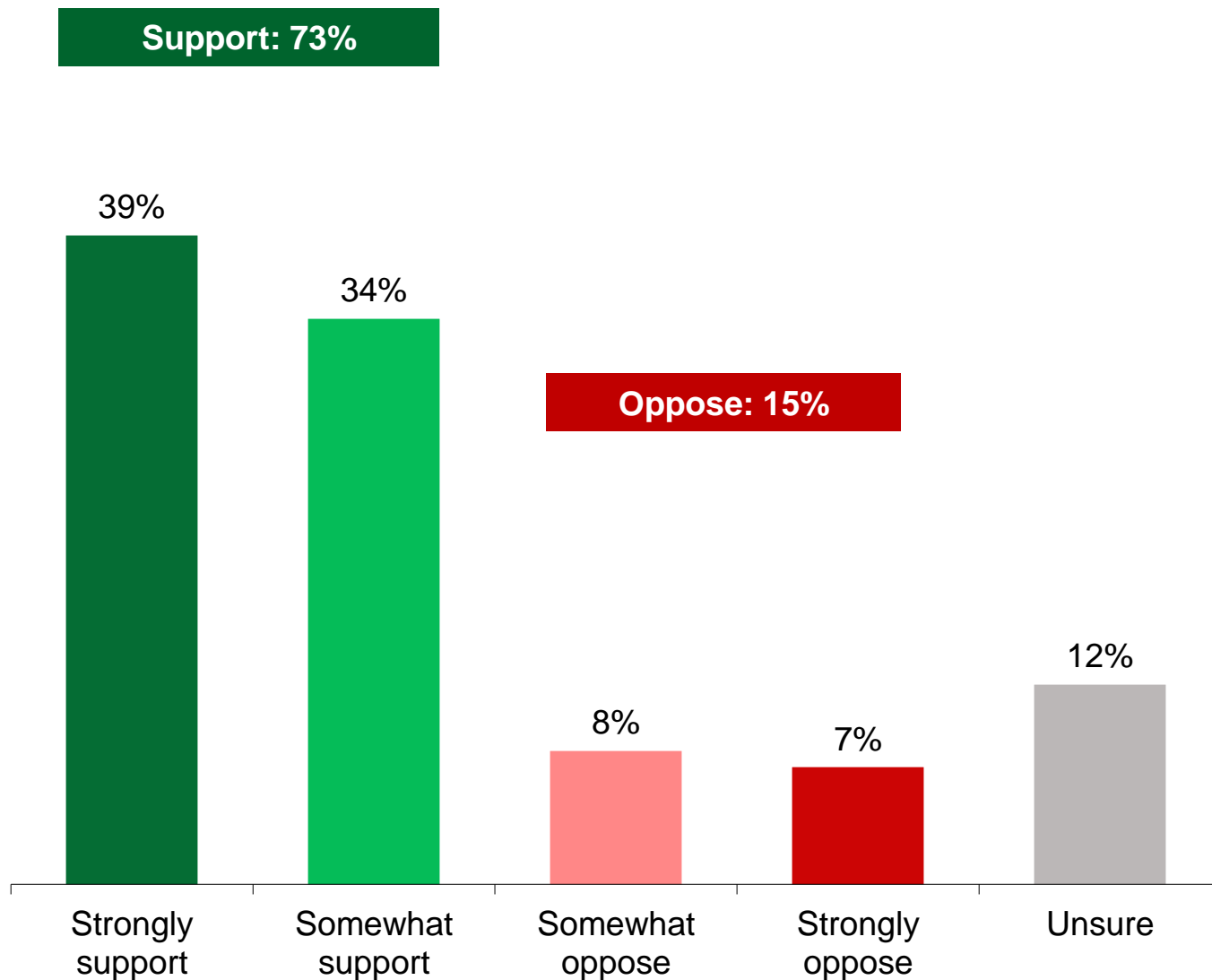
(There is no statistically significant difference in familiarity with 5G among residents of different regions of the city.)

Base: All respondents (N=600)

SOLID SUPPORT FOR SMALL CELL AND 5G TECHNOLOGIES IN WINNIPEG

COW2. "5G is the next generation of wireless service that could make internet access on cell phones much faster. As part of the potential rollout of 5G, Winnipeg needs many small cell antennas to supplement the larger cell towers that already exist around the city. These small cell antennas could be in neighbourhoods, on buildings or installed on utility poles. Knowing this, do you support or oppose introducing small cell and 5G technologies in Winnipeg?"

Base: All respondents (N=600)

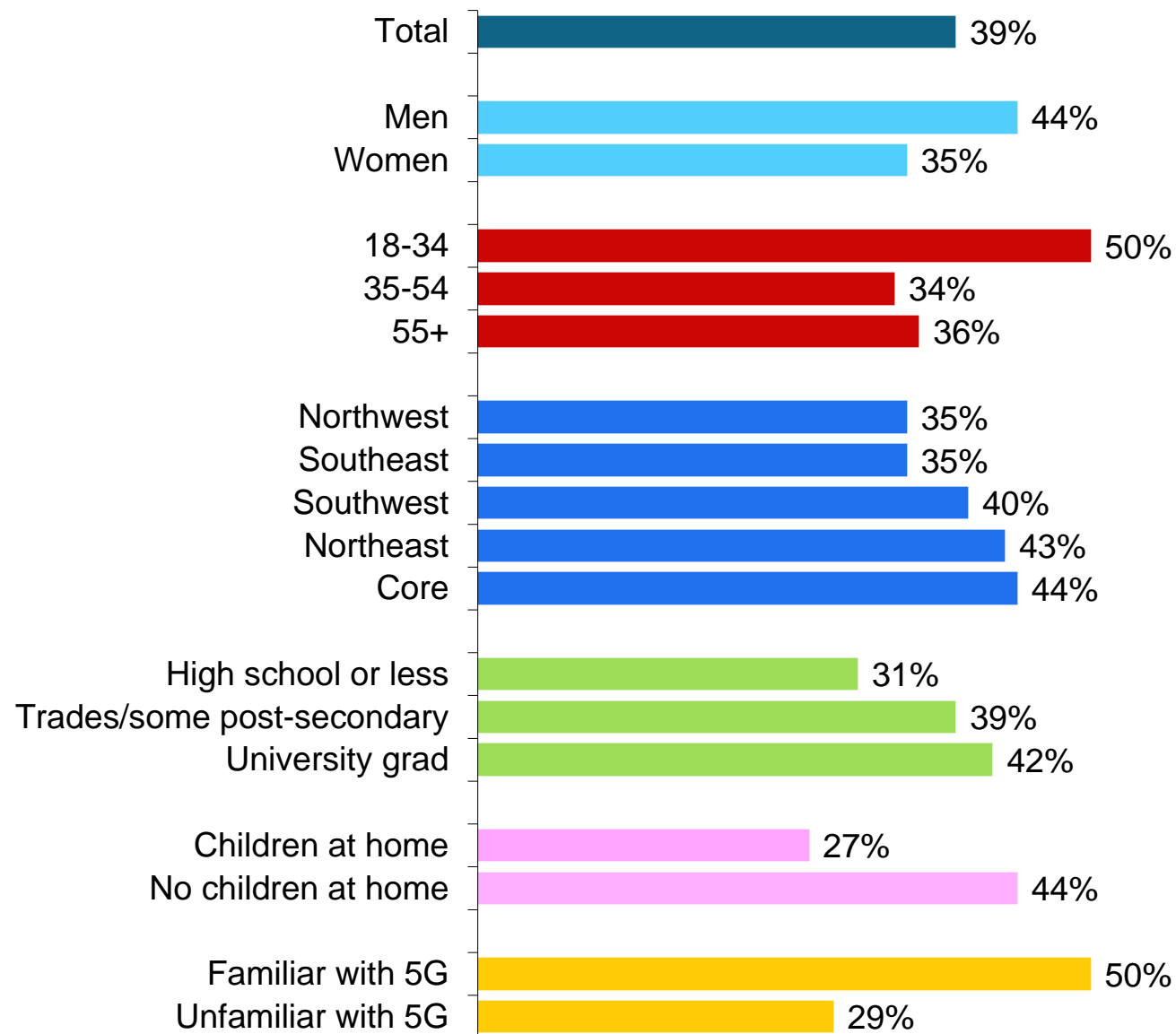


YOUNG ADULTS, MEN AND CORE AREA RESIDENTS STRONGLY SUPPORT 5G

COW2. "5G is the next generation of wireless service that could make internet access on cell phones much faster. As part of the potential rollout of 5G, Winnipeg needs many small cell antennas to supplement the larger cell towers that already exist around the city. These small cell antennas could be in neighbourhoods, on buildings or installed on utility poles. Knowing this, do you support or oppose introducing small cell and 5G technologies in Winnipeg?"

Base: All respondents (N=600)

% who **strongly** support 5G

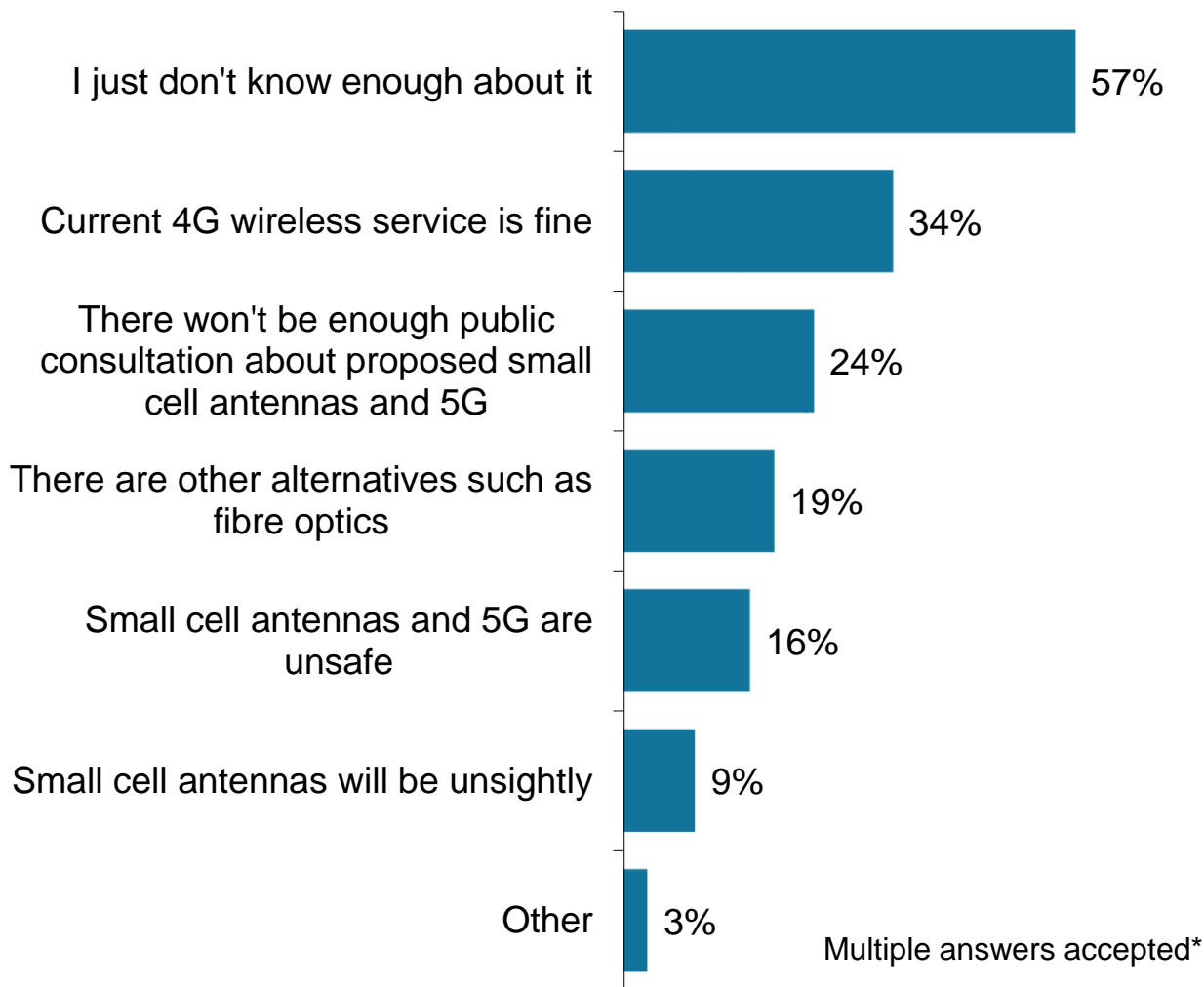


MANY NON-SUPPORTERS ADMIT THEY DON'T KNOW ENOUGH

COW3. “We’d like to know a little more about why you [are opposed/are unsure about/only somewhat support] small cell/5G technologies in Winnipeg. Please select up to three option below or write in your reason in the space provided.” (Randomized)

Base: All respondents who are not **strongly** supportive of 5G (n=364)

* Multiple answers accepted.
Totals will exceed 100%.



Those most likely to say they **don't know enough** about 5G include:

- Women (67% vs. 45% among men)
- Southwest area residents (69% vs. 54% in the Core)

Appendix C – Online survey results

Survey

SURVEY RESPONSE REPORT

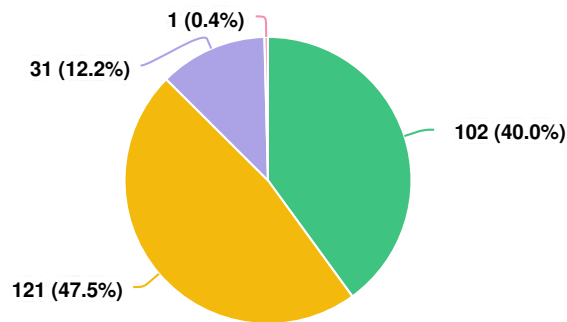
17 October 2019 - 19 November 2020

PROJECT NAME:

Small Cell Technology Review

SURVEY QUESTIONS

Q1 How familiar are you with small cell and 5G technologies?



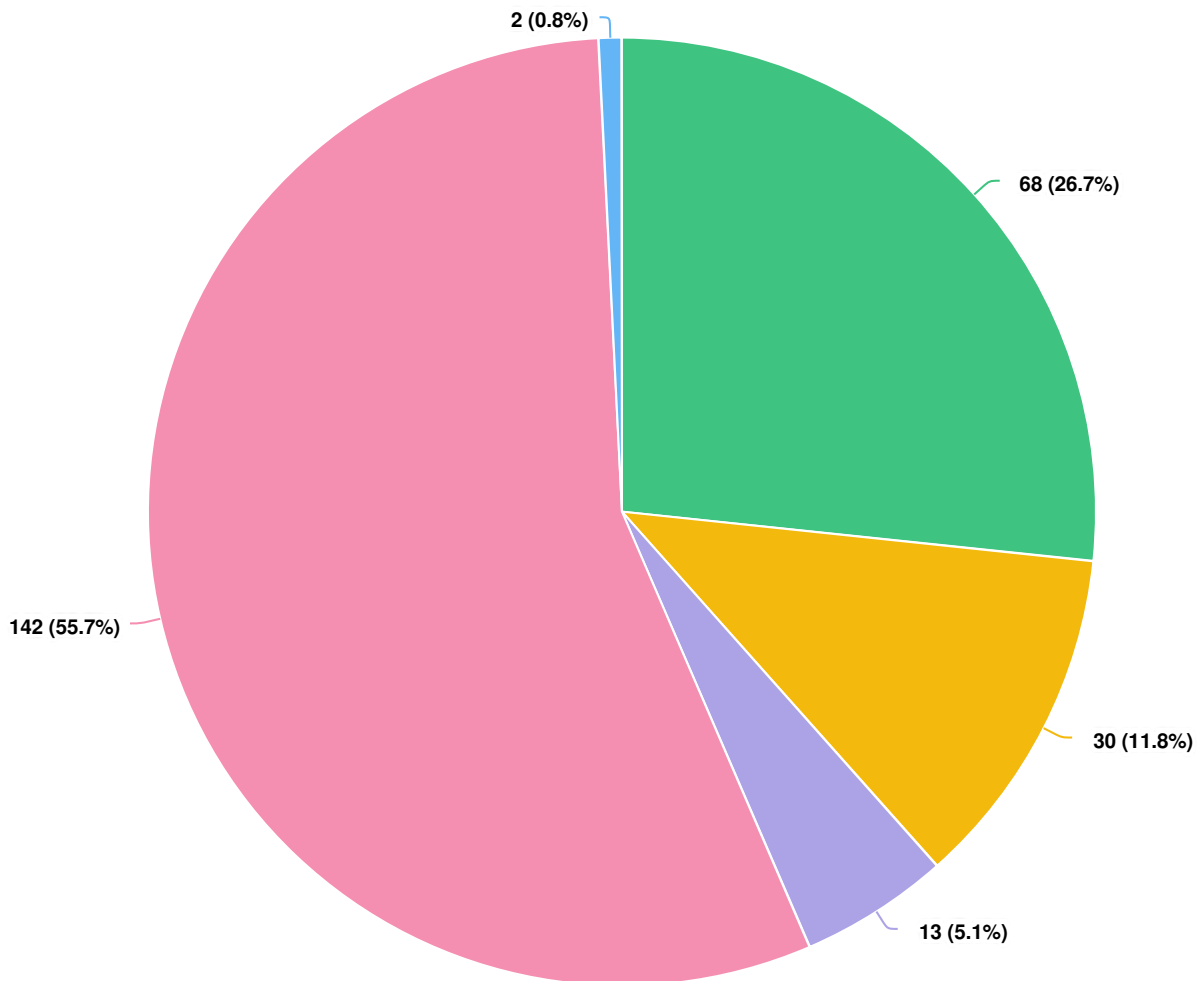
Question options

- Very familiar – I have a good understanding of these technologies
- Somewhat familiar – I have some understanding of these technologies
- Not very familiar – I've only heard the terms
- Not at all familiar – I've never heard of this

Mandatory Question (255 response(s))

Question type: Dropdown Question

Q2 | Knowing this, do you support or oppose introducing small cell and 5G technologies in Winnipeg?

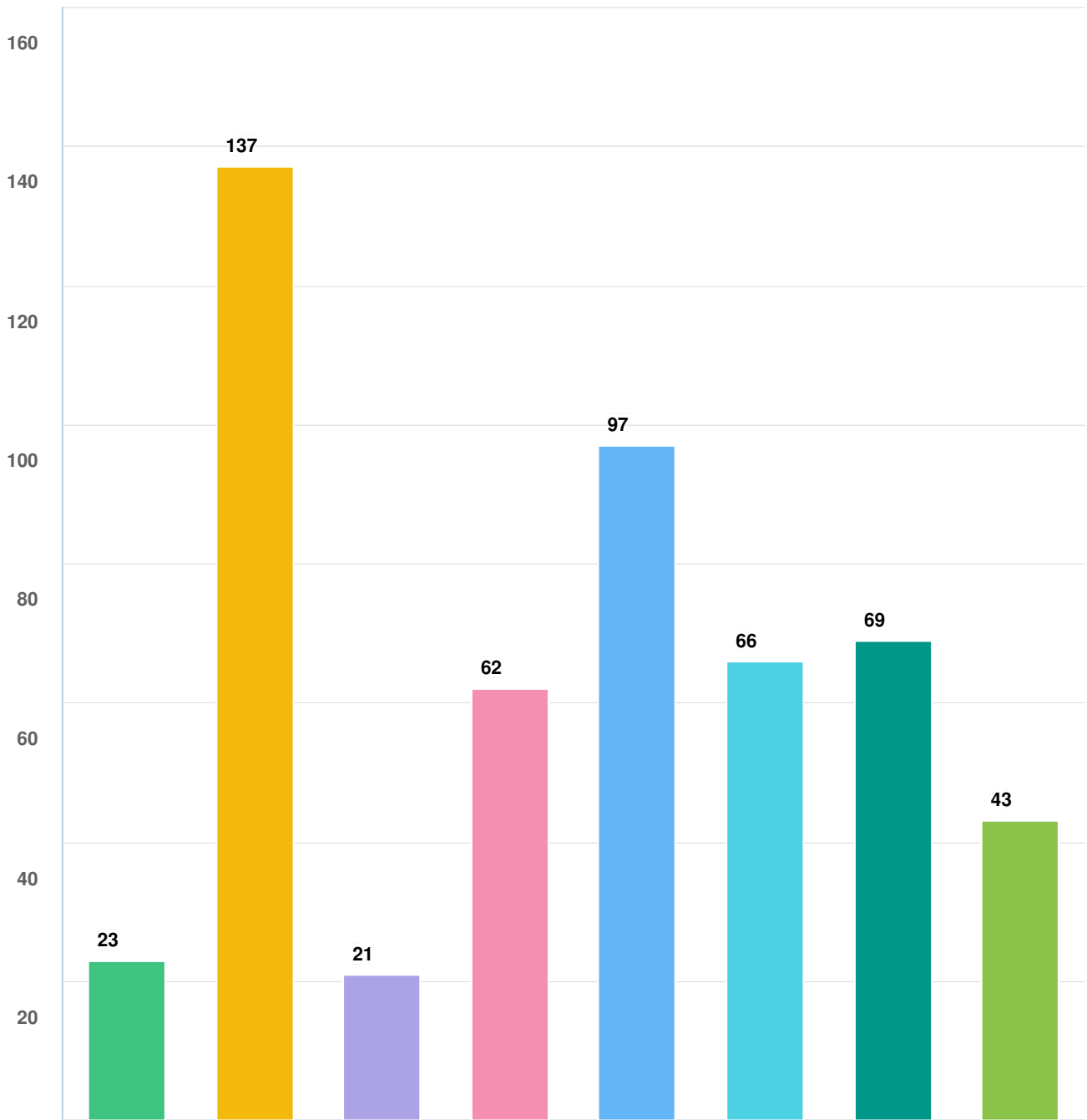


Question options

- Strongly support
- Somewhat support
- Somewhat oppose
- Strongly oppose
- Unsure

Mandatory Question (255 response(s))
Question type: Dropdown Question

Q3 We'd like to know a little more about why answered that way. Please select up to three option below or write in your reason in the space provided.



Question options

- I just don't know enough about it
 ● Small cell antennas and 5G are unsafe
● Small cell antennas will be unsightly
- Current 4G wireless service is fine
 ● There are other alternatives such as fibre optics
- There won't be enough public consultation about proposed small cell antennas and 5G
 ● Not applicable because I fully support small cell and 5G technologies in Winnipeg
● Other (please specify)

Mandatory Question (255 response(s))
 Question type: Checkbox Question

Q4 | Is there anything else you would like to add?

Screen Name Redacted

10/09/2020 02:41 PM

If we could explain the main differences between 4G which is already used and the new 5G in simple infographic that would be great.

Screen Name Redacted

10/09/2020 07:44 PM

Would like to see information on how city is ensuring implementation is being planned to maximize value and economic benefit from first installations. Allow business and interested citizens to provide input and insight on where it can best benefit us all. Make sure we move quickly so we are seen as an open city for innovation and investment. Don't put barriers in the way of telcos - move together quickly in a partnership. Get it done!!!

Screen Name Redacted

10/10/2020 08:29 AM

The City should be extremely vocal and visible about the opportunities to consult the public on this initiative. Also, installation of small cell and 5G towers should NOT be anywhere near schools.

Screen Name Redacted

10/10/2020 10:19 PM

The short and longterm health effects of 5G signals have not been studied enough. Also the it is a poor technology, the range is very short requiring an excessive amount of antennas, a superior technology will replace it in the future. 3G was replaced by 4G, now 5G is available, what is next... new tech, more antennas, we are well connected as it is. Winnipeg should look after the health of its residents and wait for more information regarding the longterm health effects The telecom companies are the driving force behind 5G, it isn't necessary, lets skip it.

Screen Name Redacted

10/12/2020 02:40 PM

The high frequencies used with 5g are not safe. The number of antennas will place them very close to people.

Screen Name Redacted

10/12/2020 02:47 PM

I am not making a judgement on the safety or not of 5G. I'm just very much of the same mind as Rome Councilor Massimiliano Quaresima, who stated, "I am in favour of technological progress but not on the experimentation of 5G technology in the absence of scientific data on the repercussions for health."

Screen Name Redacted

10/14/2020 09:49 AM

I would hope the City will advocate on behalf of Winnipeggers for a moratorium on 5G implementation until the safety of this technology can be assessed by qualified, independent scientists.

Screen Name Redacted

10/14/2020 10:57 AM

I can't believe the City is implementing 5G without consulting the proper authorities on health implications. This is just another way of government pushing things down our throats that aren't discussed at a healthcare level and doing their due diligence. What is Europe doing and why with 5G??

Screen Name Redacted

10/14/2020 10:59 AM

There are international UN Conventions of 1989, Nuremberg Code UN 1950, Canadian Children Act 1989, 2nd Treaty of Civil Governments, Declaration of Human Rights, Declaration of Children's Rights, and Health and Safety Act 588 that legally protects the health and development of children, experimenting without consent and the protection of civil society from harm from electromagnetic frequencies both thermal and non thermal. There is a

growing body of scientific evidence of harm and there is no evidence of safety regarding these wireless technologies.

Screen Name Redacted

10/14/2020 11:03 AM

I hope that the City will institute the Precautionary Principle and consider other alternatives to 5G

Screen Name Redacted

10/14/2020 11:18 AM

More and more people are becoming electromagnetic frequency (EMF) sensitive. This is happening increasingly because of all the invisible wave forms that are beaming down on us from all over. Even 3G and 4G have proven to be harmful. Wifi can be harmful and we are bombarded by this 24/7 in our homes, businesses and schools. And if we as humans are being affected, how about birds, bees (critical pollinators), and animals? No safety studies have been done for 5G. The telecom industry is pressuring government officials to push this through all over the world. At a time when our health is under attack and people are sicker than ever before, I ask you to pass a motion asking the federal government for a moratorium on 5G installations until there is a scientific consensus of safety to the public (see my previous comment about independent research and the thousands of scientists and medical professionals opposed to 5G). Ask yourself - what do these scientists and medical people have to gain for opposing small cell 5G? What does the industry stand to gain from the approval of 5G? Who is likely hiding a dark secret? Similar motions have been passed by municipalities in Ontario and Quebec. Other countries have banned 5G installs. But with Tesla (search Starlink) and others putting thousands of satellites in the sky, we will never be able to escape from these waveforms. Not even in remote areas. Please protect our children, grandchildren, and all life by demanding clear, current and independent scientific studies before approving any small cell or 5G installations. Thank you.

Screen Name Redacted

10/14/2020 11:26 AM

As a Winnipeg citizen I am strongly opposed to 5G untested technology. I don't want my kids and me to be exposed constantly to high radiation. There are safer alternatives. Why don't you listen to the people??Why don't you protect us???

Screen Name Redacted

10/14/2020 11:43 AM

Request that the city write a letter of non-concurrence and seek scientific consensus re: safety. Far too many people have no idea of the harmful effects of 4G and 5G technology. This is especially crucial at this time when people are increasingly relying on virtual technologies for work, school, health, and social connections with no knowledge or regard for the harm to which they are exposing themselves and their children. Of particular concern is the irreversible damage being done to the environment and all species. Full public consultations need to happen with complete ability to understand the issues and risks.

Screen Name Redacted

10/14/2020 11:43 AM

Not at this time

Screen Name Redacted

10/14/2020 12:10 PM

Precautionary Principle Please. In what world is tech with no long term safety data and many health concerns Pushed through with no concern?

Screen Name Redacted 10/14/2020 12:16 PM	There has been limited research into the health implications of ANY radio frequency transmission... I feel we (the citizens of Winnipeg and Canada) are being railroaded into this touted "progress" without proper investigation into possible harmful effects. Faster service should not be prioritized over the health of the populace. We should hold steady until 5G is deemed healthy; not go ahead then find out it is not.
Screen Name Redacted 10/14/2020 12:22 PM	I support the initiative - I believe it is safe, and will improve quality of life
Screen Name Redacted 10/14/2020 01:38 PM	the true science is clear that some emf/emr negatively affect living organisms. it is also clear that the federal government keep a blind eye and deaf ear to the true science.
Screen Name Redacted 10/14/2020 04:15 PM	I'd sincerely like to encourage additional research and knowledge development prior to taking this step. I'm not anti-technology, rather I'm sincerely concerned about the health and well-being of Winnipeg's citizens. There simply isn't enough longitudinal data to support this plan to move forward.
Screen Name Redacted 10/14/2020 05:39 PM	It is best to know the health effects - short and long term, of a new technology or other product before using it.
Screen Name Redacted 10/14/2020 09:03 PM	There has not been enough information made public about the dangers and long term effects of this . There are other options.
Screen Name Redacted 10/14/2020 10:04 PM	When planning please consider the position of the towers very carefully
Screen Name Redacted 10/15/2020 12:57 AM	This technology is a crime against humanity. Anyone who assists in its roll-out is either lacking education on the topic, or is a traitor to their own families and loved ones, to their neighbors, and to all citizens of the planet.
Screen Name Redacted 10/15/2020 08:42 AM	Could City Council pass a motion asking the federal government for a moratorium on this? I would like to see feedback from scientists independent of the wireless industry. I do not appreciate being used as a guinea pig, without my consent, for a new technology that has not been proven safe. That is an embarrassing violation of human rights for a city that supposed to uphold human rights. This is the year 2020- let's move forwards, not backwards.
Screen Name Redacted 10/15/2020 09:32 AM	Let the 5G technology and radiation be proven safe in neighborhoods before they are allowed to be installed.
Screen Name Redacted 10/15/2020 10:32 AM	Health assurances by Industry are worthless

Screen Name Redacted 10/15/2020 10:41 AM	Issue is controversial regarding effects on health. Don't risk endangering the health of people. Take this 5G issue seriously; go slow, get as much info as possible.
Screen Name Redacted 10/15/2020 12:00 PM	None
Screen Name Redacted 10/15/2020 01:43 PM	I feel we need to continue to provide reliable cellular options for the citizens of Winnipeg. There is a lot of misinformation out there about the "dangers" of 5G technology. We need to avoid making decisions based on opinion and ignorance and use actual science and facts to guide are investment in technologies.
Screen Name Redacted 10/15/2020 01:47 PM	The city of Winnipeg has great leverage as the owners of assets such as buildings / other structures. Make sure to use this leverage when negotiating leases for the telecoms to put their equipment on city owned buildings. Since small cells require more units to be more effective, it could be a lucrative opportunity for the City of Winnipeg to supplement tax revenue.
Screen Name Redacted 10/15/2020 01:48 PM	Listen to the experts, not the people.
Screen Name Redacted 10/15/2020 03:58 PM	Get out of the way and let technology progress.
Screen Name Redacted 10/15/2020 04:50 PM	I have other issues around increased 5G wireless - the placement of small cells in residential neighbourhoods, community centres and parks. I have also privacy concerns with 5G.
Screen Name Redacted 10/15/2020 08:50 PM	n/a
Screen Name Redacted 10/15/2020 09:10 PM	5G very unsafe for all livings! Humans&animals
Screen Name Redacted 10/15/2020 10:57 PM	We are exposed to enough toxins of all varieties already. Why must we continue to be lead by for profit organizations? We have entrusted our elected officials to be responsible for doing their due diligence,which involves researching the impacts of this (5G) and all future technological changes, prior to implementation.
Screen Name Redacted 10/16/2020 10:56 AM	Reduced RF emissions (lower power), smaller and less-unsightly antennas, better service, what's not to like?
Screen Name Redacted 10/16/2020 11:19 AM	Is Canadian 5G technology being used?
Screen Name Redacted	The scientific evidence I have read is strongly saying 5G radiation is unsafe.

10/17/2020 07:51 AM	This needs to be addressed.
Screen Name Redacted 10/17/2020 04:05 PM	These are a terrible idea and very unsafe and bad for our health
Screen Name Redacted 10/17/2020 08:52 PM	I'd like you to take this answer as consideration to not install these. You ask for opinions. We give them. Please listen to us.
Screen Name Redacted 10/18/2020 07:08 PM	The technology will definitely need to be added to Winnipeg's infrastructure. It's a matter of how best to install the technology in a safe and professional matter
Screen Name Redacted 10/18/2020 08:47 PM	5 G has never been tested and it can not be tested on anyone but us. This is very scary. It will be too late once we see the negative results of 5G. Many scientist are aware of this, but again it is all about money and speed. I am scared for our children and our future.
Screen Name Redacted 10/19/2020 03:57 AM	For our nervous system health please.
Screen Name Redacted 10/19/2020 08:25 AM	Very unsafe and no studies have been preformed to evaluate safety (by an independent third party)
Screen Name Redacted 10/19/2020 08:40 PM	5G has detrimental effects to our hormonal systems, blood oxygenation, it can cause headaches, lightheadedness, brain fog, sleep issues, reproductive issues and more. It has been affecting migratory patterns in bees/wasps/birds. We would be safer as a society improving our fibre internet infrastructure.
Screen Name Redacted 10/19/2020 11:26 PM	I am not convinced there has been sufficient research regarding long term health impacts of the multi interconnected electrical pathways associated with residential small cell technologies
Screen Name Redacted 10/20/2020 09:00 AM	5G technology is new, the frequencies it runs on have been proven to affect human physiology. In the never-ceasing push for technological advancement, I worry that we are not being cautious enough about the health risks. Based on quantum theory, everything is energy, energies that operate on varying frequencies. If we are being constantly bombarded with a frequency that is not healthy for us or interferes with our base frequency, then it is bound to have a massively negative impact on us. Or we at least don't know for certain yet if it will have no effect. That might sound a bit like I've just watched some youtube videos but I have done a decent amount of research and I absolutely worry that this technology with be harmful to us, even down to how it affects our thoughts and moods. Even if you believe my comments are not based on science, please be cautious as to implementing this technology in our city. My children will grow up here and have 5G (and future) networks that they will be living within. I worry for their health and the effect these things will have on them.

<p>Screen Name Redacted 10/20/2020 05:47 PM</p>	<p>Winnipeg needs to move into the latest communication technologies that will interconnect many devices including autonomous vehicles.</p>
<p>Screen Name Redacted 10/21/2020 12:30 PM</p>	<p>The health risks for this have been noted by scientists and medical people. If 5G is implemented those of us opposed to it because of health risks will have these units near our homes. We do not want that.</p>
<p>Screen Name Redacted 10/21/2020 05:02 PM</p>	<p>I'd like to see this be a Pam government initiative not only in Winnipeg but also to support government offices healthcare facilities public venues in both urban and underserved Ruehlen remote communities across the province to help enable better digital services access as well as diminish any unintended consequences of digital disparity among citizens of the province</p>
<p>Screen Name Redacted 10/21/2020 05:39 PM</p>	<p>A working group on ensuring better coverage of 4G LTE should be where resources are spent. Once we identify holes and get carriers to fix those then we should start researching 5G.</p>
<p>Screen Name Redacted 10/21/2020 10:33 PM</p>	<p>As the use of wireless communications expands beyond personal phones to machines, appliances and other devices the demand on bandwidth will greatly exceed what available one the existing 4G networks.</p>
<p>Screen Name Redacted 10/22/2020 07:19 AM</p>	<p>I'd like more information about the source of the demand for this. What problem(s) is this supposed to solve?</p>
<p>Screen Name Redacted 10/22/2020 12:03 PM</p>	<p>This technology is extremely hazardous to human and animal health. Do not start installing this technology - ever.</p>
<p>Screen Name Redacted 10/22/2020 04:02 PM</p>	<p>We need more information about what is being planned and what preparedness will be planned for the side effects that are expected to follow both for humans and the ecosystem. Some research has shown that electromagnetic radiation affects insects and birds which could have serious consequences in nature including the production of food crops that depend on pollinators.</p>
<p>Screen Name Redacted 10/22/2020 06:23 PM</p>	<p>I have concerns for the planet. I feel that this technology interferes with our atmosphere and that the consequences are grave.</p>
<p>Screen Name Redacted 10/23/2020 01:21 PM</p>	<p>All good</p>
<p>Screen Name Redacted 10/23/2020 02:43 PM</p>	<p>I would like a proper health review done before implementation of 5G in our market</p>
<p>Screen Name Redacted 10/23/2020 03:53 PM</p>	<p>I really think tht the city is being complicit with endangering the lives of its citizens by exposing us to these small cell antennae and I wonder if there will be a liability issue arise from this. Moreover, the lack of transparency regarding where the trial is seems to me like a "smoking gun" and this is not acceptable !</p>

Screen Name Redacted 10/23/2020 05:49 PM	I think the main question we should be asking is whether these are necessary or a priority to citizens. Fast cell service already exists for those who can afford it, and 5G devices are costly - the city should not be spending money or other resources on a service that doesn't benefit all citizens. Given the income inequality and disturbing rates of child poverty that exist in this city, it would be immoral for the city to prioritize marginally faster cell services over basic needs.
Screen Name Redacted 10/23/2020 08:06 PM	The sooner we can have the best new technology the better.
Screen Name Redacted 10/25/2020 01:55 PM	This is something that is being put into our environment and being tested on humans not rats or monkeys but humans. We won't know what the end result will be until it's too late. I worry about our children and their future. Why take a chance when there are safer alternatives.
Screen Name Redacted 10/26/2020 12:27 AM	This should be illegal and shows the depth of selfishness about as the health of citizens and children especially are of no concern.
Screen Name Redacted 10/26/2020 05:16 AM	I am shocked that the City is even asking questions like number 3 which is heavily weighted to the benefit of those opposed to 5G. We have terrible cell service in Linden Woods and proven safe technologies like 5G can go a long way to improving that service, especially with the move of more people working from home prompted by the restrictions necessary due to COVID.
Screen Name Redacted 10/26/2020 09:01 AM	There is not enough research of any long term potential negative impact or health issues of 5G technology in humans. I feel it is irresponsible to implement this kind of technology under those terms
Screen Name Redacted 10/26/2020 09:32 AM	Of course it would be nice to have faster cell service. My biggest concern is the health impacts of having these smaller towers distributed throughout the city. The more radiation that is emitted, the bigger the health impact could be. If the small cell towers are close enough together, there could be a cumulative effect. Especially since they will be closer to where people are spending significant amounts of time. I just don't have enough information to make a decision about whether I support small cell towers or not.
Screen Name Redacted 10/26/2020 11:10 AM	Many cities and countries around the world are opting out of 5G technology, due to inconclusive science, and the lack of evidence to demonstrate that 5G does NOT cause harm, long term. It is irresponsible to introduce something into the neighborhoods of people, without established results proving it's safe, and regrettably in the areas 5G have been implemented, health hazards have been observed, and in multiple countries around the world. This technology is being rushed into, without looking at all the science, and not just one side. For people to make an educated decision, it is our elected officials' responsibility to inform the public everything about this tech, and not just about "faster internet." There are long-term effects associated with electromagnetic poisoning which include cancer and neurodegenerative diseases like Parkinson's, Alzheimer's and multiple sclerosis. Children

Screen Name Redacted 10/26/2020 12:00 PM	absorb more of this kind of radiation than adults do. Putting it up in neighborhoods is completely unacceptable and abhorrently irresponsible.
Screen Name Redacted 10/26/2020 02:11 PM	My concern is with regard to how much 5G will affect the health of the population. There are already many studies that show the ill effects of these frequencies... the "canaries" here in Winnipeg have LOTS to share about the ill effects they are already suffering from with the present electromagnetic frequencies we live in. WE NEED TO LISTEN.... Yes, efficiency of telecommunications is a high priority right now, especially with COVID lock down. It should not be at the price of our long term health. Fibre optics protects us... so why not go that way...
Screen Name Redacted 10/26/2020 10:17 PM	The city of Winnipeg should have its own cellular network serving its needs with the number of devices the city of Winnipeg supports it would pay for itself is only a few years.
Screen Name Redacted 10/26/2020 10:47 PM	they are dangerous for health, especially for birds, bees, trees and many scientists consider them dangerous for human health. Posts about danger are being removed from social media, which is suspicious.
Screen Name Redacted 10/27/2020 08:00 AM	I believe those that are opposed suggesting such are unhealthy are misinformed and also misinforming others. I have a Masters degree in telecommunications, have studied cellula technologies and believe there is no risk.
Screen Name Redacted 10/27/2020 08:15 AM	As a cell signal user, the COW has many devices. Is this the time to look at what it would take for the COW to provide it's own cell coverage?
Screen Name Redacted 10/27/2020 10:21 AM	Before deciding to install more infrastructure emitting Radio and Micro waves, the city should justify their decisions to the public from a public health perspective with the latest and widely sourced research. I would like the city to answer the following questions: Will these added technologies really improve the lives of everyone in the city equally? Will they improve people's health? If there is no improvement to physical health, but there is a risk to physical health, we as a city should use our time in a more productive manner and forget about virtual improvements and concentrate on improving the real world.
Screen Name Redacted 10/28/2020 08:44 PM	I would fully support this technology in my neighborhood.
Screen Name Redacted 10/29/2020 01:37 PM	Don't let the conspiracy theorists get in the way of progress! Manitoba has the slowest average internet speeds in the province. This has the chance to provide true high speed service to many people
Screen Name Redacted 10/29/2020 09:19 PM	I am concerned about the companies who provide 5G service such as Wawei and the access that a large transnational company would have to our communications infrastructure.
Screen Name Redacted 10/29/2020 09:19 PM	Worried that it's introduction is another small step to government surveillance state

Screen Name Redacted 10/30/2020 12:43 PM	This is a really technical subject and as I am not involved in this industry, I don't have an informed opinion. I appreciate your attempts to engage but more information needs to be provided for residents to be able to participate effectively.
Screen Name Redacted 10/30/2020 11:09 PM	no
Screen Name Redacted 10/31/2020 09:13 AM	Do not put 5g in Winnipeg
Screen Name Redacted 10/31/2020 09:15 AM	this technology is dangerous to humans and wildlife..we need a moratorium on it's use until further safety studies are done by non-partisan safety consulting firms..we are already seeing the side effects of people and wildlife living in close proximity to this towers..people getting cancers and a whole range of other neurological disorders..I have kept astride of the development/ safety of this technology and all is done by the 5g industry itself . why is there no 3rd party safety studies been done? this technology has the potential to inflict serious damage if in the wrong hands. there are so many more issues I can bring up on 5G..I will not..this technology affect every living soul on this planet..
Screen Name Redacted 10/31/2020 09:39 AM	mmwave 5G is years from being ready to deploy. We do not need to deploy the minicell installations until we know the safety of 5G mmwave. The present Low Frequency 5G does not add significant data speed (20%) which is not worth the health risks now and the visual impact. New Hampshire has just published a report against 5G with plenty of science...see http://www.gencourt.state.nh.us/statstudcomm/committees/1474/reports/5G%20final%20report.pdf
Screen Name Redacted 10/31/2020 12:32 PM	The public group opposing 5G is wrongfully lumping in extremely high frequency (millimeter wavelength) transmissions. The frequencies being considered by local carriers are the same as currently in use for current 3 and 4 G networks.
Screen Name Redacted 10/31/2020 02:00 PM	This is proven far more of health hazard than Canada and the US is willing to listen to and most civilized technologically advanced countries (Europe and Russia) recognize it and have placed 100 times more restrictions. We are being sold a bill of goods by for-profit enterprises and ignorant government officials.
Screen Name Redacted 10/31/2020 02:08 PM	If Winnipeg goes ahead with the small cells I and dozens of people I know will immediately leave Winnipeg. I don't feel safe with that level of iridation to my body ON TOP of the ALREADY going 1G 2G 3G 4G. Did you know that's its ILLEGAL for firefighters to be in a certain vicinity to 5G small cells? Why do they get to be protected and not the citizens that PAY TAXES!!
Screen Name Redacted 10/31/2020 02:23 PM	5G technology is untested and scientific consensus hasn't been reached. It's dangerous to implement such technology in residential areas. That's only

partly true, research into the effects of millimeter wavelength frequencies over the last 30+ years has shown it to be harmful to all forms of life. Consultation needs to be done with the residents to obtain their approval prior to any installations being done near their homes. Most informed residents would not want to be exposed to harmful frequencies, nor have the value of their homes reduced because of a dangerous nearby installation. The City of Winnipeg needs to put a moratorium on small cell deployment until the Government of Canada can properly review their policy on the safety of 5G technology. Unbiased studies need to be done, and not funded by the industries who benefit from the blind acceptance of a flawed study. It's unfortunate that the cell phone carriers stand to lose money when 5G is shown to be dangerous and subsequently rejected, but their business is dangerous to people, animals and ecosystems. The ethical thing to do is stop it. Profits be ***comment removed***.

Screen Name Redacted

10/31/2020 02:33 PM

Especially for day cares and schools, we must have more certainty about Safe levels of daily exposure to 5G.

Screen Name Redacted

10/31/2020 02:37 PM

No

Screen Name Redacted

10/31/2020 07:13 PM

The liability of cellular antenna implementation and public exposure is discussed in the peer reviewed scientific journal article below. We need to use evidence based science to make appropriate decisions when new cell services such as 5G are proposed. It could save the City of Winnipeg and other stakeholders from potential future class action lawsuits. There are many precedents in other areas that support this issue (radium illuminated dials, asbestos, cigarette smoking, urea formaldehyde insulation, etc.). Buffer distances between antennas and exposed populations are needed. People who are potentially exposed to radio frequency radiation should have a say in whether they are exposed or not. There are many examples of cell base station installations in close proximity to schools, hospitals and high rise apartment buildings in Winnipeg. A review of the overall implementation process is needed. Public awareness of the health impacts of cell antenna exposure and public consultations are essential as part of an overall public health plan. Reviewing cell base station/antenna implementation from a health and safety exposure perspective should take priority. This also goes for existing locations of cell base stations in densely populated areas of our city. Peer Reviewed Journal Article: J.M. Pearce, Limiting liability with positioning to minimize negative health effects of cellular phone towers, Environmental Research, Volume 181, 2020, 108845, ISSN 0013-9351, <https://doi.org/10.1016/j.envres.2019.108845>. (<http://www.sciencedirect.com/science/article/pii/S0013935119306425>) Abstract: The use of cellular phones is now ubiquitous through most of the adult global population and is increasingly common among even young children in many countries (e.g. Finland, where the market for smart phones is nearly saturated). The basic operation of cellular phone networks demands

widespread human exposure to radio-frequency radiation (RFR) with cellular phone base stations providing cellular coverage in most areas. As the data needs of the population increase from the major shift in the source of Internet use from personal computers to smart phones, this coverage is widely predicted to increase. Thus, both the density of base stations and their power output is expected to increase the global human RFR exposure. Although direct causation of negative human health effects from RFR from cellular phone base stations has not been finalized, there is already enough medical and scientific evidence to warrant long-term liability concerns for companies deploying cellular phone towers. In order to protect cell phone tower firms from the ramifications of the failed paths of other industries that have caused unintended human harm (e.g. tobacco) this Current Issue summarizes the peer-reviewed literature on the effects of RFR from cellular phone base stations. Specifically the impacts of siting base stations are closely examined and recommendations are made for companies that deploy them to minimize their potential future liability. Keywords: Radiofrequency radiation (RFR); Antenna arrays; Cellular phone base stations; Microwave sickness; Nonionizing electromagnetic fields; Environmental pollution; Cancer; RFR health effects

Screen Name Redacted

10/31/2020 07:21 PM

The studies I have read say 5G is unsafe to both humans, insects (bees), birds and animals and I do not want 5G in my neighbourhood.

Screen Name Redacted

11/01/2020 05:51 AM

I ask the City of Winnipeg to write a letter of non-concurrence, meaning that it does not agree I ask that City Committees and City Council pass motions asking the federal government for a moratorium until there is a scientific consensus of safety to the public, which would include scientists independent of the wireless industry. I ask for full and meaningful public consultations by the City of Winnipeg to be held in all parts of the city where there are proposals for installations of small 4G or 5G cell antennas. We need clear notification that small cells will be installed and where they will be located, to be sent to all nearby residents. We need Maps of where 4G and 5G antennas are located to be available on the City of Winnipeg website Antennas should be clearly labelled so that people can see where they are. Buffer zones should be established for people requesting them for medical or other reasons. Thank you for your consideration

Screen Name Redacted

11/01/2020 02:57 PM

5G is quietly being rolled out during the pandemic and little meaningful consultation is being carried out. Humans have never been exposed to this frequency of radiation before and exposed to high levels can burn the body, it is also going to be used to track our every move. Amazing how many G5 satellites are being launched into outer space.

Screen Name Redacted

11/01/2020 04:40 PM

Safety, privacy and visual impacts are my main concerns in that order.

Screen Name Redacted

11/01/2020 11:50 PM

Proven research has shown the extreme health hazards that 5G technology emits to any living being near these towers. I do not want these structures

Screen Name Redacted 11/02/2020 07:30 AM	anywhere near me or anyone else. There are better and safer technologies available.
Screen Name Redacted 11/02/2020 01:50 PM	This is a technology the average person neither understands or comprehends
Screen Name Redacted 11/02/2020 08:24 PM	Be ready for lawsuits if you go ahead with the 5G rollout. Short-wave radiation has strong negative physical impacts - proven with research around the world, including brain cancer. It has never been testing for long-term effects on humans, but the short-term effects are numerous. Many countries are opting out. You are the government! You need to protect your citizens health - that is why you are being paid by the people! This 5G rollout will leave our population immune-compromised and weak, including anyone who votes in favor of it! It is the MOST IRRESPONSIBLE decision you could ever make without first knowing what the short and long-term effects of this short-wave radiation on human beings, other creatures, plants and the earth itself. 5G has never been released on the earth before! Act mature and stand up for what is right - for your people, not for the corporations. Say no to 5G, say yes to fibre optics (just as fast)!
Screen Name Redacted 11/02/2020 10:12 PM	There should be a moratorium on installation until health effects are independently reviewed.
Screen Name Redacted 11/02/2020 10:43 PM	It is unethical to allow this technology to be implemented without proper assessment of long term risks.
Screen Name Redacted 11/03/2020 12:16 AM	Why would esteemed individuals entrusted with guiding the functioning of a city agree to install military grade technology to the infrastructure? How could the notion of self-driving automobiles be considered virtuous in a “democracy” when such vehicles can be easily directed to operate without the consent of its passengers? From where did the idea to further electrify the atmosphere in Winnipeg come from? Why is Mayor Brian Bowman allowing this known problematic technology to function in Winnipeg?
Screen Name Redacted 11/03/2020 09:33 AM	Our neighborhood is in need of improved cell service. This seems like a reasonable option to do that using existing towers
Screen Name Redacted 11/03/2020 09:33 AM	1. The city should write a letter of non-concurrence to the LUA (land use authority) . 2. City committees and city council must pass motions asking the Federal government for a moratorium until there is a scientific consensus of safety to the public, which would include independent scientists and NOT the wireless industry. This has already been done in other municipalities. 3. We need full and meaningful public consultations to be held by the city where there are proposals for installations of 4G/5G antennas. 4. We need CLEAR NOTIFICATION where small cells will be installed TO BE SENT TO ALL RESIDENTS NOT JUST NEARBY RESIDENTS. The city website should show maps of where 4G/5G antennas are located. The antennas should BE CLEARLY LABELLED FOR ALL TO SEE.

Screen Name Redacted

11/03/2020 10:55 AM

There has been no public education or consultation on the implementation of these technologies. Transparency is important especially since there may be health consequences to the public of which we are unaware. This must not be implemented behind our backs without our consent.

Screen Name Redacted

11/03/2020 11:19 AM

There has not been adequate testing on these technological “advancements” and incorporating them into society is highly unsafe. You are putting the population at risk for greater health issues such as cancers, respiratory issues, and degenerative diseases. Is faster internet truly that important?

Screen Name Redacted

11/03/2020 12:12 PM

I respectfully request that the city of Winnipeg to write a letter of non-concurrence. I would ask any city committees and city councillors to pass motions asking the federal government for a moratorium pending (scientists independent of the wireless industry) scientific consensus of safety regarding the public. Full and meaningful public consultations by the city of Winnipeg as to where there are proposals for the installation of these 4G or 5G towers. Clear notification that small cell towers will be installed and where they will be located, sent to all nearby residents. Maps of where 4G and 5G towers are located should be available on the City of Winnipeg website. Antennas need to be clearly labelled so that can see where they are. Buffer zones should be established for those requesting them for medical or other reasons. Thank you!

Screen Name Redacted

11/03/2020 12:53 PM

1) I want the City of Winnipeg to write a letter of non-concurrence, meaning that it does not agree . The final authority on approvals for these antennas is the federal minister of Innovation, Science and Economic Development (ISED), [personal information removed]. Staff of ISED have told Canadians that “ At the end of the day though no tower can be built without having the land use authorities concurrence, and even though our Minister can approve the erection of all masts, towers and other antenna-supporting structures, we generally always look to the LUA for their approval first.” The City of Winnipeg is the LUA- Land Use Authority. 2) City Committees and City Council can also pass motions asking the federal government for a moratorium until there is a scientific consensus of safety to the public, which would include scientists independent of the wireless industry. This and similar motions were passed in Ontario and Quebec by municipalities. 3) Full and meaningful public consultations by the City of Winnipeg should be held in all parts of the city where there are proposals for installations of small 4G or 5G cell antennas. 4) Clear notification that small cells will be installed and where they will be located, to be sent to all nearby residents. 5) Maps of where 4G and 5G antennas are located should be available on the City of Winnipeg website 6) Antennas should be clearly labelled so that people can see where they are. 7) Buffer zones should be established for people requesting them for medical or other reasons.

Screen Name Redacted

11/03/2020 02:17 PM

People living close to where a small cell is planned need to approve of it's installation. It should not be automatic. There are too many unsightly communication boxes plunked in our boulevards.

<p>Screen Name Redacted 11/03/2020 04:00 PM</p>	<p>I would like to see the 5G technology installed quickly in order to keep up with other cities in technological investment. It will allow businesses and people alike to compete in the changing markets.</p>
<p>Screen Name Redacted 11/03/2020 04:31 PM</p>	<p>I ain't gonna pay for 5G. And I will sue the city if they will roll it out near my apartment or next to the school or anywhere close to me. I do not consent to radiation exposure.</p>
<p>Screen Name Redacted 11/03/2020 04:33 PM</p>	<p>My extensive research has lead me to believe that 5g is harmless.</p>
<p>Screen Name Redacted 11/03/2020 09:29 PM</p>	<p>My property is so small the 5G transmitter would only be a few feet from my body when I am in the yard or house. We know they cause many health conditions including cancer.</p>
<p>Screen Name Redacted 11/04/2020 07:33 AM</p>	<p>Inform the public of the health risks and hazards and do not install 5G. Other countries have decided against it due to health concerns.</p>
<p>Screen Name Redacted 11/04/2020 07:55 AM</p>	<p>This technology will improve connectivity for business and the average person. Winnipeg needs be near the lead or at least comparable when it comes to connectivity in order to be a desirable business destination.</p>
<p>Screen Name Redacted 11/04/2020 09:33 AM</p>	<p>1. write a letter of non-concurrence meaning that it does not agree with their installation. 2. pass motions asking the federal government for a moratorium, until there is a scientific consensus of safety to the public, which would include scientists independent of the wireless industry. 3) Full and meaningful public consultations by the City of Winnipeg should be held in all parts of the city where there are proposals for installations of small 4G or 5G cell antennas. 4) Clear notification when and where the small cells will be installed and where they will be located, to be sent to all nearby residents. write a letter of non-concurrence meaning that it does not agree with their installation 5) Maps of where 4G and 5G antennas are located should be available on the City of Winnipeg website 6) Antennas should be clearly labelled so that people can see where they are. 7) Buffer zones should be established for people requesting them for medical or other reasons.</p>
<p>Screen Name Redacted 11/04/2020 10:26 AM</p>	<p>Take a stand to confront our selfish desires, in the act of protecting our natural resources that get decimated by our use of Hydro.</p>
<p>Screen Name Redacted 11/04/2020 11:41 AM</p>	<p>Small cell antennas will be unsightly and too many in the city</p>
<p>Screen Name Redacted 11/04/2020 02:08 PM</p>	<p>long term health impacts, impacts on children. This needs to be determined before they go into residential areas - proper independent studies</p>
<p>Screen Name Redacted 11/04/2020 03:52 PM</p>	<p>I am very concerned about the impact of 5G technology on our health and the health of future generations.</p>
<p>Screen Name Redacted</p>	<p>Every household should receive information before installing these 5g</p>

11/04/2020 06:21 PM

antennas, it should not be installed,not without public's consent.

Screen Name Redacted

11/04/2020 07:06 PM

Until more is known about the safety/hazards of 5G technology, I strongly oppose the addition of this technology being brought to Winnipeg and surrounding areas. Currently technology is more than sufficient, and there really is no need to have "faster" than what is already available. The potential risks associated with 5G is not worth the faster speeds. If this is all 5G would do, then why take the chance on harming the health of residents of Winnipeg, just for the slight increase in internet speeds? I do not find there is any major downside to the speeds of internet/wireless that is currently available, especially considering the potential for serious health risks that would come along with 5G.

Screen Name Redacted

11/04/2020 07:10 PM

I believe that the long term health risks greatly outweigh the benefits of higher speed internet. I believe the trade-off will be an upswing in physical and mental health issues in the community. Turning off my own wifi router and other technologies at night in my home has resulted in a drastically improved sleeping pattern for my family as a whole and clearer minds during the day. We won't have the option to turn 5G off. I do not want a 5G tower anywhere near my house. I have also read research that shows 5G tech can have a detrimental effect on nature and animals. That seems like a big red flag that requires further research.

Screen Name Redacted

11/04/2020 07:24 PM

There are serious consequences to the installation of 4G/5G cell "towers" or antenna installations throughout Winnipeg neighbourhoods. WHY? Because radiation exposures will be 24/7 and there has been no health safety testing for long-term exposures. Strong scientific evidence indicates many possible serious health effects including cancers. Many people have been developing radio frequency sensitivities which include headaches, feelings of sickness, nausea, and dizziness. When they are removed from direct exposure to these Radiation waves, their health improves. With these small antennas everywhere it will be impossible to isolate or run away from these horrible cancer inducing waves. I work in Winnipeg every day and do not want to be exposed to these radio waves all day. The following must be done before a decision is made: 1) Full and meaningful public consultations by the City of Winnipeg should be held in all parts of the city where there are proposals for installations of small 4G or 5G cell antennas. 2) Clear notification that small cells will be installed and where they will be located, to be sent to all nearby residents. 3) Maps of where 4G and 5G antennas are located should be available on the City of Winnipeg website 4) Antennas should be clearly labelled so that people can see where they are and avoid. 5) Buffer zones should be established for people requesting them for medical or other reasons. This is very important. 6) I want the city of Winnipeg to write a letter of non-occurrence as the land use authority to the federal government. 7) Pass a Motion asking the federal government for a moratorium until there is scientific consensus of safety to the public, which would include scientists independent of the wireless industry. This and similar motions were passed in Ontario and Quebec by municipalities.

Screen Name Redacted

11/04/2020 07:53 PM

I do Not want a small or any size 5G tower installed anywhere near my home!!

Screen Name Redacted

11/04/2020 08:53 PM

I have received notice of a group spreading disinformation about health risks of 5G technologies. Groups against a motion are more likely to respond to polls and surveys, much like leaving bad reviews on restaurants or products. Please consider this when making a decision.

Screen Name Redacted

11/04/2020 10:17 PM

5G has not been tested for safety. As a citizen and homeowner, I should have the right to protect myself and my family from unwanted radiation, whether 4G or 5G,directed at and into my home.

Screen Name Redacted

11/04/2020 10:20 PM

As I indicated to the Standing Policy Committee on Innovation and Economic Development my concern is that extensive safety testing has not been completed on this type of frequency & its affect on humans and other life forms over the short and long term. I specifically pointed out our city's vulnerable population who have health conditions which effect the central nervous system. One major disease is Multiple Sclerosis. There are many many diseases. It is known the affects of excessive radiation already has an effect on them - The other concern is that a proper public consult has not been completed which has left the average person completely unaware this is happening. As a tax payer of this city, I find this unacceptable and negligent. Both public consultations and consultations with those who are vulnerable specifically, should be thoroughly completed before rushing forward to install devices which transmit widespread frequencies into our air space which we have not consented to. - I also feel this city, and others within Canada, as well as municipalities are simply doing what you feel is expected of you by the industry and overlooking the very people who elect and employ you with our tax dollars. - Overlooking (although I suspect intentionally) a proper public consult. - I can predict a mess in the future which will be COSTLY TO UNDO as you will at the very least need to install the fibre optics after using our tax dollars for the small cells towers and installation of them. I cannot predict the lawsuits. That is a risk and that comes out of the City's budget which we all pay for. - I am on record at the meeting of the City's above-mentioned standing committee warning of the already known effects on health that this type of frequency will have. Margaret Friesen, a highly skilled former government researcher has also offered information to the above-mentioned standing committee that the City itself should have discovered on its own, considered and now be publicly exclosing to its public. It is a very concerning topic of which many specific concerns have already been pointed out at the committee level by concerned citizens. - What we would now like to see is: a) you move toward fibre optics which is safe and low risk to our health. Educate the public that fibre optics are just as effective as Margaret has already pointed out or b) at the very least complete a public consultation whereby every tax payer is made aware of all concerns being pointed out at the committee level...there are many and perhaps show us that you are exploring our concerns more deeply Let this not be about \$\$\$\$ and service to corporations who want more, more, more. Let this be about the people and

Screen Name Redacted 11/04/2020 10:55 PM	what is best for us. Sincerely, *personal information removed*
Screen Name Redacted 11/05/2020 05:57 AM	There is sufficient research at this point in time that raises a real, credible concern about the potential long-term health effects of this technology, at the same time as there is not nearly sufficient, reliable research to the contrary. It is completely irresponsible to commit to this new technology prematurely without fully understanding the long term effects of continuing to increase the degree of cellular radiation our community will be bombarded with every single day, or a plan in place to mitigate/eliminate any harmful side effects. Winnipeggers should not form part of a large scale "science experiment", especially when viable alternatives with significantly lower health risks are available.
Screen Name Redacted 11/05/2020 07:37 AM	Consider the health risks very seriously. There is a reason why other countries are slowing down or halting the rollout of 5G microcells.
Screen Name Redacted 11/05/2020 08:41 AM	The frenzy to always keep up w industry regardless of the effects of the health of all things that make up a living world is short sighted and reckless. Industry does not care about individuals or ecosystems. Start making decisions about the health and we'll being of future generations please.
Screen Name Redacted 11/05/2020 09:01 AM	I would like the city to offer people the opportunity to opt out of having 5g towers set up near their homes.
Screen Name Redacted 11/05/2020 10:44 AM	5G is not safety tested on man. To allow this technology to be implemented and used poses a serious health risk to the population of Winnipeg. The city of Winnipeg owes its people (the one who pay taxes to keep it afloat) a safe non-irradiated environment in which to exist.
Screen Name Redacted 11/05/2020 11:26 AM	NO
Screen Name Redacted 11/05/2020 11:31 AM	Please listen to reason and science, and don't give in to the vocal minority of anti-science crusaders. Implementation of 5G is an important step forward, and we cannot let our city fall further behind other cities in terms of network infrastructure.
Screen Name Redacted 11/05/2020 11:44 AM	Companies are now installing "small" 4G LTE cell antennas (which is the first phase of 5G infrastructure) on "non-tower structures" such as lamp posts, utility poles, along streets, back lanes, close to homes, school, public spaces, parks without any notification and without advance consultation with citizens. Some antennas are installed less and 10 metres from homes, would ou want a 4G LTE cell antennas right in front of your home?
Screen Name Redacted 11/05/2020 12:18 PM	There needs to be some awareness that 5G cell towers do not impact the public's health.
Screen Name Redacted 11/05/2020 12:18 PM	5G is a weapon and should not be used in public areas including residential, public and especially schools.

Screen Name Redacted 11/05/2020 01:00 PM	6G is not possible. This is as high as you can go.5 G. Whoever gains control over this unsafe tech gonna rule the remaining 21st century. So this is the question you will have to ask yourselves: Do I want China or USA to control Canada?Self driving cars? Automated buses? Etc. You are about to diminish a gazillion jobs.Not now...later.This whole 5g is a scam anyway. You can get higher speed with updated 4g tech.The promised speed is guaranteed to bottleneck. Proven fact. Cell towers gonna be too close to your home. 24/7 living in that [removed]. Now the question is: Does our honorable mayor live under a power line?You know those big ones? As soon as he moves into one of those homes I will change my opinion.Of course, decision makers will not give a [removed]. No iluusions on my part.Just look at how well politics and businessmen handled this covid situation in Winnipeg...Bravo, now it's time to give [removed] to the front-line workers and doctors, too, eh?
Screen Name Redacted 11/05/2020 01:56 PM	Adding this technology to every streetlamp in the city without knowledge about the long term effects is not wise
Screen Name Redacted 11/05/2020 03:17 PM	Please don't base public policy on the opinions of conspiracy theorists
Screen Name Redacted 11/05/2020 03:48 PM	I am good with introducing to my neighborhood
Screen Name Redacted 11/05/2020 04:25 PM	I believe you need more research into the 5 G. Also I prefer the fibre optics, I believe this is better security and less likely to get hacked.
Screen Name Redacted 11/05/2020 07:27 PM	5G technology is completely un tested and our current radiation laws in Canada are outdated and completely inadequate. 5G technology has nothing to do with faster internet speeds and everything to do with data collection from private citizens. NO to 5G.
Screen Name Redacted 11/06/2020 09:26 AM	Providing adequate public education based in facts is important
Screen Name Redacted 11/06/2020 10:21 AM	Modern forward thinking cities need 5G to be competitive
Screen Name Redacted 11/06/2020 10:56 AM	There is a lot of environmental and health implications from 5G. It is not proven to be safe at all, the studies being used are very old and out of date.
Screen Name Redacted 11/06/2020 11:01 AM	I do not want any G5 in my neighbourhood
Screen Name Redacted 11/06/2020 12:53 PM	The science is clear. 5G radiation is non-ionizing and therefore poses no health or safety risk.
Screen Name Redacted	Invasion of privacy. We are paying for it and all of these technology

11/06/2020 12:56 PM

companies are getting tons of money to control us.

Screen Name Redacted

11/06/2020 02:44 PM

Changes to technologies that have potential health impact concerns need to be studied and assessed before being moved ahead (especially without the majority's knowledge or understanding). It is not acceptable to simply 'assume safety' with new technologies and/or taking the word of the developers and tech industry who are selling and promoting the product(s). There are many groups with research and cautions on these issues. One great resource is found on Physicians for Safe Technology's site: <https://mdsafetech.org/featured-page-one/join-mdsafetech-org/#:~:text=Physicians%20for%20Safe%20Technology.%20The%20use%20of%20wireless,as%20another%20health%20risk%20behavior%20with%20precautions%20>

Screen Name Redacted

11/06/2020 03:15 PM

City must write a letter of non-concurrence There must be full AND meaningful consultations in all parts of the city where 4G and 5G small cell antennas are proposed to be installed. Clear notification of small cell installation and where they will be installed to nearby residents Maps of where 4 and 5G small cell antennas are installed must be available on maps at the city's website. Antennas must be clearly labelled and visibility marked as such Buffer zones must be established when requested by people for health and other reasons

Screen Name Redacted

11/06/2020 03:28 PM

5G is proved unhealthy.

Screen Name Redacted

11/06/2020 03:32 PM

People should be able to have a buffer zone around their property, or be allowed to vote NO if close to them.

Screen Name Redacted

11/06/2020 03:40 PM

An alternative would be to use fiberoptic cable instead of using wireless technology. This should be required to build a 5G network unless and until a significant research study has been completed on the health effects of the proposed 5G antennae system. I think the City of Winnipeg should take the lead on commissioning that study by an independent (not industry supported) scientific research organization.

Screen Name Redacted

11/06/2020 03:44 PM

There is plenty of research on the health implications of wireless radiation. There are no studies indicating that small cell 5G radiation is safe for humans, birds and bees. Some people are extremely sensitive to wireless radiation. Fiber Optics is safer, faster and more secure. I will be joining the lawsuit against the city of Winnipeg if small cell 5G goes forth.

Screen Name Redacted

11/06/2020 04:45 PM

We know from research that these frequencies have a negative impact in human health and it is wrong to implement them without safety studies in the short and long term health effects.

Screen Name Redacted

11/06/2020 05:21 PM

5G is a very great risk to our health!

Screen Name Redacted

11/06/2020 06:00 PM

I ask our City Council Members and Mayor Bowman to please issue a statement of non-concurrence to the Proponent and to ISED Canada. A letter of non-concurrence needs to be written for a matter of this severity. I ask you, our representatives, to do this for our children and grandchildren who have the most at stake and yet no voice in this matter. I ask City Council to write this letter of non-concurrence regardless of the fact that they deem it may be considered invalid. It must be written either way to show our stance on how we feel about such technologies and the dangers they impose. Precautionary principle must be adhered to. The city guides and facilitates the siting process by developing the design guidelines for Antenna Systems contained in Section 6 of the Policy. I ask that the city establish buffer zones for people requesting them for medical or other reasons. The City of Winnipeg has a role as a legislator (a person who makes laws; a member of a legislative body). It is within the city's power to enforce laws that protect the right for people to have buffer zones around their homes. It is also "on the table", according to the site of this survey, that the City has some authority over location guidelines and design guidelines for small cell placement. Those two points, point to the fact that the City can explore and have power to implement buffer zones for residents. I ask that buffer zone distances be developed by a team of individuals who have credentials in science and medicine, and who are independent of telecom industry funding. I ask that city-owned assets near hospitals, playgrounds, daycares, and schools be buffer zoned such that all city assets in close proximity be off the table as small cell sites. My husband and children (aged 9 and 14) use public transit daily. The City has a role on small cells being placed in transit shelters. I am very concerned about small cells being placed in shelters where my children wait for the bus and ask that bus shelters be exempt/buffer zoned from to protect passengers that rely heavily on public transit from unnecessary involuntary exposure. According to the engage Winnipeg site here, what is on the table is "establishing a community consultation process, where warranted." I believe cell antennas being installed within mere feet/meters of home warrant the right to community consultation. I ask for continued consultation with the public. asking for feedback on all the topics outlined under the heading "what is 'on the table' ?" found on this survey's website (see site under "What is the City's Role"). I would like clear advance notification of where small cells are being planned, that is, specific locations, to be sent to all nearby residents. I would like to see maps indicating where all 4G and 5G small cell antennas exist available on the City of Winnipeg Website for people to reference. I would like all antennas that do move forward, should that happen, to be clearly labelled in public so that people can see where they are. Just a final note, visuals are important to me. Our city's pride in visual art is evident everywhere from the Leo Mole Sculpture Garden, to the new rapid transit way's art installations, to the beauty of nature in our rich parks. I am extremely concerned about the visual impacts these antennas will have on our city. Knowing what I know about small cells, I do not look forward to my views being tarnished by them on all city-owned assets. They will be uncomfortable reminders that my health is being

imposed upon no matter where I look. It used to be every time I looked at the sky-line in business or commercial areas I might see the odd macro tower, but now it would be every time I look out my home's windows in my own residential neighbourhood. I cringe to think that this will be added to the aesthetics of our beautiful city. I realize small cells will look a lot like the size of WiFi routers, but can take on many different looks, all of which I am aware of. I am very concerned about having to look at these for the next ten plus years of this contract. Thank you for your time to read my additional comments. Thank you for using your wisdom and power to do what you can and what is best for our city in the upcoming month(s). Please take the effort to put forth a letter of non-concurrence to the Proponent and to ISED Canada. Even if you are unsure if it will be effective, please band together as a council and DO SO REGARDLESS to show your stance for the citizens of Winnipeg.

Screen Name Redacted

11/06/2020 08:08 PM

The health impact of this technology is not yet well understood and the increased radiation could well pose problems to our health. The antenna will be in public, not private, settings, and so will impact the health even of those who oppose the technology.

Screen Name Redacted

11/06/2020 08:12 PM

Thank you for this question because I have a lot to add. Also, thank you for asking the public's opinion on this important topic. It is my understanding that the City can take a few steps to halt the roll out of small cell technology: a letter of non-concurrence and passing motions in committees/City Council. Some municipalities in Canada have passed motions to do just that. I believe the City should follow the Precautionary Principle for the roll out of a new technology until there is scientific consensus that the technology is safe long term for our health and the environment. I'd like the City Council to pass a motion asking the federal government for a moratorium until there is that scientific consensus. At minimum, the City should wait until the World Health Organisation conducts its health risk assessment. "WHO is conducting a health risk assessment from exposure to radiofrequencies, covering the entire radiofrequency range, including 5G, to be published by 2022." <https://www.who.int/news-room/q-a-detail/radiation-5g-mobile-networks-and-health> I'd like more public consultation on this issue. It would be important that the public knows where there are proposed installations of all small cell antennas and that the information be readily available on your website. In regards to your survey, I found that having to register was a barrier to filling out this survey. There should not be any registration. I don't understand why some surveys require us to sign-in while others don't have that requirement. Also, for question #1, I would have liked to have an option between "somewhat familiar" and "not very familiar" as it would be more accurate in my case.

Screen Name Redacted

11/06/2020 10:15 PM

I have small children and their health and safety is most important to me. I would like there to be fulsome public consultations conducted by the CofW. In the event that a small cell antenna is placed in my area, I would like notification prior to installation, be informed of the exact location and that the antennas be clearly labelled once installed. If and when 5G technology is

installed, I would also like notification. The city should allow for small cell antenna buffer zones. I also have privacy concerns related to this new technology. Finally, I would like the CofW to write a letter of non-concurrence.

Screen Name Redacted

11/06/2020 10:30 PM

I do not want any close to my house

Screen Name Redacted

11/06/2020 10:46 PM

There is just not enough research on how the radiation -emitting network will affect peoples' health. I don't want my children to be harmed by something we don't know enough about.

Screen Name Redacted

11/06/2020 11:53 PM

For the health and safety of Winnipeg residents, we need:

- the City of Winnipeg to write a letter of non-concurrence;
- City Committees and City Council to pass motions asking the federal government for a moratorium until there is a scientific consensus of safety to the public, which would include scientists independent of the wireless industry. This and similar motions were passed in Ontario and Quebec by municipalities;
- Full and meaningful public consultations by the City of Winnipeg in all parts of the city where there are proposals for installations of small 4G or 5G cell antennas;
- A meaningful and influential role of residents in decision-making regarding the small cell technologies project and full transparency of the process;
- Clear notification that small cell antennas will be installed, their specifications and where they will be located, to all nearby residents. Also, notifications when the power densities are increased and 5G, or technologies with millimeter waves, are installed;
- Maps of where small 4G and 5G antennas are located available on the City of Winnipeg website;
- Antennas that are clearly labelled so that people can see where and what they are e.g. in bus shelters, and;
- Buffer zones for people requesting them for medical or other reasons.

Screen Name Redacted

11/07/2020 12:05 PM

Officials keep saying that they're following Health Canada in that they determine what's safe in regards to 5G tech. Health Canada is approving based on draconian views on radio frequency exposure. We can't use old measure with new technology for safety. A proper study must be done for safety. 4G was bad enough now we're getting closer to homes more exposure to 5G microwaves that generate more heat disrupting ecosystems as well as our own bodies. Please listen to the experts (eg: 5gspaceappeal.org) around the world putting their careers on the line to say we've got it wrong with this dangerous tech. We need and are getting fibre optics installed in a city wide project already. No need for dirty 5G technology. Our health as citizens should come first not corporate greed. Thank you

Screen Name Redacted

11/07/2020 05:01 PM

Do not want this in my neighborhood. Strongly opposed. I will not vote for those in responsible for this tower to my city and neighborhood.

Screen Name Redacted

11/08/2020 08:39 AM

No one knows enough about the health effects of this technology, including the scientific community. Let's not do what we did with plastics in the 20th Century and create problems that we can't undo before we've studied it

more.

Screen Name Redacted

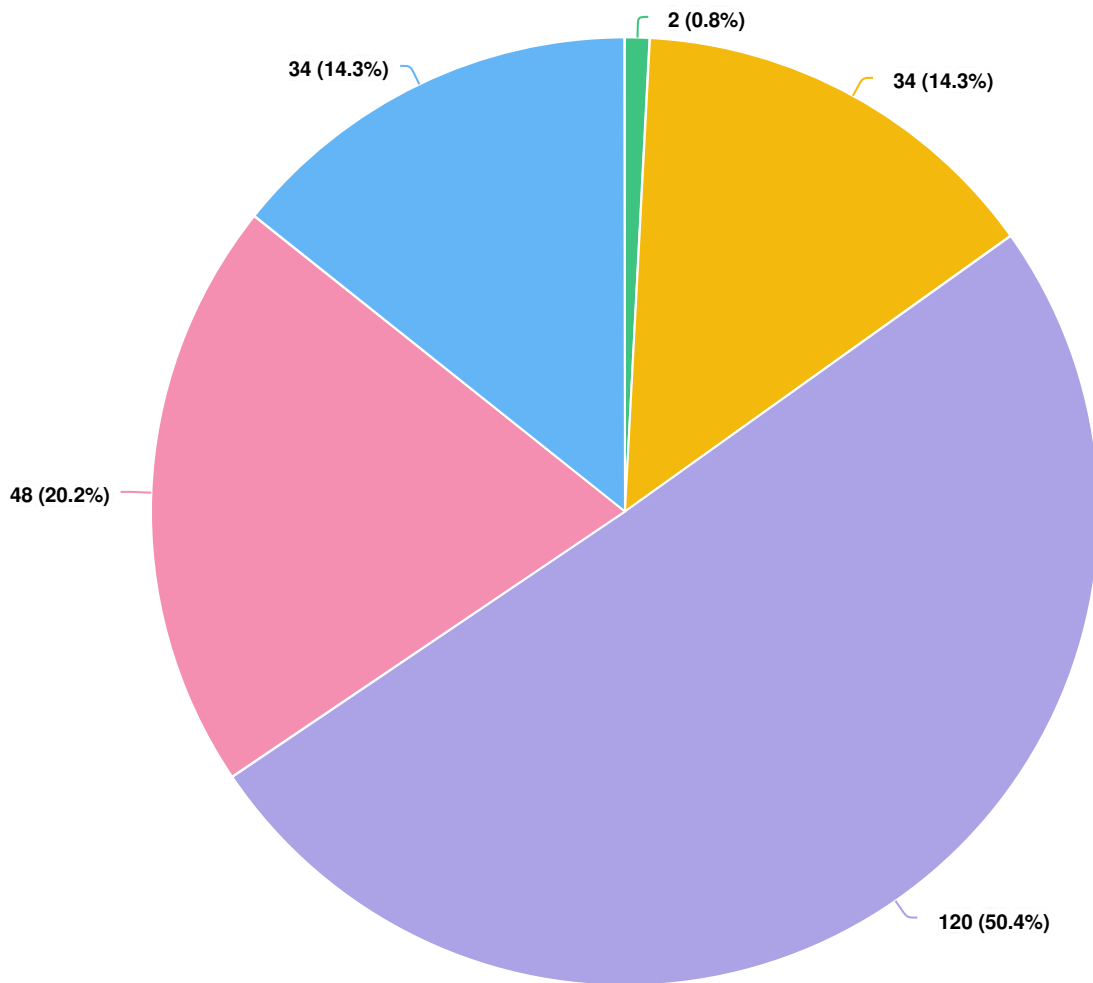
biggest concern is for health.

11/09/2020 03:08 PM

Optional question (167 response(s), 88 skipped)

Question type: Essay Question

Q5 What is your age?

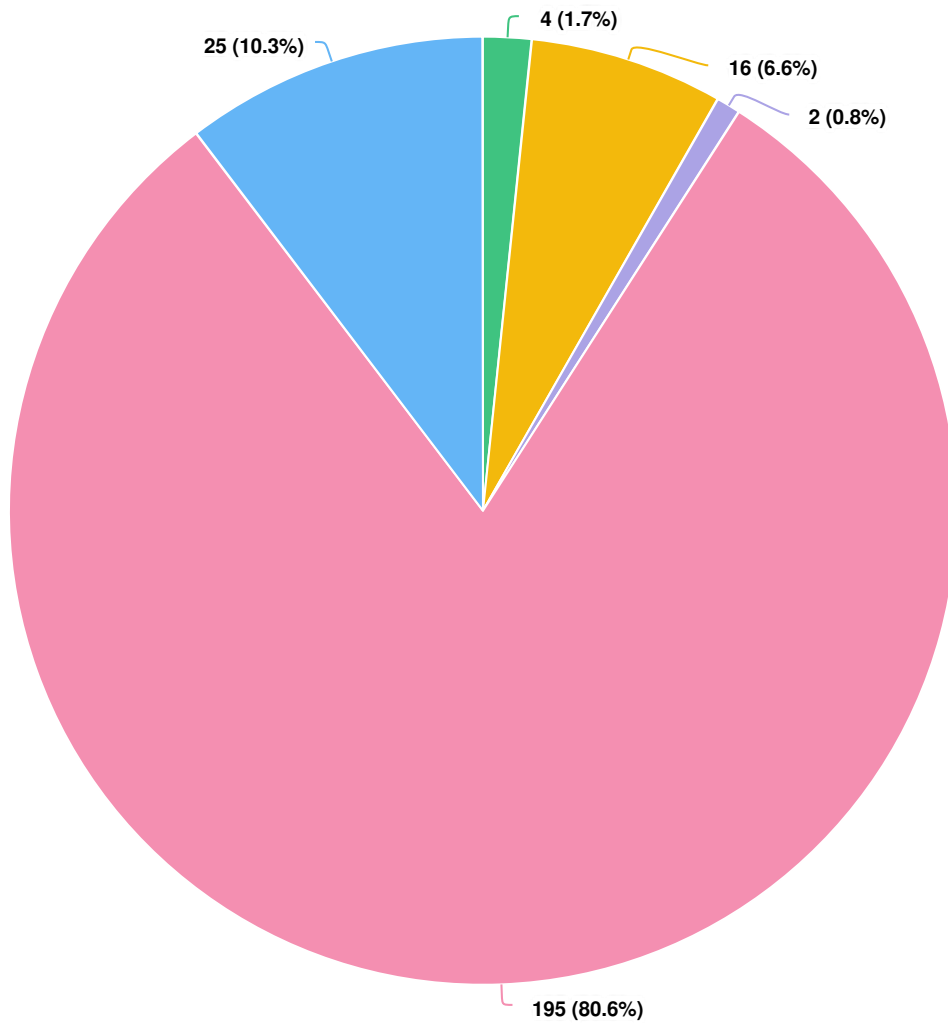


Question options

- Under 18
- 19-34
- 35-55
- 55-64
- 65+

*Optional question (238 response(s), 17 skipped)
Question type: Dropdown Question*

Q6 Please select the option that most closely aligns with you. This will help us understand who we are hearing from and who the stakeholders are in Winnipeg.



Question options

- I am affiliated with a group that is in support of 5G/small cells.
- I am affiliated with a group that is not in support of 5G/small cells.
- I am affiliated with a group that is monitoring 5G/small cell, but neither supports nor opposes 5G/small cell.
- I am not affiliated with any group.
- I prefer not to say.

Optional question (242 response(s), 13 skipped)
Question type: Dropdown Question

Q7 | If you answered that you are part of a group, what is the name of the group?

Screen Name Redacted 10/12/2020 02:47 PM	I am not affiliated with any group pro or con 5G
Screen Name Redacted 10/14/2020 09:49 AM	5G Winnipeg Awareness
Screen Name Redacted 10/14/2020 10:57 AM	5G Winnipeg awareness
Screen Name Redacted 10/14/2020 10:59 AM	We are an informed family.
Screen Name Redacted 10/14/2020 11:26 AM	5G winnipeg awereness
Screen Name Redacted 10/14/2020 11:43 AM	How is this relative to me expressing my opinion?
Screen Name Redacted 10/14/2020 12:16 PM	N/a
Screen Name Redacted 10/14/2020 12:22 PM	NA
Screen Name Redacted 10/15/2020 04:50 PM	In the past I attended meetings of a local group but I am not a part of that group. I do not participate with them in their activities. I am a citizen of this city voicing my concern.
Screen Name Redacted 10/15/2020 08:50 PM	n/a
Screen Name Redacted 10/15/2020 10:57 PM	The "5G Winnipeg Awareness" Team
Screen Name Redacted 10/17/2020 08:52 PM	Confidential
Screen Name Redacted 10/22/2020 04:02 PM	5 G Awareness Winnipeg which provides information on the technology and wants the installation of small cell antennas to be halted until independent studies show that it is safe--in other words following the Precautionary Principle of making sure there is

<p>Screen Name Redacted 10/23/2020 09:34 AM</p>	<p>Wireless provider</p>
<p>Screen Name Redacted 10/23/2020 03:53 PM</p>	<p>5G wwinnipeg Awareness</p>
<p>Screen Name Redacted 10/26/2020 12:27 AM</p>	<p>Not important. I am a citizen that is taking action to make sure that the dangers of 5G is known</p>
<p>Screen Name Redacted 10/26/2020 12:00 PM</p>	<p>5G Winnipeg Awareness</p>
<p>Screen Name Redacted 10/28/2020 08:44 PM</p>	<p>I am an authorized dealer for Rogers Communications</p>
<p>Screen Name Redacted 10/31/2020 02:23 PM</p>	<p>Doesn't matter if I'm part of a group or not. I'm an independent critical thinker. I do my own research and form my own opinions. Unbiased science drives my opinions. I stand INDEPENDENTLY OPPOSED to 5G.</p>
<p>Screen Name Redacted 10/31/2020 07:13 PM</p>	<p>I'm not affiliated with any group but am trained in Health Physics (radiation protection) and have</p>
<p>Screen Name Redacted 11/02/2020 01:50 PM</p>	<p>Why does it matter? Does it give me more or less of a voice? Weird question. Shame on you.</p>
<p>Screen Name Redacted 11/02/2020 10:12 PM</p>	<p>5G awareness</p>
<p>Screen Name Redacted 11/02/2020 10:43 PM</p>	<p>Group of One Citizen. What relevance is an association or affiliation? I am associating currently with you. What is your affiliation?</p>
<p>Screen Name Redacted 11/03/2020 09:33 AM</p>	<p>Question 6 DID NOT PROVIDE AN APPROPRIATE RESPONSE !! Appears to be a lot of bias in this survey. Question 6 does not even include 65 years and over. DO WE NOT COUNT?</p>
<p>Screen Name Redacted 11/03/2020 11:19 AM</p>	<p>5G awareness winnipeg</p>
<p>Screen Name Redacted 11/03/2020 12:12 PM</p>	<p>5G Winnipeg Awareness</p>
<p>Screen Name Redacted 11/04/2020 10:26 AM</p>	<p>5G Winnipeg Awareness</p>
<p>Screen Name Redacted 11/04/2020 10:20 PM</p>	<p>5G Winnipeg Awareness</p>

Screen Name Redacted 5G Winnipeg Awareness
11/05/2020 11:31 AM

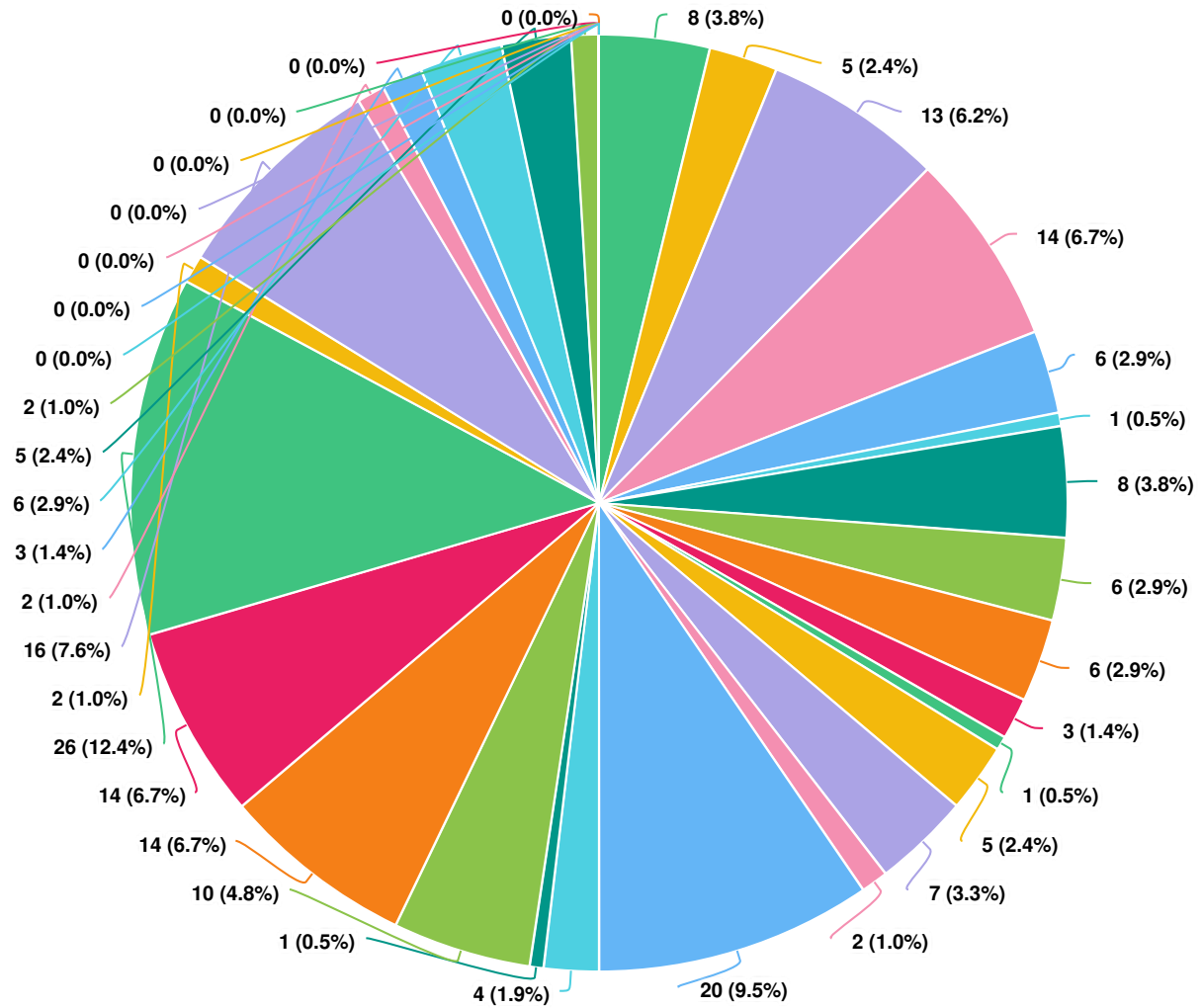
Screen Name Redacted I have received information from 5G Winnipeg Awareness but I am not
11/06/2020 08:12 PM affiliated with the group.

Screen Name Redacted 5G Winnipeg Awareness
11/06/2020 11:53 PM

Optional question (31 response(s), 224 skipped)

Question type: Single Line Question

Q8 Please select the first three characters of your postal code



Question options

- R2C R2G R2H R2J R2K R2L R2M R2N R2V R2W R2X
- R2Y R3C R3E R3G R3J R3K R3L R3M R3N R3P R3R
- R3T R3V R3W R3X R3Y Other (please specify) R2P R2R R3A R3B
- R3H R2E R3S R4A

Optional question (210 response(s), 45 skipped)
Question type: Dropdown Question

Appendix D – Qualitative Input Analysis, Questions, and Feedback

Qualitative Input Analysis, Questions, and Feedback

Qualitative feedback themes

The themes in the table below represent all of the themes found in responses to the question in the online survey ‘do you have anything to add?’ There were 165 responses to this question. Some responses had more than one theme so the total themes represented is more than 165.

Theme (alphabetical)	Number of responses
aesthetic impacts	3
avoid certain locations	13
implement buffer zones	11
City owned cellular network	2
concern about misinformation	8
consent	7
consider alternatives	12
consider financial benefits	1
do not proceed	14
environmental impacts	10
industry not trustworthy	5
label small cells	9
lack of transparency	2
legal implications	11
letter of non-concurrence	13
need more research	41
need to plan for best outcomes	5
no comment	7
ensure notification	5
precaution needed	17
privacy concern	8
question	2
share more information	7
should be Province-wide	1
should not be a priority	1
small cells are safe	6
small cells are unsafe	40
speed up installation	5
support for better service	12
support for consultation	13
support for small cell technology	6
use science for decisions	3

Feedback

This table summarizes several of the more prominent themes within the responses to the online survey open-ended question ‘do you have anything to add?’ Responses from the Public Service are also provided.

Feedback	Response and/or consideration
<p>The City should write a letter of non-concurrence to the Federal Government related to stop small cell installations in Winnipeg.</p>	<p>The Public Service intends to make Council aware of this option. Council will be provided with the Phase 1 public engagement summary.</p>
<p>There should be more independent research conducted to determine the safety of small cells before proceeding with installations.</p>	<p>The City is not responsible for the regulation of radio communications. Canada’s Radiofrequency Exposure Guidelines (known as Safety Code 6) are developed at the federal level by Health Canada and regulated by Innovation, Science and Economic Development (ISED). Any company operating 5G or Small Cell technologies in Winnipeg would be required to adhere to these guidelines.</p>
<p>There is a lot of misinformation about small cells and 5G technology. The City should avoid making decisions based on opinion and use science and facts to make decisions.</p>	<p>The City is using information from Innovation, Science and Economic Development (ISED), public feedback, and other sources to support the City’s role in providing guidance around location, design, and consultation with the community.</p>
<p>Winnipeg should avoid certain locations for small cells (e.g. schools) and should allow for buffer zones around small cells.</p>	<p>This information will be considered as we proceed. The City will also look to Health Canada and Innovation, Science and Economic Development (ISED) for advice on location requirements.</p>
<p>Winnipeg should consider alternatives to small cell technology.</p>	<p>Fibreoptic and wireless technologies typically complement each other. For instance, Small Cell sites would communicate wirelessly with mobile devices, while at the same time connecting back to the wireless provider’s main network through fibreoptic cable.</p> <p>In some cases, both fibreoptic and 5G connectivity to fixed locations (e.g. residential internet) may be alternatives to the cable or landline connections used by most internet customers today. These service offerings are the responsibility of the service providers.</p>

Feedback	Response and/or consideration
<p>There is support for improved cellular service that small cells could bring and Winnipeg should not fall behind.</p>	<p>Cellular service is the responsibility of the cellular service providers and approval of infrastructure is the responsibility of cellular service providers. Approval comes from the Government of Canada with Innovation, Science and Economic Development Canada (ISED) as the approving authority for the development and operation of radiocommunication in Canada.</p> <p>The City is involved in small cell trials to ensure we understand the opportunities, issues, and value of small cell technology.</p>
<p>When a small cell antenna is proposed, the City should conduct meaningful consultation that allows residents to understand the risks and provide feedback.</p>	<p>As part of this process, the City is collecting feedback to find out about residents' concerns and prepare for small cell technology.</p> <p>Feedback regarding the need for consultation will be considered in the City's review. The City is considering how to approach public consultation and public communication for small cell technology in the long-term. This will be determined during the course of the trials.</p>
<p>Winnipeg should ask for consent from residents before implementing small cells near where people live.</p>	<p>As part of this process, the City is collecting feedback to find out about residents' concerns and prepare for small cell technology. Feedback regarding the need for consultation will be considered in the City's review. The City is considering how to approach public consultation and public communication for small cell technology in the long-term. This will be determined during the course of the trials.</p> <p>While the City grants access to City-owned assets, the City is not the final approving authority for telecommunications antennas. Approval comes from the Government of Canada with Innovation, Science and Economic Development Canada (ISED) as the approving authority for the development and operation of radiocommunication in Canada, including telecommunications antennas, pursuant to the Radiocommunication Act and the Radiocommunication and Broadcasting Antenna Systems procedures.</p> <p>In cases where the City does not support a proposal, it cannot prevent a wireless service provider from ultimately gaining permission from ISED to install a telecommunications antenna, even if it may contravene the Winnipeg Antenna Systems Policy.</p>

Appendix E – Interview notes

Small Cell Technology Review

Interview Notes

Organization: North Forge
 Date: December 11, 2020
 Time: 11 a.m.

Purpose of interviews:

- Gather detailed feedback to supplement the research survey, online survey, and joint working group input for consideration prior to carrier trials.

The City will be coordinating with carriers during their trials to see how our existing policies, processes, and procedures regarding cellular infrastructure apply to 5G and small cells, and determine what, if any, amendments need to be made.

Question	Response
1. What is your understanding of small cell technology?	<ul style="list-style-type: none"> • Small cells are intended to provide coverage to smaller areas. • With the larger towers, the further you get the signal weakens. • Small cell technologies allow for a more reliable service. • 5G is more powerful; next generation. • There is a lot of negative connotation out there about 5G and how it could affect your health
2. What are the greatest opportunities with small cell technology, for yourself and for Winnipeg?	<ul style="list-style-type: none"> • With your phone, you do not notice a lag or issues with internet connectivity in the City of Winnipeg. • With a computer, there are issues with connectivity. Not sure if 5G will improve the strength of transmission from Shaw and BellMTS. • With high use of internet, there are slower connections in the evening. • Would be very interested in reliability if it is improved with 5G. • Will 5G be able to be implemented easier in rural Manitoba? North Forge is interested now that they have expanded their Founders Program digitally across Manitoba. • Founders need to have good connectivity to start and run a business.

Question	Response
<p>3. What are the biggest challenges with small cell technology?</p>	<ul style="list-style-type: none"> • You will have naysayers with any type of new technology. Its important to address the concerns around this. • Any time you have radio waves or transmission, there will be concerns from some people. • Younger generation will be supportive but will have to overcome the concerns from any influencers. • How might businesses react if there is better service in some places? • This could mean the difference between packing up and moving to a community that does have it. COVID has shown us we have to go online. It will need to be adopted by every community if they want to survive.
<p>4. What is your understanding of a municipality's role when it comes to small cell technology?</p>	<ul style="list-style-type: none"> • Municipalities cannot rely on the federal government to dictate when something gets rolled out. • Municipalities have to be proactive and starting looking at what is available for citizens and ensure it is offered quickly. • Municipalities will not survive and young people will not stay in communities if they do not have access. • Communities will die if they do not have these services. • Younger people are interested in work/life balance and appreciate the community life but still need to do it with a high degree of technology. • A lot of newcomers are moving into communities and communication is extremely important to them as well. • North Forge is working with a lot of businesses since June 2020 (60+); COVID has had a positive impact on the technology industry. Creating platforms and better services to deal with the challenge's businesses are seeing. • Movement of food, drones, new platforms. There is less interaction with people. • If Manitoba wants to be a world player, we have to have a reliable network and good technology in place. Need to be seen as a leader. It needs to be pushed and pushed strong.
<p>5. What actions do you think the City of Winnipeg should take when it comes to small cell technology?</p>	<ul style="list-style-type: none"> • Look at the Metro region and whether the City can influence other municipalities. • Several foreign companies are looking to start subsidiaries in Manitoba. They are technology companies and as such need innovative and reliable service. • Consider the City's role as an enabler and leader. • North Forge is the innovation arm for the Province of Manitoba and may be able to support those efforts. • If North Forge can help in any way, they would be happy. • Leadership needs to move ahead and get it done. • This is imperative for founders, for incubators. Winnipeg needs to be looked at as a smart city. We can't lag behind. Don't want Manitoba to be seen as one big rural province.

Other comments:

Question – how many small cells will be installed?

Response – In contrast to existing macro towers, there could be hundreds. Need collaboration when carrying this out.

Question – does the Province of Manitoba have an authority?

Response – The City has not identified a specific role for the Province. The authority comes from the Federal Government – ISED and CRTC. ISED along with Health Canada has defined regulations around radio communication and technology. Federal websites have information linking between ISED and Health Canada. ISED passes along regulations that municipalities have to put into practice (permitting, controls, etc). The City is upholding the rules from the federal government.

Question – can we influence the adoption by other communities in the Province?

Response – there is some interest and concern. We will take this away.

Suggestion – suggest getting a hold of the Winnipeg Metropolitan Region. They are doing policies around innovation in rural Manitoba. Also, Manitoba Chamber.

Question – with 5G, will that reduce the costs to individual subscribers? Does that mean there could be a lot more opportunity to be a smart city? Is there free wifi in downtown Winnipeg?

Response – Do not have free Wi-Fi everywhere. The City has an agreement with Shaw. Have over 50 locations related to the City's assets (libraries, community centres). Universal access now available (including non-Shaw customers).

In terms of reducing costs, likely to see a shift in how services are delivered/paid for (speed vs. quantity of data). The more cellular capacity that exists across the city, the more likely we may be to see hotspots.

Question – if there are some areas with 5G and some with 4G, will that cause issues?

Response – macro towers will stay and small cells will augment. The faster the performance, the less that signal is able to penetrate things (like walls). Likely to see some of this switching between different generations (e.g. walking indoors) with the introduction of 5G.

Question – could be three or four years?

Response – there are different versions that are being planned with a range of potential speeds and performance. There is millimetre wave which is the culmination of where the technology is going. Right now, we are on the other end of that range.

Comment – would like to see Winnipeg adopt faster than other cities. We seem to lag behind when it comes to some things.

Small Cell Technology Review

Interview Notes

Organization: Department of Electrical and Computer Engineering, University of Manitoba
 Date: December 16, 2020
 Time: 11 a.m.

Purpose of interview:

- Gather detailed feedback to supplement the research survey, online survey, and joint working group input for consideration prior to carrier trials.

The City will be coordinating with carriers during their trials to see how our existing policies, processes, and procedures regarding cellular infrastructure apply to 5G and small cells, and determine what, if any, amendments need to be made.

Question	Response
1. What is your understanding of small cell technology?	Research on this topic for 50 years. Lots of people and business headquarters require more bandwidth. Used the same band many times and keep adding more towers. Eventually, got to microcells and putting them on light posts, etc. The needs of the customers drive the whole thing. Do not have the same problem in North America as in e.g. Japan because we do not have the same density. Can maximize bandwidth use. Main benefit is reducing the signal. In principle, the system becomes safer. The issue is, no one believes you. People don't want the tower despite the benefits of using small cells.
2. What are the greatest opportunities with small cell technology, for yourself and for Winnipeg?	Main benefit for business is not so much on technology, but on the service side. Businesses cannot operate without internet anymore. Many businesses do not require infrastructure like roads, bridges, etc.; they require infrastructure required for reliable internet. Good access to the internet will lead to businesses becoming feasible. Small cells could remove the limitation of limited internet access. Benefits are primarily on the business side. Technology started in places like Japan and Korea. More employment, more income, more taxes, etc. The opportunities are incredible, especially for young people.
3. What are the biggest challenges with small cell technology?	Sage Creek – limited cell phone signal. Needed a tower, but there was a petition to stop a tower from being built. Public perception is that towers are very dangerous. With small cells, the signal strength is lowered so much that the chance of danger is minimum or non-existent. People see towers and think there is a danger.

	<p>If they can make small cell antennas almost invisible, public acceptable may be easier.</p>
<p>4. What is your understanding of a municipality's role when it comes to small cell technology?</p>	<p>The City has a role because of municipal properties. Service providers and federal government clarify what the needs are. Public has concerns and the municipality can somehow get all of the missing parts filled in and clarify how to handle petitions, etc. Right now, there is nothing there and no one to take care of it. The City is not taking responsibility, but somehow look at this and identify that there is a problem and clarify the process.</p> <p>There is a missing link with information. No one knows who is in charge. People are going around but not going to the centre to make a decision. Municipality is sitting in the middle. Somehow, there should be a link between the City, federal government, and service providers.</p>
<p>5. What actions do you think the City of Winnipeg should take when it comes to small cell technology?</p>	<p>Talk to Federal government and service providers to talk about this. Come up with something that will work. There's no point in coming up with regulations if the federal government is not going to allow it. Groups should sit down together and determine how to move forward. This would be the most effective way and quickest way to clarify problems and how to solve them. Right now, there is a black hole with the problems not being solved. This area is not growing as fast as the technology. Industry should be able to come to the City and determine what the process is.</p>

Small Cell Technology Review

Interview Notes

Organization: 5G Winnipeg Awareness

Date: December 18, 2020

Time: 3 p.m.

Purpose of interview:

- Gather detailed feedback to supplement the research survey, online survey, and joint working group input for consideration prior to carrier trials.

The City will be coordinating with carriers during their trials to see how our existing policies, processes, and procedures regarding cellular infrastructure apply to 5G and small cells, and determine what, if any, amendments need to be made.

Note: Written submission also provided (see attached)

Question	Response
1. What is your understanding of small cell technology?	<p>An above average understanding of the risks to health and some technical aspects. There are some people in the organization who have a better understanding of the technical aspects of radiofrequency emissions from wireless equipment.</p> <p>5G means different things to different companies. Mobility devices with full 5G that includes millimetre waves (mm waves) are not widely available in Winnipeg, as far as we know. Some cell phone marketers say their phones are 5G, but many do not use mm waves.</p> <p>Mm waves are why network antennas have to be close to devices. Mm waves do not penetrate readily through walls and windows. Pre-5G frequencies used for 3G, 4G and LTE are longer wavelengths and therefore are able to penetrate objects very easily.</p> <p>Our group's position: Small cell antennas are not required right now in most places in Winnipeg because people get good enough reception with the existing network antennas from the pre-existing large towers and rooftops.</p> <p>There are major technical problems with 5G technology to be used by the public for everyday mobile communications and it will be some time before, if ever, the technology is available to the regular consumer on a widespread basis that would include residential neighbourhoods.</p> <p>The real reason carriers may be rushing to get the small cells up on lamp posts, etc. is because non-tower structures can be excluded from public</p>

Question	Response
	<p>consultation according to the Winnipeg Antennas Siting Policy (WASP). Carriers may be using the excuse that 5G requires the small cells in order to install small cells instead of having to go through the hassle of public consultations that would be required for new big (macro) cell towers.</p> <p>5G with mm waves technology may never come to be in residential areas for mobility purposes but we will already have the (unnecessary) network cell antennas close to our homes. Once in place, removal of antennas will be difficult. The installations of additional antennas should be on a case-by-case basis relying on systematic and transparent-to-the-public methods of assessing need.</p>
<p>2. What are the greatest opportunities with small cell technology, for yourself and for Winnipeg?</p>	<p>Bring public awareness to the potential serious health risks posed by exposure to pervasive everyday radiofrequency radiation.</p>
<p>3. What are the biggest challenges with small cell technology?</p>	<p>The biggest challenge is to make emissions safer for people and the environment.</p> <p>Need to look at which frequencies are safer for people. Some frequencies are more biologically active. Some frequencies do not affect people as adversely as others.</p> <p>Industry denial of adverse effects prevents investigation of safer frequencies.</p>
<p>4. What is your understanding of a municipality's role when it comes to small cell technology?</p>	<p>Technology is developing rapidly. 5G technologies have not been fully developed. By the time the installation of small antennas in the City would begin, there may be enough known about 5G technologies that elected officials and health authorities will realize the technology is unsafe.</p> <p>In 2011, the World Health Organization's International Agency for Research on Cancer (IARC) classified radiofrequency radiation (cell phone, cell antenna, wi-fi, etc.) as a <i>possible</i> carcinogen. Because of recent human studies as well as two large high-quality animal studies showing "clear evidence of carcinogenicity," IARC will be re-evaluating this agent within 3-4 years. One of the animal studies was conducted at cell tower exposure levels. It is likely that radiofrequency radiation will be re-classified as a <i>probable</i> carcinogen or as a <i>known</i> carcinogen (asbestos and cigarette smoke are <i>known</i> carcinogens).</p> <p>What is the City going to do if IARC classifies 5G as a known carcinogen and the small cells have already been installed in front of homes? Who carries the liability? The Encroachment By-law does mention that coverage may be required.</p> <p>There are lawsuits ongoing in the USA challenging the basis that the Federal Communications Commission uses for its standards (these are similar to Health Canada guidelines).</p>

Question	Response
	<p>There are safety implications, particularly for pregnant women, children and medically compromised persons.</p>
<p>5. What actions do you think the City of Winnipeg should take when it comes to small cell technology?</p>	<p>What the City is doing now is critical. Better dissemination of information to the public and increased public awareness are needed.</p> <p>5G Winnipeg Awareness received feedback, from door-to-door distribution of its own survey and through an online and hardcopy petition, that people are not aware that thousands of small cell antennas are planned throughout Winnipeg and that there are health implications.</p> <p>People should be informed.</p> <p>Hope the City can step up and take a bigger role.</p> <p>People are experiencing electrical sensitivities.</p> <p>People should be made aware of the emissions from small cells in case anyone develops symptoms seek appropriate medical attention.</p> <p>Without awareness, some people may be inappropriately treated.</p> <p>Need high-quality public consultation.</p> <p>Telecommunications companies do not always conduct quality consultation.</p> <p>Member of Parliament Jim Carr wrote to Mayor Bowman requesting “fulsome” public consultations on the issue.</p> <p>If installations of small cell antennas throughout Winnipeg do go ahead, people need notification so they can take whatever protective measures they deem necessary (e.g. move away).</p> <p>Proper, prominently visible signage (labelling) at these antenna sites is also important.</p> <p>Need signs wherever a small cell is attached (e.g. bus shelter, etc.). This is important, especially for pregnant women, small children and those with who have adverse effect from exposure to wireless radiation.</p> <p>Our group intends to send more information to our Provincial public health officers. Letters were sent in June 2020 to the Chief Provincial Public Health Officer (Dr. Brent Roussin) from the Environmental Health Association of Manitoba, Winnipeggers who report being made ill by wireless radiation, Dr. Riina Bray (a physician from Toronto’s Environmental Health Clinic at Women’s College Hospital) and Dr. Anthony Miller (an MD and former advisor to the World Health Organization’s IARC) cautioning to not go forward with increased pervasive exposure of radiofrequency radiation as would occur with small antennas throughout neighbourhoods.</p> <p>At the minimum the City should ensure there are provisions for medical reasons for buffer zones that are low-radiation areas.</p> <p>Ensure citizen awareness of where the small cells are located.</p>

Other comments:

Comment: The US State of New Hampshire recently released a detailed report which has recommendations and rationale that can be applied to this situation: ***Final Report on Commission to Study the Environmental and Health Effects of Evolving 5G Technology***

<http://www.gencourt.state.nh.us/statstudcomm/committees/1474/reports/5G%20final%20report.pdf>

Question: Director of Innovation noted some small cells are going ahead without City permitting. What is going on there?

Comment: There is a small antenna on a lamppost on Harrow St. between Grosvenor and Dorchester Avenues. There are some small antennas that have already been installed and functioning (checked with an RF (radiofrequency) meter) and that's why we are curious about how the City is not involved in the permitting for this and perhaps other antennas already installed. [Morgan – this last comment could go under xxx (use find to see where it is) and would make more sense. Fine with me to move it.]

Response: Wireless Antenna System Policy (WASP) lacks context of small cells in the way it is currently written. Currently addresses certain kinds of installation, like with regards to increasing the height of a structure by more than 25%. If it does not increase the height by more than 25%, aspects of the policy do not apply.

As well, the Encroachment By-law excludes utility poles. Manitoba Hydro owns a number of utility poles within City limits.

That is why it is important to work with carriers and discuss so we can know more about what is going on in Winnipeg and to update WASP.

These small antennas can be installed without notifying the City or requiring permits from the City because they communicate through the air and no digging into the ground is occurring.

Question: Certain areas of the City have fibre optic cables already (parts of Linden Woods, Bridgwater and Island Lakes). Do they need City permission to access cables?

Response: A telecommunications company would work with the land developer while the land is being developed. What telecommunications companies do with their access is within their purview.

Some investigation in underserved areas in the USA to provide 5G rather than laying cable for home internet.

In Winnipeg, focus appears to be less on getting internet to houses, and more for wireless phone service.

Comment/Question: Many, especially businesses and younger adults, depend on wireless service.

Something to look at is where the poor cell phone coverage issues exist and increasing coverage based on need-based, systematic, scientific data following a transparent process. Not sure if there is a need for more wireless radiation if someone cannot get wireless coverage in their basement but it is sufficient in the upper floors. If people were aware of the health considerations, they might actually welcome having areas of lower levels of radiofrequency in their homes.

Response: If this is about increasing capacity and benefitting customer base, they need to meet the needs of those who need better service.

In other cities, starting in places like train tunnels where there is no service. Starting in arenas/campuses, along busy transportation corridors. It's likely the same thing would happen in Winnipeg and want to continue dialogue with carriers, so we have a better understanding.

Comment: Antennas would have to be everywhere for devices using 5G with mm waves to function. Frequencies longer than mm waves, 600 to 700 MHz and ranging up to 3.5 GHz, are as much as people need for speed on their phones. Something does not make sense. Devices using mm waves likely will not be feasible on a large scale in a place like Winnipeg in the next 5 to 10 years. What is the push to have these antennas everywhere now, with the excuse we need it for 5G?

Response: There are, broadly speaking, three bands – low band, medium band, high band. Just as 4G service often falls back to 3G service when we're indoors, 5G service is likely to change from high to med/low as someone walks inside a building, moves to different locations, etc. Expect performance increases and higher frequencies to be rolled out in phases.

Comment/Question : One of the main reasons for 5G is to enhance machine-to-machine communication and Internet of Things.

Question: Cell network antenna-sharing – will there be a requirement for different companies to co-locate?

Response: That is one purpose for this review, to look at the complexity of sharing infrastructure, etc.

Question: With regards to Manitoba Hydro, regular people do not have access similar to the access that we have to the City.

Response: We do have some business relations and are in discussions with them.

Question: 2019 is when the Encroachment By-law was written. There is much emphasis on patios. One would not realize that utility poles and small cell antennas are included.

Response: This is why we are reviewing policy and process; to determine what may need to change to reflect small cell context. The review group includes Planning, Property & Development (e.g. Urban Planning), and Public Works.

Question: How do people like me become informed about this? The Public Engagement process is a step in the right direction. We need something similar to this interview and the information on the Public Engagement site to point out where we can have input. We do not have the knowledge or time to explore all avenues. How can we be made aware of the intricacies? We only have an opportunity once at the beginning of the delegations and often do not get the relevant information we need until there is a discussion between Councillors and City Staff. At that point we (the public, who are key stakeholders) do not have an opportunity to ask further questions or get clarification.

Response: We are going to continue updating the webpage and providing updates to our list of subscribers and stakeholders.

Question: Do trials involve active small cells?

Response: Still determining the nature of the trials.

((5G)) Winnipeg Awareness!

December 18, 2020

**First 11 pages - Responses from 5G Winnipeg Awareness
to questions posed by the City of Winnipeg
in preparation for today's Interview with City of Winnipeg Staff¹ as
part of the Public Engagement Process regarding Small Cell Technologies²**
<https://engage.winnipeg.ca/smallcelltechnology>

BACKGROUND:

My name is Margaret Friesen. I represent "5G Winnipeg Awareness" who are residents in all parts of the City of Winnipeg who are deeply concerned about the pervasive expansion of radiofrequency emitting antennas installed close to where people regularly spend much of their lives. We are non-partisan and entirely volunteer-based.

First, we would like to thank you for the opportunity to provide feedback. We very much appreciate the material you have outlined on the Public Engagement website, particularly the "The City of Winnipeg's Role in Small Cell Technology" document.

<https://engage.winnipeg.ca/16800/widgets/65919/documents/40807>

I presented the concerns regarding 5G infrastructure antennas to the Innovation and Economic Development (IED) Committee on June 15 (Appendix Aa), May 13th, 2020 (Appendix Ab), and on February 10th, 2020 (Appendix B) and to the Property Development, Heritage and Downtown Development (PDHDD) Committee on January 6th, 2020 (Appendix C), as well as to various City committees and City Council before the very flawed Winnipeg Antenna Systems Policy (WASP) was passed in 2015.

5G Winnipeg educates on several issues. The most relevant for today are:

- 5G is untested for the harmful health effects of everyday and long-term exposures to humans and the environment.
- Health Canada's "Safety Code 6" is not protective of the health of Canadians.
- There is very little control exercised by the local governments and citizens about the installation of wireless technologies. The federal government has final say but there are actions that can be taken at the Land Use Authority level, e.g. City of Winnipeg.

¹ The City of Winnipeg is currently undertaking a small cell technology review. As part of the review, the City will be coordinating with cellular providers during their small cell trials of small cell-enabled 5G infrastructure to see how our existing policies, processes, and procedures regarding cellular infrastructure apply to small cells, and determine what, if any, amendments need to be made. [Invitation received by email from City of Winnipeg on December 3, 2020]

² The City of Winnipeg is "currently in phase 1 and we are collecting feedback to inform aspects of the trials before they begin".

- Fibre optic infrastructure to and through premises is a safer alternative than wireless connections. Where wireless is deemed essential, strict adherence to the ALARA (As Low As Reasonably Achievable) principle is necessary to minimize potentially harmful exposures.

Thank you for this invitation. Further notices, for new postings on the Public Engagement webpage or when this issue comes to City committees, would be very much appreciated.

Our written comments are below. Please contact me if there are any questions or for clarification.

Respectfully submitted.

Margaret Friesen M.Sc.

Spokesperson, 5G Winnipeg Awareness, 5g.winnipeg.awareness@gmail.com

WRITTEN FEEDBACK FOR REFERENCE DURING TODAY’S INTERVIEW.

CITY OF WINNIPEG, PUBLIC ENGAGEMENT QUESTIONS:

1. What is your understanding of small cell technology?
2. What are the greatest opportunities for yourself, your organization, and for Winnipeg?
3. What are the biggest challenges with small cell technology?
4. What is your understanding of a municipality’s role when it comes to small cell technology?
5. What actions do you think the City of Winnipeg should take when it comes to small cell technology?

1. QUESTION BY CITY OF WINNIPEG, PUBLIC ENGAGEMENT:

What is your understanding of small cell technology?

RESPONSE BY 5G WINNIPEG AWARENESS:

Within our membership we have a comprehensive knowledge of small cell technology and we are aware that there are plans for the installations of thousands of small cellular network antennas throughout Winnipeg—including residential areas—approximately one or more antenna sites per half-block. We see real-world examples, such as in Mission, B.C. where some small antennas are less than 15 meters from homes.

http://emrabc.ca/?page_id=8805

Canadian experts, such as Dr. Paul Héroux, Professor of Toxicology and Health Effects of Electromagnetism, McGill University of Medicine and others, advise that a minimum safe distance might be 300 to 500 meters (and provided that source antenna power intensity is not increased compared to previously planned intensities).

Subsequent to my presentation on June 15th, 2020, a number of publications and reports have come out that support use of wired connections as being superior to wireless:

- See:
Commission to Study the Environmental and Health Effects of Evolving 5G Technology, State of New Hampshire. (2020). **Final Report**. Pages 97–105.
<http://www.gencourt.state.nh.us/statstudcomm/committees/1474/reports/5G%20final%20report.pdf>
- Karaboytcheva, M. (2020). **Effects of 5G wireless communication on health**. *European Parliament Briefing*.
[https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI\(2020\)646172](https://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI(2020)646172)

2. QUESTION BY CITY OF WINNIPEG, PUBLIC ENGAGEMENT:

What are the greatest opportunities for yourself, your organization, and for Winnipeg?

RESPONSE BY 5G WINNIPEG AWARENESS:

There are no positive opportunities in terms of City of Winnipeg residents’ physical exposures to the radiofrequency radiation emissions from these technologies. We will continue our efforts of public education to inform people about the inadequacy of Health Canada’s current safety guidelines that the City of Winnipeg has chosen to follow. (Note: the City of Toronto Prudent Avoidance Policy specifies maximum limits at 1% of Health Canada’s Safety Code 6 limits).

However, plans for small cell technologies do provide opportunities to bring public awareness to the serious health issue posed by pervasive radiofrequency radiation. There is also the opportunity to inform residents that, although they are the main stakeholders, they seem to have almost zero rights to influence, and almost zero rights to be informed in advance, where cell antennas will be installed in Winnipeg. The City’s decision to include this as a Public Engagement issue is important in increasing public awareness and we hope that this will continue.

Radiofrequency energy in the frequency ranges planned and used here was classified by the World Health Organization’s International Agency for Research on Cancer (IARC) as a Group 2B *possible* human carcinogen in 2011. Because of the high-quality studies after 2011 (human, animal and mechanistic), many experts believe re-classification for this hazardous physical agent (term used by IARC) will be as a *known* carcinogen.

The health risks will not begin when this agent is re-classified. The risks begin at exposure. It would be prudent to wait at least until this re-evaluation has been conducted before immersing the entire City of Winnipeg’s population in a continuous flood of wireless radiation waves.

3. QUESTION BY CITY OF WINNIPEG, PUBLIC ENGAGEMENT:

What are the biggest challenges with small cell technology?

RESPONSE BY 5G WINNIPEG AWARENESS:

Making emissions safe for people and the environment.

4. QUESTION BY CITY OF WINNIPEG, PUBLIC ENGAGEMENT:

What is your understanding of a municipality's role when it comes to small cell technology?

RESPONSE BY 5G WINNIPEG AWARENESS:

The municipality has limited control. However, the City of Winnipeg is not entirely powerless. See below for more details.

5. QUESTION BY CITY OF WINNIPEG, PUBLIC ENGAGEMENT:

What actions do you think the City of Winnipeg should take when it comes to small cell technology?

RESPONSE BY 5G WINNIPEG AWARENESS:

Overall: Opt for fibre optics and other wired connections wherever possible. Follow the emissions principle of "As Low As Reasonably Achievable" (ALARA) for all wireless-emitting equipment.

This is outlined below under the headings provided on the Public Engagement website. Specifically, the following recommendations and comments have been organized according to the list provided in "The City of Winnipeg has Roles" document.

5G Winnipeg Awareness Recommendations for City of Winnipeg Actions

1. An asset owner: • City-owned/public buildings • City-owned poles (e.g., ornamental street lights) • Transit shelters • Traffic signal poles • City-owned street furniture, etc.

Opt for fibre optics and other connections whenever possible. When not possible, mandate the labelling (see two suggested figures below) of all emitting antennas that are placed on City of Winnipeg assets, and require following ALARA.

2. As the right-of-way owner/custodian

Do not allow small cell antennas in rights-of-way. If installations proceed, these sites should be clearly labelled. The City can set an example.

3. As land use planning authority (outlined in the Winnipeg Antennas Siting Policy (WASP)

- Amendments as per recommendations in 2015 made independently by Barry Malowanchuk (P. Eng., former telecommunications engineer with Manitoba Hydro) and Margaret Friesen M.Sc. (full text can be provided upon request):
- Include buffer zones (radiation-free zones) for medical and other reasons.
- Provide adequate notification and public consultation (not through the proponents as their diligence has been significantly inadequate).
- Remove the exclusion for public consultations regarding non-tower structures.
- Provide details of all aspects of the trials of small antennas. Request feedback from groups such as ours. The City of Winnipeg residents are the main key stakeholders.
- Ensure adequate set-backs from homes, daycares and schools.
- Mandate measurements of cell network antennas to be presented as W/m² and not as an aggregate measurement as a % of Safety code limits.
- Dedicate a webpage on the City of Winnipeg website for information on small cell network projects.

4. As building code enforcement authority

Include reducing or eliminating radiofrequency emissions in new constructions and in retrofits. See this peer-reviewed paper: *Building science and radiofrequency radiation: What makes smart and healthy buildings*

<https://www.sciencedirect.com/science/article/pii/S0360132319305347>

Mandate labelling. See suggestions in figures below.

5. As utility

- 1) Use fibre optic and wired connections whenever possible.
- 2) Conduct a full (cradle-to-grave) cost/benefit analysis of fibre and other connections versus wireless. Include costs of replacement of wireless equipment and energy costs (wireless connections use from 3 to 10x more electricity than wired connections which has implications for climate change considerations).

6. As legislator

- 1) Amend the “Encroachment” By-law No. 12/2019 taking back control of what is placed on utility poles throughout the city. This is currently under the control of Manitoba Hydro, which does not have adequate public accountability or transparency on this issue e.g. placement of small cell antennas on streetlight standards close to home in residential areas.
- 2) Amend WASP as noted above.
- 3) Take actions to obtain more local control over the siting of cell network antennas everywhere in Winnipeg.

4) Support a full study of 5G human and environmental health effects as the US State of New Hampshire has done with perspectives from all views on the issue.

5) Pass resolutions as in Ontario and Quebec municipalities (details in the appendices).

An example not in the appendices: City of Montreal- In its brief it submitted to the CRTC on May 15, 2019, the City acknowledges the impacts on the health of the citizens and its role in protecting its population: Impacts on citizens' health: Municipalities are wondering about the health risks with the advent of 5G technology. Namely, could the proliferation of antennas and the use of new radio frequencies pose health risks for citizens?

Note 1: An “Off-the-table” point (from the City of Winnipeg document): Small cell placement, on utility infrastructure, or indoors – There is no municipal involvement in these decisions. Comment by 5G Winnipeg Awareness: this should change, and the City of Winnipeg should actively pursue to have influence on this matter.

Note 2 : We have concerns that the indemnification, as may have been signed in the agreement (Encroachment By-Law), provides inadequate coverage for lawsuits, e.g. should radiofrequency radiation be identified as harmful to human and environmental health.

7. As a user (business application)

In keeping with the vision of “OurWinnipeg. It's Our City, It's Our Plan, It's Our Time”³ for a safe and secure city as well as being a “sustainable city,” specifically with regard to energy usage, and a healthy place to live, fibre optics and wired connections should be the first and preferred option. Fibre optics is faster than wireless and in the long run will be more economical.

For more information, see the Urgent Appeal to the Government of Canada to Suspend 5G Rollout and to Choose Safe and Reliable Fibre Connections:

<http://c4st.org/5Gappeal/>

³ <https://winnipeg.ca/interhom/CityHall/OurWinnipeg/pdf/CallToAction.pdf>

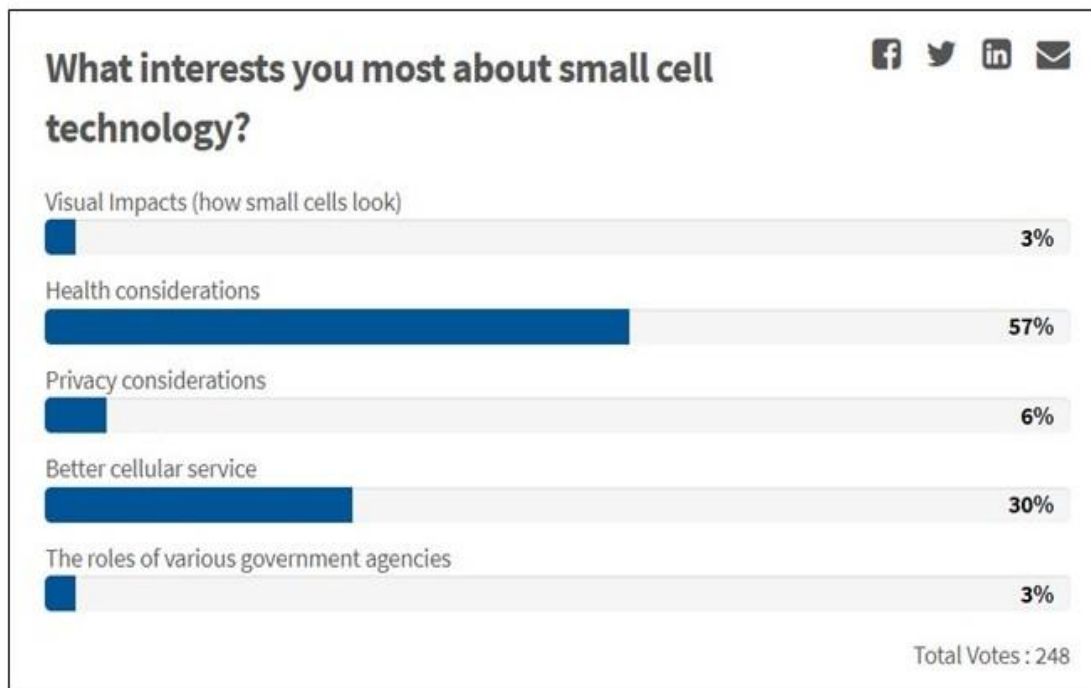
FEEDBACK

1. City of Winnipeg
2. Feed-back from 5G Winnipeg Awareness Surveys, Petitions and responses from City Councillors and Mayor Bowman
3. Comments from 5G Winnipeg Awareness Members

1. City Winnipeg Poll results:

https://enqage.winnipeg.ca/smallcelltechnology?tool=quick_poll#tool_tab

Of the total 248 responding, 70% had priorities other than better cell reception.



2. Feed-back from 5G Winnipeg Awareness Surveys, Petitions and Responses from City Councillors and Mayor Bowman

1. 5G Winnipeg Awareness survey and door-to-door feed-back.
2. 5G Winnipeg Petition hard copy and online: <https://5gwinnipegawareness.ca/>
3. Email responses to our members from City of Winnipeg Councillors and Mayor Bowman's office.

Findings:

- Winnipeggers are generally uninformed about the implications of small cell network antennas throughout Winnipeg. When they do learn more about the issue (from our information as well

as their own research), the vast majority are opposed to the widespread deployment of small and big cell antennas throughout our city.

- It is also abundantly clear that Mayor Bowman and City Councillors are not well informed.

3. Comments from 5G Winnipeg Awareness Members:

Note: 5G Winnipeg Awareness may not endorse all comments.

- it is dangerous, what we have already is making people sick, huge threat to our ecosystems and life on earth as we know it.
- it can be delivered to the premise via FTTP, more secure, private faster energy efficient
- 5g millimeter waves not ready yet so why the need for the small cells?
- bad for children and pregnant women - women in China need to wear smocks made of lead to block radiation
- concern health considerations on the Public Engagement Poll approximately doubled in numbers that of concern for cell service
- it is only needed for mobile service and mobile speeds are fast enough
- mental health disorders, thyroid cancer, and brain tumors on the rise in our children at an alarming rate
- we must do what we can to stop this or we simply will not have a next generation workforce capable of keeping our city and its economy viable
- massive impacts on our health care system which is already strained
- small cells are going to be an eyesore wherever we look – no matter the direction
- it is a 10+ year contract so once this goes through there is no taking it down once we have signed and cancer has a long latency so the health damage will have been done even if they are taken down upon the end of the contract.
- the vast majority of citizens are unaware that these are going to go up in front of their homes and on major streets/city infrastructure
- In response to today's interview question #2: What the greatest opportunities for yourself, your organization, and for Winnipeg? We have the opportunity to protect the citizens, flora and fauna of Winnipeg from the devastating short and long term effects that mobile 5g will produce while still ensuring them service to their homes and businesses via FTTP. Our greatest opportunity is the one to decide that Winnipeg will be a "smarter" city by adamantly opposing any small cells and investing in FTTP, insisting that big telecoms fit each building with fibre. Only if all avenues for these great opportunities have been exhausted, only then, our greatest opportunity is to have the city allow citizens the right to buffer zones for medical or other reasons (schools, bus stops, hospitals, daycares need to be buffered as well)

-the biggest challenges with small cell technology include:

- regular monitoring of emission levels on all antennas to ensure safety levels are being met
- the health effects and sick days/disability of our work force is going to require once these are in place and start affecting people
- parents will need time off when children get sick
- public safety will be an issue when people who are tired, confused suffering from cognitive issues, mental health disorders , mood disorders, and they will be unable to parent, operate heavy machinery, make decisions

-our future generation(s) will have birth defects, miscarriages, premature births, ADHD, Autism – this installation will largely affect childbearing women, babies, and children to an arguably higher degree. The science is strong that children absorb higher levels of radiation than adults. How do we protect children? Children are vulnerable, they are protected and promised safe living environment to the “highest degree” according to the Declaration on the Rights of the Child signed by Canada in the 1990’s.

#4 They have a role to meet everyone's needs safely

- they are elected by the people for the people
- letter of non-concurrence
- the must demand safe monitoring of levels and at minimum allow buffer zones
- they must tell us where these will be installed, exact locations, inform public of any upgrades (frequency changes and power upgrades)

#5 write a letter of non-concurrence

- insist on the option of FTTP

small cells are murder, children and people are going to be killed by this technology, whether it kills them via cancer, or they take their own life through suicide due to suffering.

-by moving forward without opposition our city elected officials have failed us in the worst possible way. Those responsible will be held accountable at some future point in court.

- All I have to add is how can they allow experimentation on people like guinea pigs, it is completely unethical and immoral? there are international laws established after the second world war against industry experimentation on people, establishing protections like the "Hippocratic Oath" and "informed" and "expressed" consent, and constitutional laws and human rights that are in place to prevent this type of scientific bodily and environmental misconduct.

- Who will be liable for harm to the citizens of Winnipeg? and has the City explained the potential thermal and biological harms caused by this technology to the people, and then, after the people being well informed about the risks, asked for their expressed consent??

- Being that the technology has never been tested for safety, then it is logically considered a "No Go" "IDLH" an immediate danger to life and health until proven otherwise.

- Not on my family, my family is well informed, we do not consent.

- I have some serious concerns about the 5G towers going up. Following the lead from other countries who went before us there were some good studies done to show that there could be some physical altering effects of these towers. Not enough testing has gone on. They are an eyesore. We do not need this.

- For the health and safety of Winnipeg residents, we need:

- the City of Winnipeg to write a letter of non-concurrence;
- City Committees and City Council to pass motions asking the federal government for a moratorium until there is a scientific consensus of safety to the public, which would include scientists independent of the wireless industry. This and similar motions were passed in Ontario and Quebec by municipalities;
- Full and meaningful public consultations by the City of Winnipeg in all parts of the city where there are proposals for installations of small 4G or 5G cell antennas;
- A meaningful and influential role of residents in decision-making regarding the small cell technologies project and full transparency of the process;
- Clear notification that small cell antennas will be installed, their specifications and where they will be located, to all nearby residents. Also, notifications when the power densities are increased and 5G, or technologies with millimeter waves, are installed;
- Maps of where small 4G and 5G antennas are located available on the City of Winnipeg website;
- Antennas that are clearly labelled so that people can see where and what they are e.g. in bus shelters, and;
- Buffer zones for people requesting them for medical or other reasons.

- The City of Winnipeg has a duty to protect the health of its residents. It must play a key role in raising awareness among key stakeholders so that the full impact of 5G technology deployments is known and understood by all and adequate actions taken.



Figure. Example of a symbol for use on poles and other structures located in public rights-of-way that hold 5G antennae

Commission to Study the Environmental and Health Effects of Evolving 5G Technology, State of New Hampshire. (2020). **Final Report**. Page 95.

<http://www.gencourt.state.nh.us/statstudcomm/committees/1474/reports/5G%20final%20report.pdf>

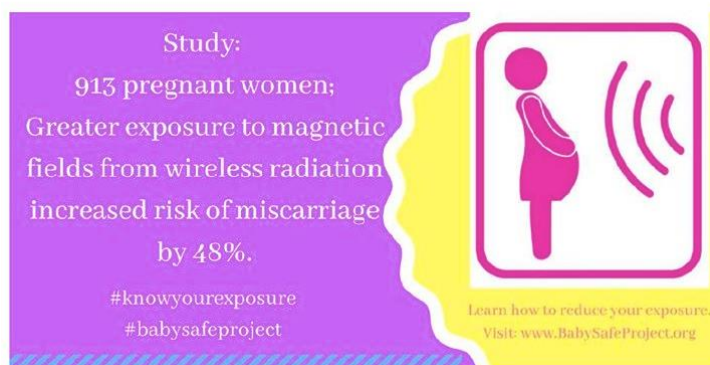


Figure. Example of an RF radiation warning.

Commission to Study the Environmental and Health Effects of Evolving 5G Technology, State of New Hampshire. (2020). **Final Report**. Page 94.

<http://www.gencourt.state.nh.us/statstudcomm/committees/1474/reports/5G%20final%20report.pdf>

Appendix A-a. 5G Awareness Winnipeg brief to the Property Development, Heritage and Downtown Development Committee on June 15, 2020

**Submission (10 pages with appendices)
to Innovation and Economic Development Committee.
City of Winnipeg, City Hall – by phone.**

Monday, June 15, 2020 9:30 am

By Margaret Friesen on behalf of 5G Winnipeg Awareness

- Item 3: Award of Contract Cellular Wireless & Cellular Data Service**
- Item 4: Cell reception and small Cell Technology Implementation**
- Item 5: Winnipeg Antenna Systems Policy - 5G Network**

Good morning Councillors Orlikow, Eadie, Lukes and Nason,

Thank you for the opportunity to present.

My name is Margaret Friesen. I am representing “5G Winnipeg Awareness” who are residents from all parts of the City of Winnipeg who are deeply concerned about the pervasive expansion of radiofrequency emitting antennas installed close to where people spend much of their lives.

I presented about the concerns surrounding 5G antennas to the Innovation and Economic Development (IED) Committee on May 13th, 2020 (Appendix A) February 10th, 2020 (Appendix B) and Property Development, Heritage and Downtown Development (PDHPD) Committee on January 6th, 2020 (Appendix C), as well as to various City committees and City Council before the very flawed Winnipeg Antenna Systems Policy (WASP) was passed in 2015.

ITEM 3. Award of Contract for the Provision of Cellular Wireless and Cellular Data Services- Material management Reference #1145-2019

The public should have an opportunity to examine the 9 million dollar contract e.g. to comment if wired connections are at all feasible in some cases. Wired connections use less energy and are more secure from hacking, and do not emit harmful radiofrequency radiation.

ITEM 4. Cell Reception and Small Cell Technology Implementation

1. We have been asking questions since the issue of possible installations of small antennas began. Most have been unanswered.

We request full participation of residents of Winnipeg in the open collaboration for “ Cell Reception and Small Cell Technology Implementation”

2 An email has been sent letter to Councillors from Dr. J.P Dorst, a biophysicist, requesting additional time to make a submission on the scientific evidence showing adverse effects of radiofrequency

radiation below safety guidelines. Dr. Dorst was instrumental in having asbestos pipes replaced in the City of Winnipeg's water supply in the early 1980s. This was after he and colleagues showed that, contrary to what was then stated by health officials, that asbestos in the pipes could not be a health hazard. (Supplemental Information 1). Asbestos is now classified as a known carcinogen and there is evidence that radiofrequency radiation should be in the same category.

Letters to Dr. Roussin (Chief Provincial Public Health Officer, Province of Manitoba) and one to Mayor Bowman have been sent by me (Environmental Health Association of Manitoba), Dr. Miller regarding cancer and other adverse health effects, and Dr. Bray – electrical sensitivities (Supplementation Information 2,3,4,5 respectively). Also see Supplemental Information 5 for a relevant quote.

Request that the City of Winnipeg suspend all actions regarding binding commitments for permitting and implementing of small cell antennas until Dr. Roussin's office provides a response to the letters that I and others have sent him on this issue of public health.

2. Liability issues – the City's "Legal Services Department" was consulted as to legal issues for ITEM 3 but not for ITEM 4. Why not? Legal cases awarding damages for radiofrequency radiation exposure have been successful in at least two cases in other countries. A number of other lawsuits are underway around the world.

We request that the City of Winnipeg provide a full legal opinion as Niagara Falls, Ontario has done.

3. Need for a full public consultation on rollout of 5G small antennas in Winnipeg before any binding commitments are made. This is allowed according the current policy (see Appendices).

We request, again, that one of the Councillor's, today, makes a motion to have the City hold meaningful public consultations on the "small cell technology implementation" and how "5G" fits into the Winnipeg Antennas Systems Policy.

ITEM 5. Review of the Winnipeg Antenna Systems Policy – 5G Network

Public consultation should also be required separate from participation in the input as stakeholders in the review of the current policy. As the Councillors and public service rightly points out, the approval of the siting of cell antennas is federal jurisdiction. Yet, had it not been for me pointing out that notification of the Member of Parliament had been omitted, this would not have been put back into the current policy. Clarification is also needed on which frequencies constitute 5G technologies. Adequate lead time is needed. Seeing an item on the agenda on a Thursday for a presentation on Monday morning may provide not sufficient time.

We request that the Councillors today make a motion to ensure there is meaningful public consultation on revising the Winnipeg Antenna systems Policy.

Respectfully submitted.

Margaret Friesen M.Sc.

Spokesperson, 5G Winnipeg Awareness, 5g.winnipeg.awareness@gmail.com

SUPPLEMENTAL INFORMATION:

SUPPLEMENTAL INFORMATION: 1. Email to Councillor Orlikow, June 12, 2020 from Dr. JP Dorst:

Dr. Jean-Paul Dorst. Ph. D. in Biophysics in 1979 at the Max-Planck-Institut für Biophysik in Frankfurt am Main, Germany. Taught Physics including Biophysics in French at the Saint-Boniface University College from 1984 to 1989. Was instrumental in the removal of asbestos pipes and replacement with safe plastic pipes in 1983/1984 for the delivery of drinking water.

“I would like to provide you over the next couple of weeks with more scientific evidence of these harmful effects related to 5 G and EMF. Therefore, I respectfully request that your committee puts your promotional efforts for the 5 G technology in Winnipeg temporarily, if not permanently on hold until you have had the chance to review my documented evidence.”

Examples: Two recent reviews on 5G and biological effects:

- 1) Simkó, Myrtill, and Mats-Olof Mattsson. “5G Wireless Communication and Health Effects—A Pragmatic Review Based on Available Studies Regarding 6 to 100 GHz.” *International Journal of Environmental Research and Public Health* 16, no. 18 (January 2019): 3406. <https://doi.org/10.3390/ijerph16183406>.

“The available studies do not provide adequate and sufficient information for a meaningful safety assessment, or for the question about non-thermal effects. There is a need for research regarding local heat developments on small surfaces, e.g., skin or the eye, and on any environmental impact. Our quality analysis shows that for future studies to be useful for safety assessment, design and implementation need to be significantly improved.”

- 2) Leszczynski, Dariusz. “Physiological Effects of Millimeter-Waves on Skin and Skin Cells: An Overview of the to-Date Published Studies.” *Reviews on Environmental Health* In Press (2020): 23. Accepted. June 2020.

“The currently ongoing deployment of the 5th generation of the wireless communication technology, the 5G technology, has reignited the health debate around the new kind of radiation that will be used/emitted by the 5G devices and networks – the millimeter-waves. The new aspect of the 5G technology, that is of concern to some of the future users, is that both, antennas and devices will be continuously in a very close proximity of the users’ bodies. Skin is the only organ of the human body, besides the eyes, that will be directly exposed to the mmwaves of the 5G technology. However, the whole scientific evidence on the possible effects of millimeter-waves on skin and skin cells, currently consists of only some 99 studies. This clearly indicates that the scientific evidence concerning the possible effects of millimeter-waves on humans is insufficient to devise science-based exposure limits and to develop science-based human health policies. The sufficient research has not been done and, therefore, precautionary measures should be considered for the deployment of the 5G, before the sufficient number of quality research studies will be executed and health risk, or lack of it, scientifically established.

Comment by Dr. Joel Moskowitz: *“This review summarizes research on the effects of millimeter waves on the skin. None of these studies has examined 5G millimeter waves. 5G employs specialized technology including phased arrays, beam-forming, and massive MIMO. 5G millimeter waves may be more biologically active and result in more adverse health effects than the earlier millimeter wave studies found.”*

Joel M. Moskowitz, Ph.D., Director
Center for Family and Community Health
School of Public Health
University of California, Berkeley

SUPPLEMENTAL INFORMATION 2: letter of the Environmental Health Association to Dr. Roussin.

EHA-MB
Environmental Health
Association of
Manitoba

9 June 2020

Dr. Brent Roussin
Chief Provincial Public Health Officer, Province of Manitoba
Via email: brent.roussin@gov.mb.ca

Dear Dr. Roussin,

SUBJECT: Urgent request to contact Councillor Orlikow before June 15th to ask for a delay in the permitting of thousands of cellular antennas throughout Winnipeg, to allow time to investigate implications of health consequences for some Winnipeg residents

I am writing on an urgent matter. Please contact City of Winnipeg Councillor John Orlikow before June 15th to request more time to investigate a potential public health situation. On June 15th, the City of Winnipeg's Standing Committee on Innovation and Economic Development (IED)⁴, chaired by Councillor Orlikow, may⁵ take the next step, and may even commit, to the permitting of thousands of new cellular network antenna installations in front of Winnipeg homes and, without exaggeration, everywhere else in the City. The City's estimate is that there would be an antenna (radiofrequency radiation emitter) installed approximately every half-block on lamp posts and hydro poles in residential neighbourhoods. Other antennas would be attached to traffic lights and to other types of "non-tower" structures including buildings⁶.

The pervasive, continuous exposure of radiofrequency (RF) radiation from these antennas (4G LTE and 5G) likely will bring undue hardship to some Winnipeg residents, like myself, who have electrical sensitivities. Estimates from other countries are that 1-3% of the population are adversely affected by exposure to electromagnetic radiation at everyday levels tolerated by most people. We fear that we will have to move to residences away from Winnipeg. We are also concerned that the numbers of adversely affected persons will increase and that the medical profession in Manitoba may not be adequately prepared to provide the appropriate medical care.

⁴ <https://winnipeg.ca/clerks/council/meetings.stm?trumbaEmbed=date%3D20200615&winClose=1>

⁵ A meeting has been scheduled but the agenda is not posted. Passing of any motion to proceed would be hard to undo.

⁶ City of Winnipeg Report: Item 2. Cell Reception and Small Cell Implementation: 9 pages
<http://clkapps.winnipeg.ca/dmis/ViewDoc.asp?DocId=19807&SectionId=&InitUrl=>

As you may know, the Ontario Environmental Health Clinic at Women's College Hospital in Toronto held a symposium in May 2019 titled: *Impacts of Wireless Technology on Health: A symposium for Ontario's medical community*. They are concerned that the massive increase in exposure will also increase the number and severity of various health problems associated with wireless radiation, and thereby resulting in increased healthcare costs⁷. I have appended the press release for the symposium to this letter.

I was fortunate to have been assessed at this Clinic for electrical sensitivity about 20 years ago. This assessment added crucial documentation for my successful claim for disability benefits and eventually a return to work, with accommodation.

The City may respond that this is federal jurisdiction and that it is the federal government that provides the approvals. This is true, however, the City can take steps to delay the permitting process, which is under its control. It can also write a letter of "non-concurrence" to the responsible federal Minister of Innovation, Science and Economic Development (ISED). The Minister can then decide whether or not to provide approvals. There are precedents involving cell tower siting disputes, where the federal Minister has passed the dispute back to the communities and telecommunications companies to resolve.

Please send a message to John Orlikow, Chair of the IED committee, asking the Committee to hold off making long-term commitments until your office can fully investigate this issue. Councillor Orlikow's email address is jorlikow@winnipeg.ca and his office phone number is 204.986.5236

Delaying the decision by the IED committee would provide some time for us to provide you with more information, and your office the time to more fully investigate this potential public health problem.

I have contacted several individuals with electrical sensitivities in Winnipeg to support this request and you may be receiving letters from them as well.

We also would like to arrange to meet with you to provide more information relevant to concerns about expected increased exposures from antennas and related applications, as well as the many challenges that people in Manitoba with "lived experience" face, ranging from day-to-day management of this condition, to issues of accessing appropriate healthcare.

Your immediate attention to this matter would be greatly appreciated.

I would be glad to discuss this further and provide more information.

Sincerely,

⁷ *Impacts of Wireless Technology on Health: A symposium for Ontario's medical community*

Approved for: 6.0 Section 1 Royal College of Physicians and Surgeons

6.0 College Family Physicians of Canada Mainpro+ credits

By Continuing Professional Development of the Faculty of Medicine, University of Toronto

<https://www.womenscolleghospital.ca/care-programs/environmental-health-clinic/june-2019-conference-videos>

Margaret Friesen M.Sc.

Environmental Health Association of Manitoba, Director

Phone: 204-261-8591

Email: ehamanitoba@gmail.com

Address: 43 Rutgers Bay, Winnipeg, MB R3T 3C9

[Press Release May 30, 2019 - Impacts of Wireless Technology on Health: A symposium for Ontario's medical community:]

Ontario Doctors Warn of Rising Health Care Costs after 5G Roll Out.

TORONTO, May 30, 2019 /CNW/ - Doctors treating patients from over-exposure to wireless radiation will join scientists at Queen's Park today to recommend the Ontario Government take steps to protect public health before the roll-out of 5G – the next generation of cell phone technology.

"My clinic is already assessing patients from across Ontario who are sensitive to microwave radiation from their wireless devices including cell phones, Wi-Fi, and an increasing number of smart appliances," said Dr. Riina Bray, Medical Director of the Environmental Health Clinic at Women's College Hospital in Toronto. "We expect 5G to add to this burden."

Scientists from 42 countries are now warning their governments about the emerging health problems associated wireless radiation. The initial 5G infrastructure is planned to begin in the Toronto to Montreal corridor. Daily human exposure to microwave radiation is already more than a trillion times higher than it was before cell phones.

Dr. Anthony Miller, Professor Emeritus with the University of Toronto, and adviser to the International Agency for Research on Cancer says, "Many scientists worldwide now believe that radiofrequency radiation should be elevated to a Class One human carcinogen, on the same list as Cigarettes, X-Rays, and Asbestos."

The doctors will advise the Province that increased health care costs can be avoided, if the government takes precautions to protect the public from exposure to 5G technology.

Women's College Hospital will host a medical symposium tomorrow, designed to educate Ontario healthcare practitioners to identify the symptoms of electrical sensitivity and develop treatment plans for their patients.

SUPPLEMENTAL INFORMATION: 3,4. LETTERS: Dr. Miller to Mayor Bowman with letter sent to Dr. Brent Roussin

Dr. Anthony B. Miller

136 Charles Street
Port Hope
Ontario, L1A 1T3

June 6, 2020

Mayor Brian Bowman
City of Winnipeg
dlorentz@winnipeg.ca

Subject: My letter to Dr. Brent Roussin, Chief Public Health Officer regarding:

Urgent request to delay the permitting of small cellular antenna infrastructure in the City of Winnipeg because of scientific evidence supporting radiofrequency radiation as being carcinogenic to humans as well as having other adverse effects

I am a Canadian physician and epidemiologist deeply concerned about the pervasive expansion across Canada of radiofrequency radiation emitting cellular antennas in neighbourhoods close to homes and schools. There are significant potential adverse consequences for public health.

The City of Winnipeg is about to begin the permitting of thousands of these cellular antennas throughout the City. Although final approval of these antenna installation rests with the federal department of Innovation, Science and Economic Development, the City of Winnipeg can voice its objections to the federal authorities in a number of ways. There is precedence in the changing of the regulations of cellular siting regulations by the federal government.

I have attached my letter to Dr. Brent Roussin outlining my concerns for your consideration.

I would be glad to respond to questions and to provide more information.

Sincerely,



Anthony B. Miller MD, FRCPC, CM.

Professor Emeritus, Dalla Lana School of Public Health, University of Toronto
Telephone 905 885 0253. Email: ab.miller@utoronto.ca

Attachment: Letter to Dr. Brent Roussin, Chief Public Health Officer, Manitoba

cc: Murray Cunningham, President

Environmental Health Association of Manitoba via ehamanitoba@gmail.com

¹ Item2 – Public Service written report :

<http://clkapps.winnipeg.ca/dmis/ViewDoc.asp?DocId=19807&SectionId=&InitUrl=>

¹ Public service verbal report and response to questions: Starts at about 1 hour 30 minutes:

<http://clkapps.winnipeg.ca/dmis/ViewDoc.asp?DocId=19807&SectionId=&InitUrl=>

¹ Miller, Anthony B., L. Lloyd Morgan, Iris Udasin, and Devra Lee Davis. “Cancer Epidemiology Update, Following the 2011 IARC Evaluation of Radiofrequency Electromagnetic Fields (Monograph 102).” *Environmental Research* 167 (July 17, 2018): 673–83. <https://doi.org/10.1016/j.envres.2018.06.043>.

¹ Miller, Anthony B., Margaret E. Sears, L. Lloyd Morgan, Devra L. Davis, Lennart Hardell, Mark Oremus, and Colin L. Soskolne. “Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices.” *Frontiers in Public Health* 7 (2019). <https://doi.org/10.3389/fpubh.2019.00223>.

¹ Russell, Cindy L. “5 G Wireless Telecommunications Expansion: Public Health and Environmental Implications.” *Environmental Research* 165 (August 1, 2018): 484–95. <https://doi.org/10.1016/j.envres.2018.01.016>.

¹ Simkó, Myrtil, and Mats-Olof Mattsson. “5G Wireless Communication and Health Effects—A Pragmatic Review Based on Available Studies Regarding 6 to 100 GHz.” *International Journal of Environmental Research and Public Health* 16, no. 18 (January 2019): 3406. <https://doi.org/10.3390/ijerph16183406>.

¹ Clegg, Frank M., Margaret Sears, Margaret Friesen, Theodora Scarato, Rob Metzinger, Cindy Lee Russell, Alex Stadtner, and Anthony B. Miller.(2020) “Building Science and Radiofrequency Radiation: What Makes Smart and Healthy Buildings.” *Building and Environment*. <https://doi.org/10.1016/j.buildenv.2019.106324>

SUPPLEMENTAL INFORMATION 5. Letter of Dr. Riina Bray to Dr. Roussin.

June 12th, 2020

From:
Dr. R. I. Bray
13069 Keele St.
King City, L7B 1G1
Ontario

To:
Dr. Brent Roussin
Chief Provincial Public Health Officer, Province of Manitoba
Via email: brent.roussin@gov.mb.ca

Dear Dr. Roussin

Residents with medical vulnerabilities living in Winnipeg have asked me to reach out to you because of concern that their existing diagnoses of electromagnetic hypersensitivity (EHS) will become intensified and cause further physical impairment and disability.

In my work as Medical Director of the Environmental Health Clinic, Women's College Hospital, University of Toronto, my colleagues and I regularly diagnose patients with electrical sensitivity and are quite aware of the impact on health from microwave and radiofrequency radiation. There is an extensive number of scientific studies confirming physiological impacts on living organisms.

The exposure of more radiofrequency radiation through the deployment 5G will further injure these patients and the population at large, in particular those with chronic illnesses, the very young and the elderly.

In addition, a recent symposium I hosted at Women's College Hospital entitled 'Impacts of Wireless Technology on Health: A Symposium for Ontario's Medical Community' demonstrated that radiofrequency exposure is linked to many other degenerative conditions including cancer. Please see presentations at:
<https://www.womenscollegehospital.ca/care-programs/environmental-health-clinic/presentation-conference-june2019>

Again, I strongly discourage the implementation of 5G into the city of Winnipeg, as it will injure not only those who have electrical sensitivity but affect the health of all the citizens to varying degrees.

Sincerely,



Dr. Riina I. Bray
BASc, MSc, MD, FCFP, MHSc Medical Director Environmental Health Clinic at Women's College Hospital
Assistant Professor, Department of Family and Community Medicine, University of Toronto
Dalla Lana School of Public Health

SUPPLEMENTAL INFORMATION 6:

Dr. Beatrice Golomb is Professor of Medicine in the Division of Internal Medicine at the University of California, San Diego School of Medicine. She is also director of UCSD's Golomb Research Group which focuses on the relation of oxidative stress and mitochondrial function to health, aging, behavior, illness, environmental and medication effects and nutrition. Current research studies are on Gulf War Illness, statin and fluoroquinolone side effects and electrosensitivity. Dr. Golomb completed her undergraduate degree at University of Southern California in Physics. She then went on to obtain her PhD in Biology and her Medical Degree at the University of California San Diego. She was a postdoctoral fellow in the Computational Neurobiology Laboratory at Salk Institute.

“Let our focus be on safer, wired and well shielded technology – not more wireless. This [USA} legislation, if passed, and the resulting unrestricted roll-out of this technology, will predictably and directly injure and disable a new group, and add depth of suffering to those already affected.”

<https://ehtrust.org/wp-content/uploads/Golomb-SB-649-5G-letter-2017-08-18b.pdf>

((5G)) Winnipeg Awareness!

**Submission (3 pages with appendices)
to Innovation and Economic Development Committee.**

City of Winnipeg, City Hall – by phone.

Wednesday May 13th, 2020 9:30 am

By Margaret Friesen on behalf of 5G Winnipeg Awareness

Item 2: Cell reception and small Cell Technology Implementation

Item 3: Winnipeg Antenna Systems Policy - 5G Network

Good morning Councillors Orlikow, Eadie, Lukes and Nason,

Thank you for the opportunity to present on small cell technology implementation and the review of the Winnipeg Antenna systems Policy as presented in the reports submitted by City staff for your consideration today (Items 2 and 3).

My name is Margaret Friesen. I am representing “5G Winnipeg Awareness” who are residents from all parts of the City of Winnipeg who are deeply concerned about the pervasive expansion of radiofrequency emitting antennas installed close to where people spend much of their lives.

I presented about the concerns surrounding 5G antennas to the Innovation and Economic Development (IED) Committee on May 13, 2020 (Appendix A) February 10th, 2020 (Appendix B) and Property Development, Heritage and Downtown Development (PDHPD) Committee on January 6th, 2020 (see Appendix C), as well as to various City committees and City Council before the very flawed Winnipeg Antenna Systems Policy (WASP) was passed in 2015.

Our submission Items:

1. Need for a full public consultation on rollout of 5G small antennas in Winnipeg.
2. Comments on Item 2 on today’s agenda: Cell Reception and Small Cell Technology Implementation
3. Comments on Item 3 on today’s agenda: Review of the Winnipeg Antenna Systems Policy – 5G Network

1. Need for a full public consultation on rollout of 5G small antennas in Winnipeg

First, I would like to remind Councillor Orlikow that when you met with Eleanor Bond and me, you assured us that the voices of Winnipeggers would be heard on the issue of small cell antennas. This has not yet taken place.

Councillors, I believe, and I think you will agree, that one of your main responsibilities is to the residents of this City. That you and the Mayor have committed to an open and transparent process on issues that matter to Winnipeggers. This is one of those issues. I have heard from many residents of Winnipeg, and I think that you also have heard from only some of them, that we have been left in the dark on this issue. According to the report there will be at least 3,400 antennas, and perhaps more than 7,000 small antennas throughout Winnipeg. There are many questions for which Winnipeggers would like to have fulsome answers.

In case you are not aware, there are provisions in Item 2 report and in the Antenna Systems Policy for public consultations.

In the item 2 Report:

- Page 3, Directive 1: 1st paragraph under B.
“ ... Innovation Science and Economic Development (ISED) is the approval and licensing authority for radiocommunications facilities and encourages municipalities to seek **meaningful local input on antenna and tower siting as part of the federal licensing process.**”
- “The City provides a response to ISED on whether it concerns or does not concur with a proposed facility **based on** a land use review and **results of a consultation process.**”
- The word “stakeholders” is used throughout the report. Are the residents of Winnipeg not also stakeholders?

In the Winnipeg Antenna systems Policy:

Page 1. Objectives

- (2) “To set out an objective process, criteria and guidelines that are **transparent**...”

Page 2. 2.2. Role of the City

- “The ultimate role of the city is to issue a statement of concurrence or non-concurrence to the Proponent and to Industry Canada. The statement considers the land use requirement and compatibility of the Antenna System, **the responses of the affected residents** ...The City also guides and facilitates the siting process by:
- **Establishing a community consultation process, where warranted.**

Also:

- Page 7. Pont 5. “**Pre-consultation** is one of the most important elements in the Antenna siting process...”
- Page 17. Point 8.4. “The City may request the Proponent chair a public information session in cases where there is expected to be **significant public interest** ...”
Public consultations for macro antenna towers held by Proponents have been shams, as many will attest to. I would be glad to share details from my and others’ experiences. It is important

for the City to host a consultation for the public to be given the opportunity for input and have questions addressed by knowledgeable staff.

Our first and foremost request is that one of the Councillor's, today, makes a motion to have the City hold meaningful public consultations on the "small cell technology implementation" and how "5G" fits into the Winnipeg Antennas Systems Policy.

Councillor Orlikow – you have already stated that Winnipeggers' voices will be heard on this. Councillors Lukes and Councillor Nason – I believe that you gave similar indications to me and others that the public should be informed on this issue. Councillor Eadie – We have not had a detailed discussion on this, but I know that you favour informing those in your ward of issues of importance. So, I hope all will support such a motion.

2. Comments on Item 2 on today's agenda: Cell Reception and Small Cell Technology Implementation
This report addresses only a few of the questions put forward by us (see Appendix B and C).

Of importance:

1) What is meant by 5G in the report? Is it the frequencies (less than 6 GHz) that Rogers is rolling out in major cities across Canada? Is it the 5G that will include the mm waves (above 6 GHz) , many still to auctioned/licenced by the federal government? No one really knows what 5G with mm waves really entails, and if the City does, is it not its responsibility/obligation to inform Councillors and residents what it is?

Note: In the WASP, page 1 Objectives (6): the City is supposed to provide "informed consent" If City staff and City Councillors do not know what 5G is (and no one really knows what 5G technology with mm waves will be because much of it is still in development, or will be developed), then how can the City be providing an "informed statement of concurrence"?

2) Liability issues – the World Health Organization – International Agency for Research on Cancer (WHO-IARC) will be evaluating the evidence since 2011 when radiofrequency radiation was classified as a Group 1 *possible* carcinogen (meaning that there was some evidence of carcinogenicity, but not enough to put it into group 2A- *probable* or Group 1 *known* carcinogen). Where does the liability lie, if RF radiation is classified as a *known* carcinogen? Would it not be prudent to wait until that evaluation is complete?

Large insurance companies such as Lloyd's and Swiss Re are averse to insuring injury and damage from electromagnetic fields. What type of insurance is there, should there be injuries?

A precautionary note about Health Canada and its predecessors: In the late 1950s early 1960s, the federal health department approved thalidomide for treating morning sickness for pregnant women. Many Canadian babies were born with birth defects because of it. The compensation is just now being settled⁸ even though the science was there to indicate precaution. (The USA did not approve the drug

⁸ *Federal settlement for thalidomide survivors gets court's approval*

<https://www.winnipegfreepress.com/arts-and-life/life/health/federal-settlement-for-thalidomide-survivors-gets-courts-approval-570318012.html>

because of lack of sufficient evidence to prove safety.)Health Canada ignored the science then. And, I think the science is there – see Table 1 – that we have early warnings that exposure to radiofrequency radiation, even at very low levels, can lead to harmful outcomes in years to come. Pregnant women trusted their doctors who trusted Health Canada. There is now compelling evidence to indicate that Health Canada cannot be trusted on this issue (see Table 1 for just some of it.).

Other unanswered questions: See Appendix B and C.

3. Comments on Item 3 on today’s agenda: Review of the Winnipeg Antenna Systems Policy – 5G Network

I could find no report under this item. I suggest that the report be made available for public comment and also that this is part of the public consultation.

Respectfully submitted.

Margaret Friesen M.Sc.

Spokesperson, 5G Winnipeg Awareness

5g.winnipeg.awareness@gmail.com

Website: <https://5gwinnipegawareness.ca/>

Face Book: https://www.facebook.com/5GWinnipegAwareness/?modal=admin_todo_tour

Table 1.

<p>Adverse health effects of radiation emitted as wireless signals from pre-5G technologies: Scientific Evidence from Publications in Peer-reviewed Journals Numerous frequencies and modulations are used to make wireless signals. 5G wireless signals include 3G and 4G frequencies plus other frequencies of the electromagnetic wavelength “spectrum.” 5G technology has not had any long term health safety exposure testing.</p>
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Compiled by Margaret Friesen M.Sc., May 13, 2020

<p>A. CANCER - Evidence to support a Group 1 “KNOWN HUMAN CARCINOGEN” classification [World Health Organization, International Agency for Research on Cancer (WHO-IARC)]</p>

EPIDEMIOLOGY UPDATES

- Miller, A. B.*, Morgan, L. L., Udasin, I., & Davis, D. L. (2018). **Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102).** *Environmental Research*, 167, 673–683.

<https://doi.org/10.1016/j.envres.2018.06.043>

“Glioma is an important human cancer found to be associated with RFR in 9 case-control studies conducted in Sweden and France, as well as in some other countries. Increasing glioma incidence trends have been reported in the UK and other countries. Non-malignant endpoints linked include acoustic neuroma (vestibular Schwannoma) and meningioma. ... When considered with recent animal experimental evidence, the recent epidemiological studies strengthen and support the conclusion that RFR should be categorized as carcinogenic to humans (IARC Group 1).”

*Anthony B. Miller, MD, FRCP, FRCP(C), FFPH, FACE. Professor Emeritus, Dalla Lana School of Public Health, University of Toronto. A physician-epidemiologist, he was trained in internal medicine, and was a member of the scientific staff of the Tuberculosis and Chest Diseases Research Unit, UK Medical Research Council, 1962-71. He was Director of the Epidemiology Unit of the National Cancer Institute of Canada 1971-86 and Chair of the Department of Preventive Medicine and Biostatistics, University of Toronto, 1992-96. He served as a special expert in the Division of Cancer Prevention, US National Cancer Institute, 1997, Senior Epidemiologist, International Agency for Research on Cancer 1998-99, Head, Division of Epidemiology, German Cancer Research Centre, Heidelberg, 2000-03, Associate Director, Research, Dalla Lana School of Public Health, University of Toronto, 2008-10. He has been a consultant to the World Health Organization. He is Scientific Lead of the OncoSim microsimulation modelling initiative of the Canadian Partnership Against Cancer. His research encompasses cancer etiology, prevention and screening.

- Hardell, L., & Carlberg, M. (2018). **Comments on the US National Toxicology Program technical reports on toxicology and carcinogenesis study in rats exposed to whole-body radiofrequency radiation at 900 MHz and in mice exposed to whole-body radiofrequency radiation at 1,900 MHz.** *International Journal of Oncology*.

<https://doi.org/10.3892/ijo.2018.4606>

“We conclude that there is clear evidence that RF radiation is a human carcinogen, causing glioma and vestibular schwannoma (acoustic neuroma). There is some evidence of an increased risk of developing thyroid cancer, and clear evidence that RF radiation is a multi-site carcinogen. Based on the Preamble to the IARC Monographs, RF radiation should be classified as carcinogenic to humans, Group 1.”

CANADIAN BRAIN CANCER DATA

2X RISK OF GLIOMAS WITH >558 HOURS OF CELL PHONE USE (APPROX. 10 MINUTES/DAY FOR 10 YEARS) - ADJUSTED FOR SELECTION AND RECALL BIAS.

- Momoli, F., Siemiatycki, J., McBride, M. L., Parent, M.-É., Richardson, L., Bedard, D., ... Krewski, D. (2017). **Probabilistic Multiple-Bias Modeling Applied to the Canadian Data From the Interphone Study of Mobile Phone Use and Risk of Glioma, Meningioma, Acoustic Neuroma, and Parotid Gland Tumors.** *American Journal of Epidemiology*, 186(7), 885–893.

<https://doi.org/10.1093/aje/kwx157>

“For glioma, when comparing those in the highest quartile of use (>558 lifetime hours) to those who were not regular users, the odds ratio was 2.0 (95% confidence interval: 1.2, 3.4). After adjustment for selection and recall biases, the odds ratio was 2.2 (95% limits: 1.3, 4.1).”

BRAIN CANCER INCIDENCE IN ENGLAND

- Philips, Alisdair, Henshaw, Denis L., Lamburn, Graham, & O’Carroll, Michael. (2018). **Brain tumours:**

rise in Glioblastoma Muliforme incidence in England 1995-2015 suggests an adverse environmental or lifestyle factor. *Journal of Environmental and Public Health*, 20.

<https://www.hindawi.com/journals/jeph/2018/7910754/>

“UK Office of National Statistics (ONS) data covering 81,135 ICD10 C71 brain tumours diagnosed in England (1995–2015) were used to calculate incidence rates (ASR) per 100k person–years, age–standardised to the European Standard Population (ESP–2013). Results. We report a sustained and highly statistically significant ASR rise in glioblastoma multiforme (GBM) across all ages. The ASR for GBM more than doubled from 2.4 to 5.0, with annual case numbers rising from 983 to 2531. Overall, this rise is mostly hidden in the overall data by a reduced incidence of lower-grade tumours. Conclusions. The rise is of importance for clinical resources and brain tumour aetiology. The rise cannot be fully accounted for by promotion of lower–grade tumours, random chance or improvement in diagnostic techniques as it affects specific areas of the brain and only one type of brain tumour. Despite the large variation in case numbers by age, the percentage rise is similar across the age groups, which suggests widespread environmental or lifestyle factors may be responsible.”

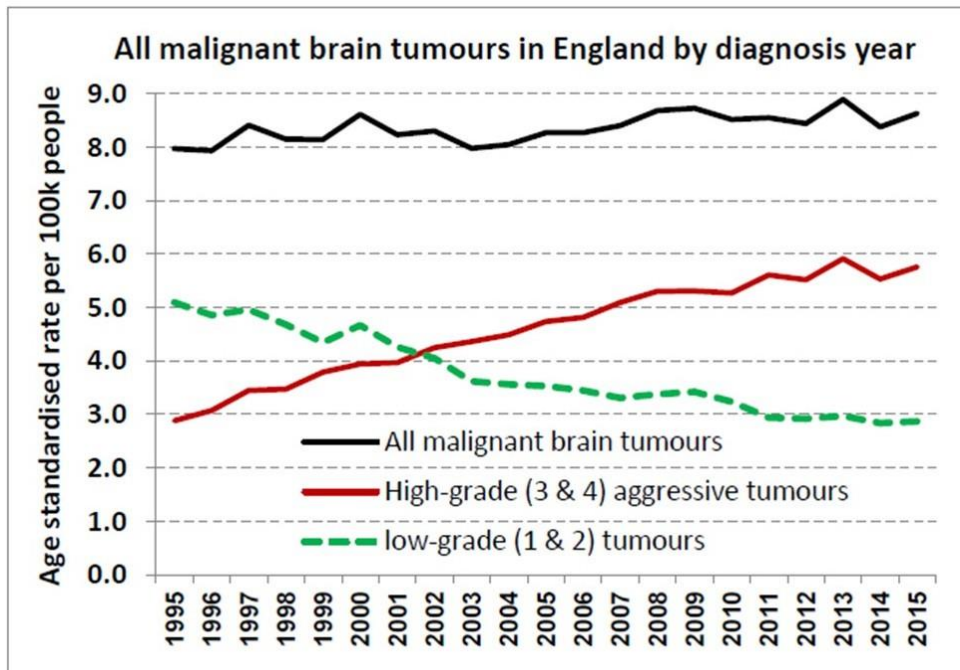


Figure 1. From: Philips A, et al; Rise in GBM incidence, England 1995–2015; Supplementary File. <https://www.hindawi.com/journals/jeph/2018/7910754/>

ANIMAL STUDIES

CLEAR EVIDENCE OF CARCINOGENICITY

- National Toxicology Program, National Institute of Environmental Health Sciences. (2018). **Toxicology and carcinogenesis studies in Hsd: Sprague Dawley SD rats exposed to whole-body radio frequency radiation at a frequency (900 MHz) and modulations (GSM and CDMA) used by cell phones.** *NTP Technical Report 595*, 384. (This was a multi-million dollar study.)
 “Under the conditions of this 2-year whole-body exposure study, there was clear evidence of carcinogenic activity of CDMA-modulated cell phone RFR at 900 MHz in male Hsd: Sprague Dawley SD rats based on the incidences of malignant schwannoma of the heart. The incidences of malignant

glioma of the brain were also related to RFR exposure.”

- Falcioni, L., Bua, L., Tibaldi, E., Lauriola, M., De Angelis, L., Gnudi, F., ... Belpoggi, F. (2018). **Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz GSM base station environmental emission.** *Environmental Research*.

<https://doi.org/10.1016/j.envres.2018.01.037>

“[Our] findings on far field exposure to RFR are consistent with and reinforce the results of the NTP study on near field exposure, as both reported an increase in the incidence of tumors of the brain and heart in RFR-exposed Sprague-Dawley rats. These tumors are of the same histotype of those observed in some epidemiological studies on cell phone users.”

- Lerchl, A., Klose, M., Grote, K., Wilhelm, A. F. X., Spathmann, O., Fiedler, T., ... Clemens, M. (2015). **Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans.** *Biochemical and Biophysical Research Communications*, 459(4), 585–590.

<https://doi.org/10.1016/j.bbrc.2015.02.151>

“We have performed a replication study ... We could confirm and extend the originally reported findings. Numbers of tumors of the lungs and livers in exposed animals were significantly higher than in sham-exposed controls. In addition, lymphomas were also found to be significantly elevated by exposure ... many of the tumor-promoting effects in our study were seen at low to moderate exposure levels (0.04 and 0.4 W/kg SAR), thus well below exposure limits for the users of mobile phones ... Our findings may help to understand the repeatedly reported increased incidences of brain tumors in heavy users of mobile phones.”

B. RADIOFREQUENCY ENERGY ABSORBED IN DEEPER REGIONS IN CHILDREN’S HEADS

Fernández, C., de Salles, A. A., Sears, M. E., Morris, R. D., & Davis, D. L. (2018). **Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality.** *Environmental Research*, 167, 694–699. <https://doi.org/10.1016/j.envres.2018.05.013>

“Modeling of a cell phone held to the ear, or of virtual reality devices in front of the eyes, reveals that young eyes and brains absorb substantially higher local radiation doses than adults’. Age-specific simulations indicate the need to apply refined methods for regulatory compliance testing; and for public education regarding manufacturers’ advice to keep phones off the body, and prudent use to limit exposures, particularly to protect the young.”

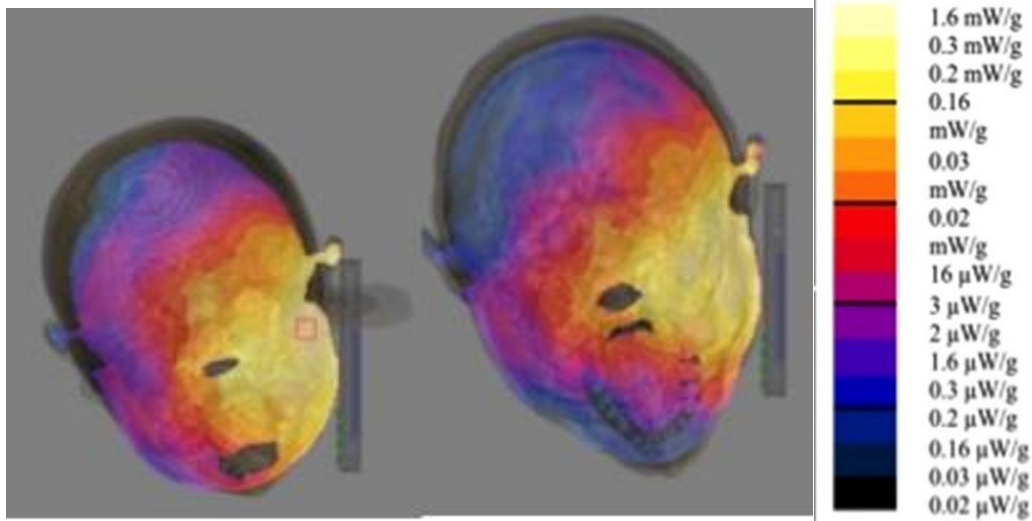


Figure 2. Specific Absorption Rate (SAR) in child (age 6 years) and adult male heads with phone in talk position. The scale is 50 dB with 0 dB = 1.6 mW/kg. From work of Claudio Fernández, 2018 (image used with permission of Environmental Health Trust).

C. PUBLIC HEALTH RISKS (both Miller and Russell are medical doctors)

- Miller, A. B., Sears, M. E., Morgan, L. L., Davis, D. L., Hardell, L., Oremus, M., & Soskolne, C. L. (2019). **Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices.** *Frontiers in Public Health*, 7. <https://doi.org/10.3389/fpubh.2019.00223>
 “Based on the accumulated evidence, we recommend that IARC re-evaluate its 2011 classification of the human carcinogenicity of RFR, and that WHO complete a systematic review of multiple other health effects such as sperm damage. In the interim, current knowledge provides justification for governments, public health authorities, and physicians/allied health professionals to warn the population that having a cell phone next to the body is harmful, and to support measures to reduce all exposures to RFR [radiofrequency radiation].”
- Russell, C. L. (2018). **5 G wireless telecommunications expansion: Public health and environmental implications.** *Environmental Research*, 165, 484–495. <https://doi.org/10.1016/j.envres.2018.01.016>
 Website: Physicians for Safe Technology - <https://midsafetech.org/>
 “Like other common toxic exposures, the effects of radiofrequency electromagnetic radiation (RF EMR) will be problematic if not impossible to sort out epidemiologically as there no longer remains an unexposed control group. This is especially important considering these effects are likely magnified by synergistic toxic exposures and other common health risk behaviors. Effects can also be non-linear. Because this is the first generation to have cradle-to-grave lifespan exposure to this level of man-made microwave (RF EMR) radiofrequencies, it will be years or decades before the true health consequences are known. Precaution in the roll out of this new technology is strongly indicated.”

D. BEHAVIOURAL PROBLEMS IN CHILDREN

Birks, L., Guxens, M., Papadopoulou, E., Alexander, J., Ballester, F., Estarlich, M., ... Vrijheid, M. (2017). **Maternal cell phone use during pregnancy and child behavioral problems in five birth cohorts.** *Environment International*, 104, 122–131. <https://doi.org/10.1016/j.envint.2017.03.024>

“Overall, 38.8% of mothers, mostly from the Danish cohort, reported no cell phone use during pregnancy and these mothers were less likely to have a child with overall behavioral, hyperactivity/inattention or emotional problems. Evidence for a trend of increasing risk of child behavioral problems through the maternal cell phone use categories was observed for hyperactivity/inattention problems (OR for problems in the clinical range: 1.11, 95%CI 1.01, 1.22; 1.28, 95%CI 1.12, 1.48, among children of medium and high users, respectively). This association was fairly consistent across cohorts and between cohorts with retrospectively and prospectively collected cell phone use data.”

E. ADVERSE EFFECTS ON SPERM QUALITY (one of several reviews with similar conclusions)

Houston, B. J., Nixon, B., King, B. V., De Iulius, G. N., & Aitken, R. J. (2016). **The effects of radiofrequency electromagnetic radiation on sperm function.** *Reproduction (Cambridge, England)*, 152(6), R263–R276. <https://doi.org/10.1530/REP-16-0126>

“Among a total of 27 studies investigating the effects of RF-EMR on the male reproductive system, negative consequences of exposure were reported in 21. Within these 21 studies, 11 of the 15 that investigated sperm motility reported significant declines, 7 of 7 that measured the production of reactive oxygen species (ROS) documented elevated levels and 4 of 5 studies that probed for DNA damage highlighted increased damage due to RF-EMR exposure. Associated with this, RF-EMR treatment reduced the antioxidant levels in 6 of 6 studies that discussed this phenomenon”

F. DNA DAMAGE (more than 30 studies)

Panagopoulos, D. J. (2019). **Comparing DNA damage induced by mobile telephony and other types of man-made electromagnetic fields.** *Mutation Research/Reviews in Mutation Research*, 781, 53–62. <https://doi.org/10.1016/j.mrrev.2019.03.003>
<https://www.sciencedirect.com/science/article/pii/S1383574218300991>

“The present review - of results published by my group from 2006 until 2016 - compares DNA fragmentation induced by six different EMFs on the same biological system - the oogenesis of *Drosophila melanogaster* - under identical conditions and procedures. Such a direct comparison between different EMFs - especially those employed in daily life - on the same biological endpoint, is very useful for drawing conclusions on their bioactivity, and novel. It shows that real MT EMFs are far more damaging than 50 Hz alternating magnetic field (MF) - similar or much stronger to those of power lines - or a pulsed electric field (PEF) found before to increase fertility. The MT EMFs were significantly more bioactive even for much shorter exposure durations than the other EMFs. Moreover, they were more damaging than previously tested cytotoxic agents like certain chemicals, starvation, dehydration. Individual parameters of the real MT EMFs like intensity, frequency, exposure duration, polarization, pulsing, modulation, are discussed in terms of their role in bioactivity. The crucial parameter for the intense bioactivity seems to be the extreme variability of the polarized MT signals, mainly due to the large unpredictable intensity changes.”

G. OXIDATIVE STRESS

Oxidative stress can lead to many health conditions, including cancer, Alzheimer’s and Parkinson’s Diseases.

Yakymenko, I., Tsybulin, O., Sidorik, E., Henshel, D., Kyrylenko, O., & Kyrylenko, S. (2016). **Oxidative**

mechanisms of biological activity of low-intensity radiofrequency radiation. *Electromagnetic Biology and Medicine*, 35(2), 186–202. <https://doi.org/10.3109/15368378.2015.1043557>

“... among 100 currently available peer-reviewed studies dealing with oxidative effects of low-intensity RFR, in general, 93 confirmed that RFR induces oxidative effects in biological systems. A wide pathogenic potential of the induced ROS and their involvement in cell signaling pathways explains a range of biological/health effects of low-intensity RFR, which include both cancer and non-cancer pathologies. In conclusion, our analysis demonstrates that low-intensity RFR is an expressive oxidative agent for living cells with a high pathogenic potential and that the oxidative stress induced by RFR exposure should be recognized as one of the primary mechanisms of the biological activity of this kind of radiation.”

H. ELECTROHYPERSENSITIVITY (EHS)

- Belyaev, I., Dean, A., Eger, H., Hubmann, G., Jandrisovits, R., Kern, M., ... Thill, R. (2016). **EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses.** *Reviews on Environmental Health*, 31(3). <https://doi.org/10.1515/reveh-2016-0011>
“... the emerging electromagnetic hypersensitivity (EHS) is more and more recognized by health authorities, disability administrators and case workers, politicians, as well as courts of law. We recommend treating EHS clinically as part of the group of chronic multisystem illnesses (CMI), but still recognizing that the underlying cause remains the environment. In the beginning, EHS symptoms occur only occasionally, but over time they may increase in frequency and severity. Common EHS symptoms include headaches, concentration difficulties, sleep problems, depression, a lack of energy, fatigue, and flu-like symptoms. A comprehensive medical history, which should include all symptoms and their occurrences in spatial and temporal terms and in the context of EMF exposures, is the key to making the diagnosis.”
- Havas, M. (2019). **Electrohypersensitivity (EHS) is an Environmentally-Induced Disability that Requires Immediate Attention.** *J. Sci. Discov.*, 3(1), 20. <https://doi.org/jsd18020>
“A growing number of countries are beginning to acknowledge that electrohypersensitivity (EHS) exists and a few countries have classified it as a disability or a functional impairment attributable to the environment. Epidemiological studies and in vivo experiments show that exposure to non-ionizing radiation (NIR) from extremely low to microwave frequency electromagnetic fields (EMF) at exposure intensities far below the maximum limits in international guidelines increases anxiety, depression, and physiological stress and impairs cognitive functions that include concentration, memory and learning.”

I. NON-THERMAL EFFECTS: HEALTH CANADA’S SAFETY CODE 6 GUIDELINES FOR CELL ANTENNA RADIATION ARE SOLEY BASED ON THERMAL (HEATING) EFFECTS

- Belpomme, D., Hardell, L., Belyaev, I., Burgio, E., & Carpenter, D. O. (2018). **Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective.** *Environmental Pollution*, 242, 643–658. <https://doi.org/10.1016/j.envpol.2018.07.019>
“Exposure to low frequency and radiofrequency electromagnetic fields at low intensities poses a significant health hazard that has not been adequately addressed by national and international organizations such as the World Health Organization. There is strong evidence that excessive exposure to mobile phone-frequencies over long periods of time increases the risk of brain cancer both in humans and animals. The mechanism(s) responsible include induction of reactive oxygen

species, gene expression alteration and DNA damage through both epigenetic and genetic processes. In vivo and in vitro studies demonstrate adverse effects on male and female reproduction, almost certainly due to generation of reactive oxygen species.”

- Smith-Roe, S. L., Wyde, M. E., Stout, M. D., Winters, J. W., Hobbs, C. A., Shepard, K. G., ... Witt, K. L. (2019). **Evaluation of the genotoxicity of cell phone radiofrequency radiation in male and female rats and mice following subchronic exposure.** *Environmental and Molecular Mutagenesis*. <https://doi.org/10.1002/em.22343>
“Results of the comet assay showed significant increases in DNA damage in the frontal cortex of male mice (both modulations), leukocytes of female mice (CDMA only), and hippocampus of male rats (CDMA only).”

J. CELL TOWER EXPOSURE STUDIES

Symptoms, DNA damage, oxidative stress

- Bortkiewicz, A., Gadzicka, E., Szykowska, A., Politański, P., Mamrot, P., Szymczak, W., & Zmyślony, M. (2012). **Subjective complaints of people living near mobile phone base stations in Poland.** *International Journal of Occupational Medicine and Environmental Health*, 25(1), 31–40. <https://doi.org/10.2478/s13382-012-0007-9>
“Headache was declared by 57% people, most frequently (36.4%) living 100–150 m away from the base station compared to people living at longer distances ($p = 0.013$). 24.4% subjects, mostly living at a distance above 150 m, declared impaired memory. Difference was statistically significant in comparison with people living at other distances ($p = 0.004$).”
- Levitt, B. B., & Lai, H. (2010). **Biological effects from exposure to electromagnetic radiation emitted by cell tower base stations and other antenna arrays.** *Environmental Reviews*, 18, 369–395. <https://doi.org/10.1139/A10-018>
“Both anecdotal reports and some epidemiology studies have found headaches, skin rashes, sleep disturbances, depression, decreased libido, increased rates of suicide, concentration problems, dizziness, memory changes, increased risk of cancer, tremors, and other neurophysiological effects in populations near base stations.”
- Zothansiana, Zosangzuali, M., Lalramdinpui, M., & Jagetia, G. C. (2017). **Impact of radiofrequency radiation on DNA damage and antioxidants in peripheral blood lymphocytes of humans residing in the vicinity of mobile phone base stations.** *Electromagnetic Biology and Medicine*, 1–11. <https://doi.org/10.1080/15368378.2017.1350584>
“The analyses of data from the exposed group ($n = 40$), residing within a perimeter of 80 m of mobile base stations, showed significantly ($p < 0.0001$) higher frequency of micronuclei when compared to the control group, residing 300 m away from the mobile base station/s. The analysis of various antioxidants in the plasma of exposed individuals revealed a significant attrition in glutathione (GSH) concentration ($p < 0.01$), activities of catalase (CAT) ($p < 0.001$) and superoxide dismutase (SOD) ($p < 0.001$) and rise in lipid peroxidation (LOO) when compared to controls. Multiple linear regression analyses revealed a significant association among reduced GSH concentration ($p < 0.05$), CAT ($p < 0.001$) and SOD ($p < 0.001$) activities and elevated MN frequency ($p < 0.001$) and LOO ($p < 0.001$) with increasing RF power density.”

K. HEALTH CANADA’S SAFETY CODE 6 GUIDELINES COMPARED TO RECOMMENDED PRECAUTIONARY LIMITS

PUBLIC EXPOSURE GUIDELINES	INTENSITY (mW/m²)
Safety Code 6 (for 6 GHz and higher)	10,000
Belgium, parts of Italy	100
Austrian Sustainable Building Council	1
EUROPAEM* (MDs)	0.1
Natural (all frequencies)	0.001
Cosmic background	0.0000001

* *Belyaev, et al. (2016). **EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses.** Modified from Powerwatch <https://www.powerwatch.org.uk/science>

**Brief (4 pages with the remainder being appendices)
to Innovation and Economic Development Committee.
City of Winnipeg, City Hall. Monday February 10th, 2020 9:30 am**

By Margaret Friesen on behalf of 5G Winnipeg Awareness

Item 2: Winnipeg Antenna Systems Policy - 5G Network

Good morning Councillors - Thank you for the opportunity to present on this important topic of 5G technologies and associated so-called “small cell” antenna infrastructure.

My name is Margaret Friesen. I am representing “5G Winnipeg Awareness” who are residents from all parts of the City of Winnipeg who are deeply concerned about the pervasive expansion of radiofrequency emitting antennas installed close to where people spend much of their lives.

I presented about the concerns surrounding 5G antennas to the Property Development, Heritage and Downtown Development committee on January 6th, 2020 (see Appendix B).

It is not just Winnipeggers who are concerned about 5G roll out. People worldwide are voicing opposition because the standards in their countries, are not protective of human health.

On January 25th, 2020 protests were held across Canada and around the world.

- FOR CANADA, at least 14 events in 8 provinces. See - EMR Health Alliance BC:
<https://emrabc.ca/?p=16197>
- WORLDWIDE:
 - EMR Radiation Safety (Joel Moskowitz, Ph.D., Public Health, University of California, Berkeley)- <https://www.saferemr.com/2020/01/5g-global-protest-1-25-2020.html>
 - Stop 5G International reported 270 Stop 5G events in 38 countries-
<https://stop5ginternational.org/wp-content/uploads/2020/02/Press-Release-Feb-2020.pdf>

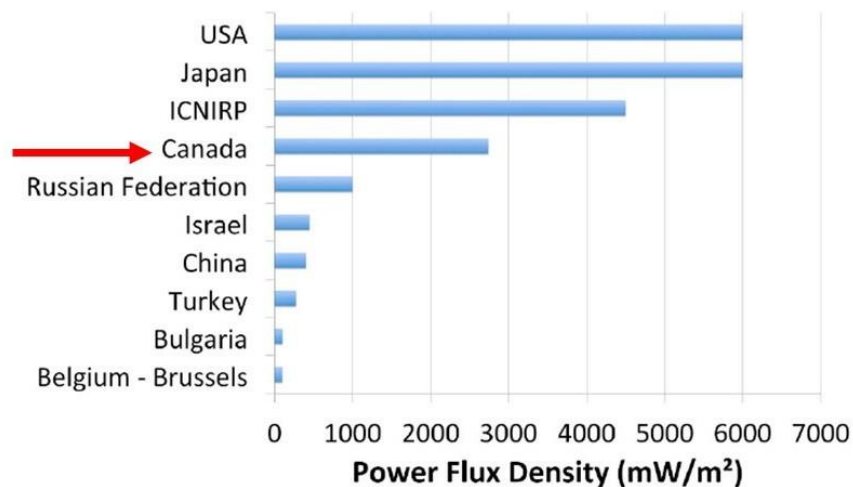
The next information event in Winnipeg called **5G Wireless Forum - Opportunities and Threats: Health, Environment and Rights** will be held on Saturday afternoon , May 2nd, 2020. It will be a public meeting open to the public and you are invited.

HEALTH CONCERNS:

**There is no scientific evidence to support any claim of safety for long term 5G exposures.
Health Canada’s Safety Code 6 guidelines are obsolete because they are based on the now disproven assumption that only heating from radiofrequency radiation exposure causes adverse health effects.
See Appendix B.**

Health Canada's claim that its Safety Code 6 guidelines (adopted as its standard by Innovation, Science and Economic Development which regulates cell antenna emissions) are among the most stringent in the world is simply not true.

International guidelines/limits at 900 MHz



Source: World Health Organization, Global Health Observatory, Exposure limits for radiofrequency fields (public) - data by country, WHO, <http://apps.who.int/gho/data/node.main.EMFLIMITSPUBLICRADIOFREQUENCY?lang=en>, (2017) accessed July 3, 2019.
H. Mazar, Human radio frequency exposure limits: an update of reference levels in Europe, USA, Canada, China, Japan and Korea, 2016 International Symposium on Electromagnetic Compatibility - EMC EUROPE, IEEE, Wroclaw, Poland, 2016, pp. 467-473,, <https://doi.org/10.1109/EMCEurope.2016.7739164>.

Dr. Anthony Miller (MD, FRCP, FRCP (C), FFPH, FACE) is a specialist in internal medicine and Professor Emeritus of the Dalla Lana School of Public Health, University of Toronto. He is among a group of concerned medical experts and individuals that there are health risks of radio frequency radiation. This comes from all these mobile devices and the myriad towers we already have, and he says the health risks at present are being ignored and that these risks and concerns will only be increased with 5G.⁹

Dr. Miller's publications are listed in Appendix B and detail the scientific evidence that supports a Class 1 known carcinogen classification by the World Health Organization's International Agency for Research on Cancer (Dr. Miller has served as an advisor to the WHO-IARC)

Dr. Miller was recently interviewed by CBC Radio Canada **5G-In the rush to the internet of things, is human health at risk?** (posted Tuesday, February 4, 2020 12:26).

<https://www.rcinet.ca/en/2020/02/04/5g-in-the-rush-to-the-internet-of-things-is-human-health-at-risk/>

⁹ Source of extract: Environmental Health Trust: <https://ehtrust.org/5g-a-human-health-risk-dr-miller-interviewed-on-radio-canada-international/>

Dr. Miller has also recently (February 4, 2020) written his concerns about 5G to the Penticton City council and others (Appendix B.) Dr. Miller outlines the evidence for health concerns and also makes this statement about liability:

LIABILITY CONCERNS - Extract from Dr. Miller's letter: "Possible liability concerns: Those who support the introduction of 5G should recognize that no insurance agency (including Lloyds of London) will cover them against liability from ill health effects caused by radiofrequency radiation."

What the City of Winnipeg can do:

1. Conduct public consultations on the installation of small cell antennas in residential areas. This option is open according to the "Winnipeg Systems Antenna Systems Policy" and the federal department whose minister has the ultimate say in cell antenna installations (Industry, innovation, Economic Development) CPC20-03. CPC-2-0-03 — "Radiocommunication and Broadcasting Antenna Systems" <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08777.html>

It is our understanding that as it is now, there will be no public consultations, no notifications nor any signage for the installation of small cellular radiofrequency emitting antennas in neighbourhoods or elsewhere.

2. The City of Winnipeg can amend its policy to include the requirement of having public consultations for the installation of cellular antennas of "non-tower structures" within City limits.

3. The City can issue a letter of non-concurrence. The city's policy states:

2.2 Role of the City

The ultimate role of the City is to issue a statement of concurrence or non-concurrence to the Proponent and to Industry Canada. The statement considers the land use compatibility of the Antenna System, the responses of the affected residents and the Proponent's adherence to this Policy. The City also guides and facilitates the siting process by:

☒ **Communicating** to Proponents the particular amenities, sensitivities, planning priorities and other relevant characteristics of the area;

☒ **Developing the design guidelines** for Antenna Systems contained in Section 6 of this Policy; and

☒ **Establishing** a community consultation process, where warranted.

By working with Proponents throughout the siting process, beginning with preliminary notification and the site investigation meeting, the City seeks to facilitate Antenna System installations that are sensitive to the needs of the local community.

I am here today to inform you that we, the “affected” residents of Winnipeg, wish to be consulted and that a community consultation process is warranted. We, the residents who will be irradiated by what the scientific evidence is telling us is likely a known carcinogen (as well as having many other adverse effects) are the biggest stakeholders in this process, with our health at stake, and are being left out of this whole process.

QUESTIONS:

- -Do you agree that we, the residents of Winnipeg have a “right to know” and be fully informed about the installations of 5G antennas close to our homes and schools?
- -Will you, as our representatives, do what is necessary to hold full public consultation hearings before the 5G rollout begins?

Furthermore:

We, the residents of Winnipeg, do not consent to having radiofrequency radiation emitting antennas installed close to our homes. We urge the City of Winnipeg to do everything within its jurisdiction* to prevent the development and installations in residential areas of cell antennas of the 4G/5G network until it is deemed safe for the general public.**

* Including writing a letter of non-concurrence to the federal department of Innovation, Science and Economic Development.

** By a panel of medical doctors and scientists recommended by the Environmental Health Clinic at Women’s College Hospital in Toronto, Ontario, Canada.

Respectfully submitted.

Margaret Friesen M.Sc.

Spokesperson, 5G Awareness Winnipeg

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Website: <https://5gwinnipegawareness.ca/>

Face Book: https://www.facebook.com/5GWinnipegAwareness/?modal=admin_todo_tour

Brief to Property Development, Heritage, Downtown Development Committee. City of Winnipeg, City Hall.

Monday January 6th, 2020 9:30 am

By Margaret Friesen on behalf of 5G Winnipeg Awareness

Item 22: Review of the Winnipeg Antenna Systems Policy - 5G Network

Good morning Councillors - Thank you for the opportunity to present on this important topic of 5G technologies and associated so-called “small cell” antenna infrastructure.

My name is Margaret Friesen. Today I am representing a newly formed group named “5G Winnipeg Awareness.” We are residents from all parts of the City of Winnipeg who are deeply concerned about the pervasive expansion of radiofrequency emitting antennas installed close to where people spend much of their lives. My background: Master of Science in Entomology/Toxicology and a Bachelor of Science (Honours) degree in Zoology. Most of my 30+ years career in the federal government and University of Manitoba was in original research projects including ecosystem toxicology and DNA population genetics of marine mammals. I have published in peer-reviewed literature, including most recently a paper on radiofrequency radiation and smart and healthy buildings¹⁰. I presented to City committees in 2015 about the proposed *Winnipeg Antenna Systems Policy* (passed) 27 May 2015: Winnipeg.ca/ppd/planning/AntennaSystemsPolicy/pdfs/WinnipegAntennaSystemsPolicy.pdf

5G uses newer frequencies – different wave sizes and with higher energy than existing 1G, 2G, 3G and 4G. It will be in addition to the other frequencies already in use AND because the newer wave size cannot as easily penetrate objects (e.g. tree leaves and water droplets), these small cells would be located close to our homes – possibly every 2 to 3 homes in residential areas (see picture from Mission BC). Also, network coverage signal areas are designed to overlap, therefore many, if not all, residences will be swamped by the emissions from more than one nearby small cell. We will be exposed, whether we want to be or not, to radiation emitted from so-called “small cell” antennas installed close to our homes.



Based on what is happening in other parts of Canada, there could be more than one antenna on each lamp pole or hydro pole installation. The actual 5G technology is not yet widely rolled out (there are pilot projects) but antennas emitting the 4G and other frequencies are already being installed close to homes – frequencies where the science has shown potential harm such as cancers and DNA damage. 5G

¹⁰ Clegg et al. (2019) Building science and radiofrequency radiation: What makes smart and healthy buildings. Building and Environment. <https://www.sciencedirect.com/science/article/pii/S0360132319305347>

rollouts plan to require more towers and more antennas on existing towers. Based on information from European countries, such installations increase radiofrequency emissions levels.

1. There is an urgent need to delay 5G and 4G antenna installations in residential areas

Health concerns alone are enough to put the brakes on the rollout of 5G and the 4G antenna installations but there are also serious privacy and cyber-security issues.

2. The fundamental problem: Safety Code 6 (2015), Health Canada’s guidelines for safe human exposure are not protective of human health

Safety Code 6 (2015) for the frequencies used for common telecommunications, relies only on the adverse effects of the heating of tissue for its guidelines [which had been adopted as its standards by Innovation, Science and Economic Development (ISED)]. This has been shown in many studies to be a false assumption. There are many hundreds of studies showing adverse effects at levels that do not cause heating.

- During the last revision of Safety Code 6 (2015) more than 100 international scientists and Canadian medical doctors wrote to the Minister of Health stating that Safety Code 6 limits were not protective enough.
- The so-called independent review by an expert panel of Safety Code 6 that recommended only minor changes seem to be a rubber-stamp exercise. Some of the controversy was described in several articles in the *Canadian Medical Association Journal*¹¹.
- More recently, the EMF (electromagnetic field) Scientists and MDs Appeal <https://www.emfscientist.org/> (as of August 25th, 2019 signed by 250 specialists from 42 nations) asks for more protective standards.

Speeding analogy:

Modified from Powerwatch <https://www.powerwatch.org.uk/science/intguidance.asp>

1800 MHz Public Exposure Guidelines	Intensity (mW/m ²)	Speed Analogy in km/hour
Safety Code 6	10,000	4,800
Belgium, parts of Italy	100	480
Austrian Sustainable Building Council	1	50
EUROPAEM* (MDs)	0.1	15
Natural (all frequencies)	0.001	< 1
Cosmic background	0.00000001	< 1

¹¹ 1) Webster, Paul Christopher. (2013). **Federal Wi-Fi panel criticized for undisclosed conflict.** *CMAJ: Canadian Medical Association Journal = Journal de l’Association Medicale Canadienne*, 185(11), E515-516. <https://doi.org/10.1503/cmaj.109-4523>

2) Webster, P. (2013). **Chair of Wi-Fi safety panel steps down.** *CMAJ*, 185(12), E573. <https://www.cmaj.ca/content/185/12/E573>

3) Webster, Paul Christopher. (2014). **Federal Wi-Fi safety report is deeply flawed, say experts.** *CMAJ: Canadian Medical Association Journal = Journal de l’Association Medicale Canadienne*, 186(9), E300. <https://doi.org/10.1503/cmaj.109-4785>

4) Webster, Paul Christopher. (2015). **Scientists decry Canada’s outdated Wi-Fi safety rules.** *Canadian Medical Association Journal*, 187(9), 639–640. <https://doi.org/10.1503/cmaj.109-5061>

* Belyaev, et al. (2016). EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses. *Reviews on Environmental Health*, 31(3). <https://doi.org/10.1515/reveh-2016-0011>

- Health Canada has a number of links that go to the World Health Organization (WHO) website. There are at least 2 bodies that have studied health effects of radiofrequency radiation:
 1. International EMF Project. Most of the information on this site is not very recent. This project has put a call out for systematic reviews of the health literature on radiofrequency radiation (RFR). This came after much controversy after an earlier review was heavily criticized for bias and conflict of interest. It is heavily influenced by industry friendly scientists.
 2. International Agency for Research on Cancer (IARC). In 2011, IARC classified RFR, which would include 5G, as a *possible* carcinogen. RFR is on the list to be re-evaluated based on more recent evidence showing harm. Many scientists, independent of industry influence, consider the scientific evidence to warrant a *known* carcinogen classification, along with asbestos and cigarette smoking.
- Evidence for radiofrequency radiation as a *known* carcinogen. Canadian MD and cancer epidemiologist Dr. Anthony B. Miller published that there is now enough evidence for the upgrading of radiofrequency radiation as a *known* human carcinogen (same category as asbestos and cigarette smoking). In 2011, radiofrequency radiation was classified as a *possible* human carcinogen by the World Health Organization’s International Agency for Research on Cancer (IARC). An Advisory Group of 29 scientists from 18 countries met at IARC on 25–27 March 2019 to recommend priorities for the IARC Monographs Programme during 2020–2024.¹²
- **There is no scientific evidence to support any claim of safety for long term 5G exposures.**
- Strong evidence of cancer, DNA damage and sperm damage from 2G, 3G and 4G frequencies (Appendix 1).
- Public health issue is described by Cindy Russel MD. (Appendix 1, Russell 2018).
- Electrosensitivity (EHS) – Article by Magda Havas PhD (see Appendix 1). Press release: *Ontario Doctors Warn of Rising Health Care Costs after 5G Roll Out* (see below).
- We plan to write to the Chief Provincial Public Health Officer (Dr. Brent Roussin) with this and other information.
- *Winnipeg Free Press* article: “Winnipeg should be cautious about 5G antennas” <https://www.winnipegfreepress.com/opinion/analysis/winnipeg-should-be-cautious-about-5g-antennas-564489772.html>
- *Common Ground* article: “Better health safety guidelines imperative before exposing public to 5G” <https://commonground.ca/better-health-safety-guidelines-imperative-before-exposing-public-to-5g/>
- Property Development, Heritage and Downtown Development (PDHDD) Committee passed a motion – May 27th. City staff working on a report. MB Hydro in discussions with providers.

¹² The Lancet. [https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045\(19\)30246-3/fulltext](https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(19)30246-3/fulltext)

3. City of Winnipeg and small cell antennas close to homes and schools, etc.

- Federation of Canadian Municipalities – Press Release June 16, 2019: *Statement by FCM on Supreme Court of Canada decision on telecommunications*
<https://fcm.ca/en/news-media/news-release/statement-fcm-supreme-court-canada-decision-telecommunications>.
- Some municipalities have said no: a citizen who attended the Maple Ridge BC council meeting emailed to Margaret, “Maple Ridge in 2018 had been approached by TELUS and they [Council] said we need to think about it, need evidence its safe. No small cell antennas were installed.”
- Installation of at least 2 cell towers in Winnipeg halted after letters of non-concurrence were written by Councillors for those Wards. Another was halted after the City Councillor followed up on residents’ complaints and found that the area was not zoned for a tower.
- Sutton, Quebec unanimously passed a resolution in December 2019: TO REQUEST the federal government, following the precautionary principle, to decree a moratorium on the deployment of the 5G cellular network, until the various studies reach a consensus on the absence of risk and impact of 5G cell technology on health and the environment. TO TRANSMIT a copy of this resolution to the Minister of Health, the Minister of Innovation, Science and Economic Development, and the federal member for Brome-Missisquoi.
- [Original wording in French: “DE DEMANDER au gouvernement fédéral, en suivant le principe de précaution, qu’il décrète un moratoire sur le déploiement du réseau cellulaire 5G, et ce, jusqu’à ce que les diverses études dégagent un consensus quant à l’absence de risque et d’impact de la technologie cellulaire 5G sur la santé et l’environnement.”]
- The Bloc Québécois in October 2019: *“in favor of a moratorium on the establishment of the 5G network ... that scientific studies be entrusted to an independent and autonomous commission ... respecting the precautionary principle.”*
- The Green Party of Canada in its 2019 platform stated: *“A green government will strike a parliamentary committee to examine the implications of introducing 5G technologies...”*
- Highly controversial in parts of the USA. New Hampshire, USA has ...

4. If small cells may be installed in homes and near schools, need “fulsome” public consultation held by the City of Winnipeg.

Currently can be exempted. In Winnipeg, *“if these antenna installations would be on new towers, public consultation would be required. But most, if not all, 5G antennas, will be exempt from consultation. The Winnipeg Antenna Systems Policy allows the exemption of “antennas on buildings, water towers, lamp posts, etc. ... provided the height above ground of the non-tower structure ... is not increased by more than 25%.”* This loophole is possible because of the federal Innovation, Science and Economic Development’s policy CPC-2-0-03.

5. Alternatives must be investigated with full public consultations:

1. Copper and ethernet (widely used now) to and through the premises – one non-wireless alternative (slower transmission speeds than fiber optics).
2. Fiber optics to and through the premises (FTTP) – Community-owned wired fiber-to-the-premises
 - Community Broadband – Municipal Broadband - Canadian success stories <https://community-broadband.ca/>

- Site from BC: *Connected Communities. Wired Networks for Crossing the Digital Divide:*
<https://connected-communities.ca/>
 - Wired Smart Cities: <https://connected-communities.ca/wired-smart-cities>
- In Manitoba:
 - St. Frances Xavier (in progress)
 - Maybe Thompson and Hamiota

6. Our Requests:

1) Put a “pause” on future plans for rollout of 5G and the 4G small antennas that pave the way for 5G.

2) Help us get answers to questions to clarify the situation, for example:

- a) On Sept. 4th, 2019, Margaret asked in an email to the Mayor’s office: “Can you tell me if the City of Winnipeg is legally obligated to accept 5G technology or other radiofrequency emitting installations on its facilities or utilities such as lamp posts, by Manitoba Hydro or telecommunications providers?” As of today, there has been no response. Any suggestions on how to get an answer to this?
- b) Have any legal commitments been made? If so, what are they?
- c) Manitoba Hydro owns the lamp posts on Winnipeg’s streets. Who has say on what they are used for?
- d) Can new poles for small cell placement be erected without Council consent?
- e) Public Rights of Way agreements, what access do the telecommunications companies have?
- f) What are the relevant “Joint Pole” agreements?
- g) Need full scale public consultations (not by the telecommunications providers) if small cell are installed close to homes, daycares and schools. How can the City of Winnipeg do this?
- h) Have alternatives such as fiber-optic networks been fully investigated? For health and cyber-security aspects?

3) Provide us with guidance in preparing a report to send to the City of Winnipeg – to whom?

Some questions (still in draft form):

- a) Cost/benefit analysis: Is there a cost/benefit analysis? If so, is it available to the public?
- b) Legal aspects/Liability/ Insurance. London, Ontario has required \$5 million insurance. Insurance policy? What are the monetary factors? Has the subject of compensation been considered? Require proof of liability insurance against harmful effects of RFR on health from all telecommunications companies deploying wireless technologies.

c) Pedestrian safety

Who is measuring (pedestrians may be exposed to a high levels of RF radiation)

d) Monitoring exposure levels/tracking health effects

- a. ISED (formerly Industry Canada) requires that each wireless system owner comply with Safety Code 6. In the case of a structure with cells from more than one provider, (a multiparty structure for 5G) who is calculating the cumulative exposure of having all these antennas active at the same time? Each company files for their system....do the site owners compile the cumulative exposure report?
- b. Will Manitoba Public Health start monitoring and reporting on the exposure to, and related health effects, of RF radiation.

4) Assist in increasing awareness of Electromagnetic hypersensitivity (EHS), also commonly called electrosensitivity and electrohypersensitivity. Surveys conducted in Sweden, Taiwan, the United

Kingdom and the U.S. (California) have found that approximately **3 to 13.3% of the population** reported symptoms (Eltiti et al., 2007) (Johansson, 2006) (Levallois, Neutra, Lee, & Hristova, 2002) (Tseng M, Lin, & Cheng, 2011). It is likely that Canada would be within this range because the same wireless technologies (e.g. cell phones, computers, wireless routers, etc.) are commonly used in all of these countries.

In Canada, the Canadian Human Rights Commission has a policy with EHS classified under environmental sensitivities (Canadian Human Rights Commission, 2007) (Sears, 2007) – a health condition that is a consequence of the environment. It must be accommodated under the *Canadian Human Rights Act*. EHS is recognized as a disability in the United States under the *Americans with Disabilities Act*.¹³ Sweden recognizes EHS as a functional impairment (Johansson, 2010). Legal cases for compensation and disability pensions have been successful in Australia,¹⁴ France,¹⁵ Spain¹⁶ and U.S.¹⁷

Symptoms often reported include headaches, concentration difficulties, sleep problems, dizziness, depression, fatigue, skin rashes, tinnitus and flu-like symptoms (Genuis & Lipp, 2012) (Johansson, Hilliges, Björnham, & Hall, 1994). Adverse reactions to emissions from wireless equipment range from mild and readily reversible to severe, when individuals must greatly reduce their exposures to sources of electromagnetic radiation (Carpenter, 2015) (Hedendahl, Carlberg, & Hardell, 2015) (Sears, 2007).

Provocation studies have been uneven in their findings. The need for changing the approach is discussed by Dr. Darius Leszczynski, Adjunct Professor of Biochemistry, University of Helsinki, Finland.¹⁸ Dr. Magda Havas, recently retired from Trent University, Ontario has reviewed the topic in a paper titled “*Electrohypersensitivity (EHS) is an Environmentally-Induced Disability that Requires Immediate Attention*” (Havas, 2019).

On May 31st, 2019, Women’s College Hospital (in Toronto) hosted a symposium, approved for various medical credits for physicians: “*Impacts of Wireless Technology on Health: a symposium for Ontario’s medical community.*” This covered a wide range of topics as described in their media release:

Extract from Press Release of May 30, 2019:¹⁹

“Ontario Doctors Warn of Rising Health Care Costs after 5G Roll Out

Doctors treating patients from over-exposure to wireless radiation will join scientists at Queen's Park today to recommend the Ontario Government take steps to protect public health before the roll-out of 5G – the next generation of cell phone technology.

¹³ <https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/background/ada-accessibility-guidelines-for-recreation-facilities/general-issues>

¹⁴ <https://www.news.com.au/technology/csiro-scientist-dr-david-mcdonald-wins-compensation-for-wifi-pain/news-story/0a2abc1814dca200d9e54b05f810c8f5>

¹⁵ <http://www.journaldelenvironnement.net/article/dans-l-essonne-l-electrosensibilite-reconnue-comme-un-handicap,45060>

¹⁶ <https://www.portalesmedicos.com/publicaciones/>

¹⁷ <https://www.prlog.org/12381499-los-angeles-unified-school-district-accommodates-teacher-who-fell-ill-after-wireless-installation.html>

¹⁸ The end of the road for EHS (IEI-EMF) provocation studies

<https://betweenrockandhardplace.files.wordpress.com/2018/02/open-letter-on-the-ehs-research-dated.pdf>

¹⁹ Video of media briefing: <http://c4st.org/ontario-doctors-warn-of-rising-health-care-costs-after-5g-roll-out/>

"My clinic is already assessing patients from across Ontario who are sensitive to microwave radiation from their wireless devices including cell phones, Wi-Fi, and an increasing number of smart appliances," said Dr. Riina Bray, Medical Director of the Environmental Health Clinic at Women's College Hospital in Toronto. "We expect 5G to add to this burden."

Scientists from 42 countries are now warning their governments about the emerging health problems associated wireless radiation. The initial 5G infrastructure is planned to begin in the Toronto to Montreal corridor. Daily human exposure to microwave radiation is already more than a trillion times higher than it was before cell phones.

Dr. Anthony Miller, Professor Emeritus with the University of Toronto, and adviser to the International Agency for Research on Cancer says, "Many scientists worldwide now believe that radiofrequency radiation should be elevated to a Class One human carcinogen, on the same list as Cigarettes, X-Rays, and Asbestos."

The doctors will advise the Province that increased health care costs can be avoided, if the government takes precautions to protect the public from exposure to 5G technology."

International Classification of Diseases (ICD) now has codes for health effects caused by non-ionizing radiation. This was a request from Electromagnetic Hypersensitivity (EHS) Resolution adopted in Belgium in 2015. Doctors can now use this code to characterize health effects associated with radiofrequency radiation and other types of non-ionizing radiation. <https://icd.codes/icd10cm/W90>

It is not only people who are adversely affected. Environmental implications and aspects of public health related to 5G have been recently reviewed by Cindy Russell MD (11, Russell, 2018). This review includes studies showing wildlife, including birds and pollinators, are affected by ambient levels of radiofrequency radiation.

7. Possible Actions by the City of Winnipeg:

1. As our elected officials, you have a responsibility to make the city as healthy and safe as possible for its residents.
2. Please invest the time to learn about 5G and other technologies. How can we get the benefits as safely as possible?
3. It is our understanding that municipal governments can say "no" to the placement of antennas on public property, although this can be overruled by the federal minister of ISED (IC).
4. What is the City's, and your, liability should a definitive link be made to harm from radiofrequency such as that emitted from City-approved antennas in the future?
5. Some municipalities have requested²⁰:
 - a) Annual renewal of contracts for small cell antenna installations.
 - b) Ability to have small cell antennas removed with no legal penalty to the City should a link between harm to human health and radiofrequency be made.

²⁰ Modified from a presentation by Dr. Magda Havas.

- c) Regular monitoring of exposure to radiofrequency emissions before installation and after the antennas are activated, and thereafter at regular intervals.
- d) Establishment of a health registry for reporting adverse biological and health effects associated with 5G antennas. Establishment of a process that investigates each complaint/report in a timely manner.
- e) Request to the appropriate public health authorities to contact the physicians at the Environmental Health Clinic, Women’s College Hospital, Toronto for detailed information on their concerns about increased health care costs and appropriate care for persons reporting adverse effects from exposure to radiofrequency radiation from these antennas and other sources.
- f) If the city cannot put a “pause” on 5G, then it should hold “fulsome” public consultations.

8. References cited above:

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5. Havas, M. (2019). **Electrohypersensitivity (EHS) is an Environmentally-Induced Disability that Requires Immediate Attention.** *J. Sci. Discov., 3*(1), 20. <https://doi.org/jsd18020>
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8. Johansson, O., Hilliges, M., Björnham, V., & Hall, K. (1994). **Skin changes in patients claiming to suffer from “screen dermatitis”: a two-case open-field provocation study.** *Experimental Dermatology, 3*(5), 234–238.
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10. Levallois, P., Neutra, R., Lee, G., & Hristova, L. (2002). **Study of self-reported hypersensitivity to electromagnetic fields in California.** *Environmental Health Perspectives, 110*(Suppl 4), 619–623.

11. Russell, C. L. (2018). **5 G wireless telecommunications expansion: Public health and environmental implications.** *Environmental Research*, 165, 484–495. <https://doi.org/10.1016/j.envres.2018.01.016>
 12. Sears, M. E. (2007). **The medical perspective on environmental sensitivities.** *Canadian Human Rights Commission Ottawa, Canada*, <https://www.chrc-ccdp.gc.ca/eng/content/medical-perspective-environmental-sensitivities>, 79.
 13. Tseng M, M.-C., Lin, Y.-P., & Cheng, T.-J. (2011). **Prevalence and psychiatric comorbidity of self-reported electromagnetic field sensitivity in Taiwan: A population-based study.** *Journal of the Formosan Medical Association*, 110(10), 634–641. <https://doi.org/10.1016/j.jfma.2011.08.005>
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APPENDIX 1. Wireless radiation in the radiofrequency range and adverse health effects: Key peer-reviewed papers and videos

PAPERS IN PEER-REVIEWED JOURNALS:

- L. **CANCER – EVIDENCE TO SUPPORT A GROUP 1 KNOWN HUMAN CARCINOGEN CLASSIFICATION (WORLD HEALTH ORGANIZATION, INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (WHO-IARC))**
 - Miller, A. B.²¹, Morgan, L. L., Udasin, I., & Davis, D. L. (2018). **Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102).** *Environmental Research*, 167, 673–683. <https://doi.org/10.1016/j.envres.2018.06.043> <https://www.ncbi.nlm.nih.gov/pubmed/30196934>
 - Hardell, L., & Carlberg, M. (2018). **Comments on the US National Toxicology Program technical reports on toxicology and carcinogenesis study in rats exposed to whole-body radiofrequency radiation at 900 MHz and in mice exposed to whole-body radiofrequency radiation at 1,900 MHz.** *International Journal of Oncology*. <https://doi.org/10.3892/ijo.2018.4606> <https://www.ncbi.nlm.nih.gov/pubmed/30365129>
- M. **CANADIAN BRAIN CANCER DATA – 2X RISK OF GLIOMAS WITH >558 HOURS OF CELL PHONE USE**
 - Momoli, F., Siemiatycki, J., McBride, M. L., Parent, M.-É., Richardson, L., Bedard, D., ...

²¹ Anthony B. Miller, MD, FRCP, FRCP(C), FFPH, FACE. Professor Emeritus, Dalla Lana School of Public Health, University of Toronto. A physician-epidemiologist, he was trained in internal medicine, and was a member of the scientific staff of the Tuberculosis and Chest Diseases Research Unit, UK Medical Research Council, 1962-71. He was Director of the Epidemiology Unit of the National Cancer Institute of Canada 1971-86 and Chair of the Department of Preventive Medicine and Biostatistics, University of Toronto, 1992-96. He served as a special expert in the Division of Cancer Prevention, US National Cancer Institute, 1997, Senior Epidemiologist, International Agency for Research on Cancer 1998-99, Head, Division of Epidemiology, German Cancer Research Centre, Heidelberg, 2000-03, Associate Director, Research, Dalla Lana School of Public Health, University of Toronto, 2008-10. He has been a consultant to the World Health Organization. He is Scientific Lead of the OncoSim microsimulation modelling initiative of the Canadian Partnership Against Cancer. His research encompasses cancer etiology, prevention and screening.

Krewski, D. (2017). **Probabilistic Multiple-Bias Modeling Applied to the Canadian Data From the Interphone Study of Mobile Phone Use and Risk of Glioma, Meningioma, Acoustic Neuroma, and Parotid Gland Tumors.** *American Journal of Epidemiology*, 186(7), 885–893. <https://doi.org/10.1093/aje/kwx157>
<https://www.ncbi.nlm.nih.gov/pubmed/28535174>

N. BRAIN CANCER INCIDENCE IN ENGLAND

- Philips, Alisdair, Henshaw, Denis L., Lamburn, Graham, & O'Carroll, Michael. (2018). **Brain tumours: rise in Glioblastoma Muliforme incidence in England 1995-2015 suggests an adverse environmental or lifestyle factor.** *Journal of Environmental and Public Health*, 20.
<https://www.hindawi.com/journals/jep/2018/7910754/>

O. CANADIAN COLORECTAL CANCER INCIDENCE IN YOUNGER ADULTS IS “CONTINUING AND POSSIBLY ACCELERATING”

- Brenner, D. R., Heer, E., Sutherland, R. L., Ruan, Y., Tinmouth, J., Heitman, S. J., & Hilsden, R. J. (2019). **National Trends in Colorectal Cancer Incidence Among Older and Younger Adults in Canada.** *JAMA Network Open*, 2(7), e198090–e198090.
<https://doi.org/10.1001/jamanetworkopen.2019.8090>

P. INCREASED ABSORPTION OF RADIOFREQUENCY ENERGY IN CHILDREN

- Fernández, C., de Salles, A. A., Sears, M. E., Morris, R. D., & Davis, D. L. (2018). **Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality.** *Environmental Research*, 167, 694–699.
<https://doi.org/10.1016/j.envres.2018.05.013>
<https://www.sciencedirect.com/science/article/pii/S0013935118302561>

Q. PUBLIC HEALTH RISKS (BOTH MILLER AND RUSSELL ARE MEDICAL DOCTORS)

- Miller, A. B., Sears, M. E., Morgan, L. L., Davis, D. L., Hardell, L., Oremus, M., & Soskolne, C. L. (2019). **Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices.** *Frontiers in Public Health*, 7.
<https://doi.org/10.3389/fpubh.2019.00223>
<https://www.frontiersin.org/articles/10.3389/fpubh.2019.00223/full>
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<https://doi.org/10.1016/j.envres.2018.01.016>
Website: Physicians for Safe Technology - <https://mdsafetech.org/>

R. BEHAVIOURAL PROBLEMS IN CHILDREN

- Birks, L., Guxens, M., Papadopoulou, E., Alexander, J., Ballester, F., Estarlich, M., ... Vrijheid, M. (2017). **Maternal cell phone use during pregnancy and child behavioral problems in five birth cohorts.** *Environment International*, 104, 122–131.
<https://doi.org/10.1016/j.envint.2017.03.024>
<https://www.ncbi.nlm.nih.gov/pubmed/28392066>

S. ADVERSE EFFECTS ON SPERM QUALITY (ONE OF SEVERAL REVIEWS WITH SIMILAR CONCLUSIONS)

- Houston, B. J., Nixon, B., King, B. V., De Iuliis, G. N., & Aitken, R. J. (2016). **The effects of radiofrequency electromagnetic radiation on sperm function.** *Reproduction (Cambridge, England)*, 152(6), R263–R276. <https://doi.org/10.1530/REP-16-0126>
<https://www.ncbi.nlm.nih.gov/pubmed/27601711>

T. DNA DAMAGE – OVER 30 STUDIES SHOWING DAMAGE AT UNDER SAFETY LEVEL EXPOSURES

- Panagopoulos, D. J. (2019). **Comparing DNA damage induced by mobile telephony and other types of man-made electromagnetic fields.** *Mutation Research/Reviews in Mutation Research*, 781, 53–62. <https://doi.org/10.1016/j.mrrev.2019.03.003>
<https://www.sciencedirect.com/science/article/pii/S1383574218300991>

U. OXIDATIVE STRESS (CAN LEAD TO MANY HEALTH CONDITIONS INCLUDING CANCER, ALZHEIMER'S AND PARKINSON'S DISEASE)

- Yakymenko, I., Tsybulin, O., Sidorik, E., Henshel, D., Kyrylenko, O., & Kyrylenko, S. (2016). **Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation.** *Electromagnetic Biology and Medicine*, 35(2), 186–202. <https://doi.org/10.3109/15368378.2015.1043557>
<https://www.ncbi.nlm.nih.gov/pubmed/26151230>

V. ELECTROHYPERSENSITIVITY (EHS)

- Belyaev, I., Dean, A., Eger, H., Hubmann, G., Jandrisovits, R., Kern, M., ... Thill, R. (2016). **EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses.** *Reviews on Environmental Health*, 31(3). <https://doi.org/10.1515/reveh-2016-0011>
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W. CELL TOWER EXPOSURE STUDY (DNA DAMAGE, OXIDATIVE STRESS)

- Zothansiam, null, Zosangzuali, M., Lalramdinpuii, M., & Jagetia, G. C. (2017). **Impact of radiofrequency radiation on DNA damage and antioxidants in peripheral blood lymphocytes of humans residing in the vicinity of mobile phone base stations.** *Electromagnetic Biology and Medicine*, 1–11. <https://doi.org/10.1080/15368378.2017.1350584>
<https://www.ncbi.nlm.nih.gov/pubmed/28777669>

VIDEOS:

1. Less than 5 minutes: Dr. Anthony B. Miller: **Radio Frequency Radiation, Cancer and Cell Towers Statement to School District. Statement that wireless radiation should be classified as a Class 1 known carcinogen.**

<https://www.youtube.com/watch?v=LPs6PAG1H6c>

2. Approximately 24 minutes (2017): Dr. Anthony B. Miller: **Epidemiology of Cell Phones and Other Wireless Transmitting Devices – An Update (describes the evidence supporting an IARC Class 2A**

probable human carcinogen classification). Expert Forum: Wireless Radiation and Human Health. Hebrew University Medical School, January 23-26, 2017

<https://ehtrust.org/science/key-scientific-lectures/2017-expert-forum-wireless-radiation-human-health/>

3. Approximately 1 hour: Devra Davis PhD, MPH. (2015) **The truth about mobile phone and wireless radiation**. Dean's Lecture at University of Melbourne, School of Engineering
<https://ehtrust.org/science/key-scientific-lectures/dr-davis-delivered-the-deans-lecture-at-melbourne-school-of-engineering/>

SUPPLEMENTAL INFORMATION: A SAMPLE OF CELL TOWER STUDIES

1. Abdel-Rassoul, G., El-Fateh, O. A., Salem, M. A., Michael, A., Farahat, F., El-Batanouny, M., & Salem, E. (2007). **Neurobehavioral effects among inhabitants around mobile phone base stations**. *Neurotoxicology*, 28(2), 434–440. <https://doi.org/10.1016/j.neuro.2006.07.012>

2. Bortkiewicz, A., Gadzicka, E., Szykowska, A., Politański, P., Mamrot, P., Szymczak, W., & Zmyślony, M. (2012). **Subjective complaints of people living near mobile phone base stations in Poland**. *International Journal of Occupational Medicine and Environmental Health*, 25(1), 31–40.
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APPENDIX B.

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February 4, 2020

For the urgent attention of:

Penticton City Council Mayor John Vassilaki and Councillors
RDOS Chair Karla Kozakevich and Board of Directors
Editor of the Penticton Herald Joe Fries
Editor of the Penticton Western News
MP Richard Cannings (South Okanagan-West Kootenay)
MLA Dan Ashton (Penticton)
Linda Larson, MLA (Boundary-Similkameen)

CC: Hans Karow (Coalition to Reduce Electropollution, CORE)

Subject: Exposure of the public to Wireless 3G, 4G, 5G

It has been brought to my attention, that last summer, in addition to already existing macro cell antennas, one cell antenna tower has been constructed on 1953 Dartmouth Road (near hospital, residential and industrial area) and antennas have also been attached to the top of the Park Place Sun Village Retirement Complex on 1147 Main Street (across the RCMP building) in Penticton.

I have also learned that antennas were previously attached to other living complexes i.e.: Charles Manor on 320 Martin Street; Apartment building on 2401 South Main Street; three cell towers only 200 m apart from each other: two Telus towers Fairview/Calgary Ave with nearest residential homes 60 m away, and one Rogers tower with an output power of 120.23 facing directly to several four stories apartment complexes 80 m away.

It is completely unacceptable that cell towers should be placed on or close to residential buildings, as this results in exposure of humans to a potentially carcinogenic form of radiation.

Radiation exposure has long been a concern for the public, policy makers and health researchers. Beginning with radar during World War II, human exposure to radio-frequency radiation (RFR) and associated technologies has grown more than 100,000-fold. In 2011, a working group of the International Agency for Research on Cancer (IARC) reviewed the published literature and categorized RFR as a possible (Group 2B) human carcinogen. A broad range of adverse human health effects associated with RFR have been reported since the IARC review, including brain cancer, cancers of the vestibular (hearing) nerve (Schwannomas), and sterility. In addition, two large-scale carcinogenicity studies in rodents exposed to levels of RFR that mimic lifetime human exposures have shown significantly increased rates of Schwannomas and malignant gliomas, as well as chromosomal DNA damage.

Of particular concern are the effects of RFR exposure on the developing brain in children. Compared with an adult male, a cell phone held against the head of a child exposes deeper brain structures to greater radiation doses per unit volume, and the young, thin skull's bone marrow absorbs a roughly 10-fold higher local dose. Recent reports also suggest that men who keep cell phones in their trouser pockets have significantly lower sperm counts and significantly impaired sperm motility and morphology, including mitochondrial DNA damage, and increased risk of colon cancer.

Based on the accumulated evidence, I believe that if IARC were to re-evaluate its 2011 classification of the human carcinogenicity of RFR, it would be categorized as Group 1, i.e. carcinogenic to humans. Thus, current knowledge provides justification for governments, public health authorities, and physicians/allied health professionals to support measures to reduce all exposures to RFR to As Low As Reasonably Achievable, something we learnt was necessary for exposures to ionizing radiation (e.g. X-rays) many years ago.

The Telecom industry's fifth generation (5G) wireless service will require the placement of many small antennae/cell towers close to all recipients of the service, because solid structures, rain and foliage block the associated millimeter wave RFR. 5G technology is being developed as it is also being deployed, with large arrays of directional, steerable antennae, operating at higher power than previous technologies. 5G is not stand-alone – it will operate and interface with other (including 3G and 4G) frequencies and modulations to enable diverse devices under continual development for the “internet of things,” driverless vehicles and more.

This novel 5G technology is being rolled out although potential chronic health or environmental impacts have not been evaluated. The range and magnitude of potential impacts of 5G technology are under-researched, although important biological outcomes have been reported with the associated millimeter wavelength exposure to RFR. These include oxidative stress and altered gene expression, effects on skin and systemic effects such as on immune function, all of which highlight the need for more research before population-wide continuous exposures occur.

An individual, if appropriately informed, can reduce her or his exposure to radiofrequency radiation from cell phones, but in the case of cell towers and small cell transmitters of 5G the exposure they receive is outside their control. With the people who manufacture these devices and those who promote small cell technology in front of homes failing to issue

adequate health warnings, we are reaching a situation where homes, schools, and workplaces are being saturated with radiofrequency radiation.

Thus, to avoid an epidemic of cancer and heart damage, brain damage and infertility caused by radiofrequency radiation, we should introduce means to reduce such exposures to As Low As Reasonably Achievable, something we learnt to do many years ago for ionizing radiation (X-rays). Instead use fiber-optic connections to the home, place small cell transmitters away from residential neighborhoods and schools and strengthen the rules that are meant to protect the public.

Those who support the introduction of 5G should recognize that no insurance agency (including Lloyds of London) will cover them against liability from ill health effects caused by radiofrequency radiation.

The removal of cell towers from the top of buildings and a moratorium on the roll-out of 5G is essential.

A handwritten signature in black ink, appearing to read 'A. B. Miller'.

Anthony B. Miller, MD, FRCP, CM. Professor Emeritus, Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada.