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TO: The Honorable Detroit City Council

FROM: David Whitaker, Director
Legislative Policy Division Staff

DATE: June 30, 2023

RE: **FUNDING NEEDED FOR STUDY ON IMPACT OF CELL PHONE TOWERS AT PUBLIC SCHOOLS ON CHILDREN**

Council Member Mary Waters requested that the Legislative Policy Division (LPD) draft a report to collaborate with the Health Department to identify the funding needed to conduct a study on the impact that cell phone towers hosted at public schools in Detroit has on Detroit children.

According to Deputy Director of Health for the Detroit Health Department, Christina Floyd, a study analyzing the impact of cell phone towers hosted at Detroit public schools on children is outside the scope of the work done by the Health Department. Because the cell towers are a potential outdoor environmental hazard, she suggested that the Buildings, Safety Engineering, and Environmental Department (BSEED) or an independent organization or university may be able to conduct a study. See below for further information on the cost of a potential study.

The medical concerns about cell phone towers and the use of cell phones are due to the fact that cell phones and cell towers emit radio frequency (RF) waves. The RF waves emitted from cell towers are a known quantity. Cell towers emit "non-ionizing radiation," similar to FM radio waves, television broadcasts, and microwaves.[1] Unlike "ionizing radiation," such as x rays, gamma rays, and ultraviolet

[1] https://www.cancer.org/cancer/risk-prevention/radiation-exposure/cellular-phone-towers.html#:~:text=Cell%20phone%20towers%20are%20still,causes%20any%20noticeable%20health%20effects.

(UV) rays, non-ionizing radiation does not occur at a frequency that can heat up body tissue and damage DNA.[2]

At the ground level, the RF waves from cell towers are typically thousands of times less than the Federal Communications Commission (FCC) safety standards and the RF exposure from being near a cell tower is less than the exposure from carrying and using a cell phone.[3]

The FCC safety standards for RF exposure were set in the 1990s and are based on the distinction between ionizing radiation and non-ionizing radiation. Those concerned with the potential health effects of exposure to radiation from cell phones and cell towers, both in the public and in the scientific community, believe that the distinction between ionizing and non-ionizing radiation is not the only factor that should be considered when regulating cell towers and that there may be negative health outcomes associated with long-term exposure to non-ionizing radiation.

Currently, there is no conclusive evidence that links negative health outcomes with exposure to RF waves from cell phones and cell towers. Organizations such as the World Health Organization (WHO)[4], The Food and Drug Administration (FDA)[5], and the National Institutes of Health (NIH)[6] have studied RF exposure from cell phone networks, and while there is no conclusive evidence of negative health outcomes, there is also insufficient evidence that exposure is harmless.

The general consensus in the scientific community is that there need to be further studies on the potential health effects of exposure to non-ionizing radiation, particularly with potential effects on fertility and the potential effects on children.[7] While there have been many studies on the subject, there is a great deal of ambiguity in the results due to the fact that the studies have not been able to keep up with the changes in technology and in the ways people use technology in the last 30 years.

According to a Pew Research report from 2021, cell phone use by Americans rose from around 60% in 2002 to 97% percent in 2021. Not only do more people use cell phones, but they have increasingly incorporated them into their daily lives, especially since the emergence of smart phones. At the same time, networks have also consistently been updated from 1G to 5G, and Wi-Fi networks and Bluetooth have become ubiquitous. These rapid changes have made it difficult for researchers to narrow down the causation of any particular health outcomes, especially if they are conducting studies that take place over a number of years.

Much of the scientific research on RF exposure has been focused on exposure from cell phone use given that cell phone use typically exposes people to much higher levels of radiation than cell towers. The primary concern has been that long-term exposure to RF waves from cell phones may cause increased rates of cancer and tumors. The results of these studies vary, with some suggesting that there may be an association between cell phone use and cancer/tumors and some suggesting that there is not a significant correlation.

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[2] https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/electromagnetic-fields-fact-sheet#r10
[3] https://www.fcc.gov/consumers/guides/human-exposure-radio-frequency-fields-guidelines-cellular-and-pcs-sites
[4] https://www.iarc.who.int/wp-content/uploads/2018/07/IARC_Mobiles_QA.pdf; World Health Organization, International Agency for Research on Cancer. Non-ionizing radiation, Part 1: Static and extremely low-frequency (ELF) electric and magnetic fieldsExit Disclaimer. *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans* 2002; 80:1–395.
[5] Review of Published Literature between 2008 and 2018 of Relevance to Radiofrequency Radiation and Cancer https://www.fda.gov/media/135043/download
[6] https://www.niehs.nih.gov/health/materials/cell_phone_radiofrequency_radiation_studies_508.pdf
[7] https://www.vox.com/2018/7/16/17067214/cellphone-cancer-5g-evidence-studies

However, if there was a significant correlation between exposure to RF waves from cell phones and the presence of cancer/tumors, we would expect to see a rapid increase in instances of cancer/tumors that correlates with the rapid increase in cell phone use. Thus far, that has not been the case.[8]

The few studies on the effect of broadcast transmitters on rates of cancer in children have not found an increased risk of cancer.[9] One large study in the UK specifically dealt with potential effects on children caused by a proximity to cell towers. The study looked at data over a 2 year period and attempted to find a correlation between pregnant mothers exposure to cell towers and rates of childhood cancer. The study did not find an association between exposure to cell towers and the rate of childhood cancer, although the study estimated the exposure based on proximity to the towers instead of directly measuring the RF wave exposure for each individual.[10]

It is difficult to estimate the cost of a study on the impact of cell towers at Detroit public schools without detailed parameters. If the purpose of the study was to simply measure the RF levels at one or multiple schools, it could likely be done for relatively little cost. However, unless the RF levels at Detroit public schools exceeded the FCC safety guidelines, the study would not provide much valuable information with regard to the impact on students.

A study meant to track the health outcomes of students would likely have to be what is known as a "cohort study," where researchers would select a group of students exposed to RF waves at their school and compare their health outcomes to students at a school without a cell tower over an extended period of time.[11] Cohort studies are typically very costly because they often take place over a period of years and require a source of long-term funding while researchers continually follow up with subjects.

The cost could vary greatly depending on the length of the study and whether the researchers are following up with subjects by mail, phone, online, or in person. While most studies cite the source of their funding, it is difficult to find information on specific funding amounts for studies on this topic. A study on the cost of publicly funded drug research showed that, with an average study time of 34 months and an average of 62 subjects, average cost is about $520,000.[12] The subject group would likely have to be fairly large in this case to yield results that were statistically significant. In addition to the increase in cost, the extended length of time for a cohort study means that it may not yield results that are helpful in the short term.

For the results of a cohort study to be useful and informative, the researchers would have to make a significant effort to isolate the exposure from the cell tower on school property from other sources of RF waves. This is a persistent problem for researchers studying this topic because people are exposed to RF waves from a variety of sources in their daily lives such as broadcast signals, cell phones, and Wifi

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[8] Review of Published Literature between 2008 and 2018 of Relevance to Radiofrequency Radiation and Cancer https://www.fda.gov/media/135043/download

[9] Ha M, Im H, Lee M, et al. Radio-frequency radiation exposure from AM radio transmitters and childhood leukemia and brain cancer. *American Journal of Epidemiology* 2007; 166(3):270–279. [PubMed Abstract]; Merzenich H, Schmiedel S, Bennack S, et al. Childhood leukemia in relation to radio frequency electromagnetic fields in the vicinity of TV and radio broadcast transmitters. *American Journal of Epidemiology* 2008; 168(10):1169–1178. [PubMed Abstract]; Elliott P, Toledano MB, Bennett J, et al. Mobile phone base stations and early childhood cancers: Case–control study. *British Medical Journal* 2010; 340:c3077. [PubMed Abstract]

[10] *British Medical Journal* 2010; 341 doi: https://doi.org/10.1136/bmj.c4115 (Published 29 July 2010)

[11] https://www.vox.com/2018/7/16/17067214/cellphone-cancer-5g-evidence-studies

[12] van Asselt, T., Ramaekers, B., Corro Ramos, I. *et al.* Research Costs Investigated: A Study Into the Budgets of Dutch Publicly Funded Drug-Related Research. *PharmacoEconomics* **36**, 105–113 (2018). https://doi.org/10.1007/s40273-017-0572-7

networks. If the subjects use cell phones, which is expected for the vast majority of the population, they are being exposed to RF levels that are likely much higher than from exposure to a cell tower.

There are also cell phone towers scattered throughout Detroit, meaning that researchers would have to control for the exposure to other towers. They could do this by mapping the locations of cell towers in the city and attempting to pick subjects that do not live within a certain distance of a cell tower. This is further complicated by the presence of 5G towers, which emit a slightly different form of RF radiation and have not been around for sufficient time for researchers to study the potential effect on people.

Ultimately, the results of a cohort study are unlikely to be useful unless the researchers are able to isolate the RF exposure from a cell tower on school property from RF exposure where the children live. If the researchers choose to estimate the RF exposure of the subjects at home, it will make the results of the study much less conclusive. But if researchers choose to measure the RF levels for each subject at their home, it would significantly increase the cost of the study.

To conclude, it is difficult to estimate the cost of a study on the impact of cell towers at Detroit public schools without specific parameters, but based on the information currently available it would take significant funding and time with no guarantee of conclusive results given the difficulties generally present in studies on RF exposure.

Please contact our office if we can be of further assistance.