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Name of the group: Peel Parents For Safe Use of Technology In Schools

I hereby submit this petition to the Auditor General of Canada under section 22 of the Auditor General Act.

Signature of the petitioner:

Date: May 25, 2017

**Title of the Petition:** Need for Health Canada to provide appropriate precautionary messaging and advisories in schools for safer use of wireless devices such as cell phones and tablets, especially when connected through Wi-Fi, to protect children and others from radiofrequency/microwave radiation – above and below Safety Code 6 (2015) guidelines.

We request responses from Health Canada, and Innovation, Science and Economic Development Canada, – Families, Children and Social Development, Employment Workforce Development and Labour and other relevant Departments/Agencies.

#### **Background:**

The environments of schools across Canada are being permeated with increasing levels of radiofrequency/microwave (RF/MW) radiation being emitted from wireless devices such as cell phones, smart boards and tablets. Emissions are often even higher when connected through Wi-Fi technology. Health Canada's Safety Code 6, which applies to federal workplaces and federal employees, sets out limits for safe exposure to RF/MW radiation. These guidelines have been adopted by school boards, Provinces and Territories<sup>1</sup>. In many cases, reliance on Safety Code 6 by these authorities has been presented as an excuse not to exercise caution by reducing exposures that may protect children, teachers and others in the school environment e.g. by turning Wi-Fi routers in classrooms off when not in use.

#### **1. Above, i.e. exceeding (=unsafe) Safety Code 6 emission exposure levels:**

**Breach of guidelines – having devices too close to the body may create health hazards**

Safety Code 6 (2015)<sup>2</sup> states: that "at frequencies between 100 kHz and 6 GHz<sup>3</sup>, the SAR [Specific Absorption Rate] limits shall not be exceeded. The SAR should be determined for

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<sup>1</sup> Schools boards, etc. are free to set their own safer RF/MW radiation guidelines.

<sup>2</sup> [http://www.hc-sc.gc.ca/ewh-semt/consult/\\_2014/safety\\_code\\_6-code\\_securite\\_6/final\\_finale-eng.php](http://www.hc-sc.gc.ca/ewh-semt/consult/_2014/safety_code_6-code_securite_6/final_finale-eng.php)

<sup>3</sup> Devices used by students and teachers would fall within this range, as does Wi-Fi frequency.

situations where exposures occur at 0.2m or less from the source. In all cases, the values in Table 2 *"shall not be exceeded."* The value in "Table 2" that would apply is 1.6 W/kg.

On March 24th, 2017, the CBC aired a TV program called *"The Secret Inside Your Phone."*<sup>4</sup> In this program, three popular cell phones were tested by a company that provides testing services for USA Federal Communications Commission (FCC) certification for cell phones. FCC standards and Safety Code 6, SAR guidelines are the same. All of the RF/MW radiation emissions of these phones exceeded (unsafe) the FCC standard when tested as though they were being held right next to the body. The distance that a device must be held from the body to meet requirements is at least 5 mm for cell phones and 200 mm for tablets, yet students and teachers often keep these devices closer than this to their bodies.

Children in schools can be exposed to multiple devices for extended periods (their own as well as second hand exposure from others' devices) which, if not used according to the instructions which come with the devices, could expose them to levels that exceed Health Canada's Safety Code 6 safety guidelines and put them at particular risk.

## 2. Below Safety Code 6 emission exposure levels:

There is also historic and recent evidence that Safety Code 6 (2015) is not protective enough at many times below its guidelines.<sup>5,6</sup>

The first public reports of Canadian children becoming ill from newly installed Wi-Fi in their school occurred in the fall of 2010 and were documented in a Global News television program called *Wi-Fi Safety in Schools*. The affected students reported headaches, nausea and lack of ability to concentrate as well as heart problems. In that program, a Health Canada representative stated that there was *"no scientific evidence"* of harm<sup>7</sup> from Wi-Fi frequency exposure as would be found in schools and provided a list of 16 studies (Appendix 1) as supporting Health Canada's assertions that Wi-Fi was not dangerous; only one of those studies was conducted on real people and it was not specifically on Wi-Fi and children.

In 2015, Canadians for Safe Technology (C4ST) prepared a report documenting 50 studies showing adverse biological effects at below Safety Code 6 levels. Seventeen (17) were published before Health Canada made their statement of *"no scientific evidence"* of harm and 33 were published after 2010.

Potentially harmful effects described in the C4ST report included DNA (genetic) damage and oxidative stress on body systems e.g. brain, cardiovascular, immune, testes.<sup>8</sup> DNA damage

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4 Marketplace with Wendy Mesley - <http://www.cbc.ca/marketplace/episodes/2015-2016/the-secret-inside-your-phone>

5 Canadians for Safe Technology web page: <http://c4st.org/news/category/wifi-in-schools/>

6 Environmental Health Trust - <https://ehtrust.org/key-issues/cell-phoneswireless/wifi-in-schools/>

7 Wi-Fi Safety in Schools - 16:9. The Bigger Picture (about 14 minutes): October 2010

<http://www.youtube.com/watch?v=KN7VetsCR2I>

8 <http://c4st.org/images/documents/cell-tower-situations/Limestone-DSB/50-Recent-Studies-Showing-Harm-Below->



can lead to various adverse reproductive and other health effects – not only cancer. Chronic or excessive oxidative stress can lead to chronic inflammation, which in turn has been associated with illnesses such as cancer, and cardiovascular and neurological diseases (Alzheimer's and Parkinson's).<sup>9, 10</sup>

Although Health Canada has stated: "*while Health Canada is aware of concerns related to WIFI in schools, decisions on this matter are outside the department's mandate,*"<sup>11</sup> it has provided published information on "*situations where the use of –or exposure to – a product could pose a risk*" for other public health concerns.<sup>12</sup>

We maintain that the following factors and scientific evidence must be considered in setting standards to protect children and teachers in the school environment:

## CANADA

- a) The Specific Absorption Rate can exceed (=unsafe) Safety Code 6 guidelines when devices are held next to the body, as is commonly done by many students, teachers and others.
- b) Power Density readings can exceed (= unsafe) Safety Code 6 guidelines in schools as demonstrated in a 2011 report by the Simcoe County District School Board in Ontario.<sup>13</sup>
- c) The Ontario English Catholic Teachers Association (OECTA) state in "*A position regarding the use of Non-Ionizing Electromagnetic Radiation, including WiFi, in the workplace:*" Controls for Wi-Fi would best be guided by the ALARA principle (As Low As Reasonably Achievable), as well as by applying the concept of prudent avoidance."<sup>14</sup>
- d) The Canadian Teachers' Federation has expressed concern for students and their exposure to Wi-Fi.<sup>15, 16</sup> "*That an education program regarding the relative safety of Wi-Fi exposure be implemented and that appropriate resources be developed to educate the public regarding ways to avoid potential exposure risks of Wi-Fi access points and devices.*"<sup>17</sup>
- e) There are reports of more children being made ill from exposure to wireless radiation.<sup>18</sup>

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### SC6.pdf

9 Reuter et al. (2010). Oxidative stress, inflammation and cancer: How are they linked? *Free Radic Biol. Med.* 49 (11):1603-1616.

10 Dasdag, S., & Akdag, M. Z. (2015). The link between radiofrequencies emitted from wireless technologies and oxidative stress. *Journal of Chemical Neuroanatomy*. doi:10.1016/j.jchemneu.2015.09.001;

11 Health Canada letter to a Canadian resident.

12 <http://www.HealthCanada-sc.gc.ca/aHealthCanada-asc/media/advisories-avis/index-eng.php> [accessed 8October2016]

13 <http://www.magdahavas.com/wordpress/wp-content/uploads/2011/06/SCDSB-Feb-9-2011-B-F-Use-of-Wi-fi.pdf>

Table 1. Power Densities, MountainView ED (Elementary School); Whereas 1.0 = SC6 Threshold. The fifth measurement is 1.32. = 32% above SC6 limits

14 <http://www.oecta.on.ca/wps/portal/>! <http://www.safeschool.ca/uploads/WiFiPositionpaper2.pdf>

15 Canadian Teacher Magazine. CTF [Canadian Teachers' Federation] sounds the alarm on Wi-Fi (page 46).

[http://www.canadianteachermagazine.com/issues/2015/CTM\\_JanFeb15/index.html](http://www.canadianteachermagazine.com/issues/2015/CTM_JanFeb15/index.html)

16 Canadian Teachers' Federation- The Use of Wi-Fi in Schools - Briefing document.

<http://www.ctf-fce.ca/en/Pages/Issues/Wi-Fi-Briefing-Documents.aspx>

17 <http://www.ctf-fce.ca/en/Pages/Issues/Wi-Fi-Briefing-Documents.aspx>

18 Presentation to Royal Society of Canada, October 28, 2013. <https://www.youtube.com/watch?v=A6yUpx9Ved8>

f) *"Brain tumours are now the leading cancer in American adolescents, and incidence is rising in young adults according to the largest most comprehensive analysis<sup>19</sup> of these age groups to date. Dr. Jacob Easaw, from the Tom Baker Cancer Centre in Calgary: 'The astounding increases reported in this study, especially in young people; mirror what I am seeing in my clinic. Canada is in the process of establishing a comparable brain tumour registry, so these analyses will not be available here for 15 or 20 years. I am increasingly convinced that mobile phones are a major cause and urgent action is needed.'*"<sup>20</sup>

- There was recently a legal ruling in Italy: *"Landmark Case: First Court Worldwide to Recognize Causal Link Between Cellphone Use and Brain Tumor."*<sup>21</sup>
- Dr. Joel Moskowitz<sup>22</sup> recently reported: *"Four reviews of the research on cell phone use and brain tumor risk have been published in peer-reviewed journals in 2017. All of these studies report finding a statistically significant relationship between cell phone use of ten or more years and brain tumor risk especially on the side of the head where the cell phone was predominantly placed during phone calls (i.e., ipsilateral use)."*<sup>23</sup>

g) More than 50 Canadian medical doctors and a further 50 international scientists have written to Canada's Minister of Health calling for more protective wireless radiation guidelines, based on recent studies and the presence of patients seeking medical attention for relief of symptoms from exposure to microwave radiation from common wireless devices.<sup>24</sup>

h) More than 60 studies have been identified in 2015 and early 2016 documenting potential adverse effects below Safety Code 6. Adverse effects and RF/MW radiation levels tested for 30 of them at SAR levels below Safety Code 6 are charted in Appendix 2.

## INTERNATIONALLY

i) In 2011 the World Health Organization – International Agency for Research on Cancer (WHO-IARC) classified wireless radiation in the radiofrequency/microwave range [radiofrequency electromagnetic fields], which includes Wi-Fi, as a Class 2B, *possible* human carcinogen.<sup>25</sup> Dr. Hardell and his brain cancer research team, whose work was used, in part, to reach this determination, is now calling for a Class 1 *known* human carcinogen classification, based on newer research.<sup>26, 27</sup>

19 Ostrom, Q.T., et al. (2016). American Brain Tumor Association Adolescent and Young Adult Primary Brain and Central Nervous System Tumors Diagnosed in the United States in 2008-2012.

Neuro-Oncology 18.Suppl. 1. i1-50. First Author Affiliation: Case Comprehensive Cancer Center, Case Western Reserve University School of Medicine, Cleveland, OH USA; **Central Brain Tumor Registry of the United States**, Hinsdale, IL USA.

20 <http://www.preventcancer.ca/brain-tumours-now-leading-form-of-cancer-in-adolescents>

21 <https://ehtrust.org/landmark-italian-court-ruling-recognizes-causal-link-cellphone-use-brain-tumor/>

22 Director, Center for Family and Community Health, School of Public Health, University of California, Berkeley

23 <http://www.saferemr.com/2017/02/long-term-cell-phone-use-increases.html>

24 <http://c4st.org/category/appeals-research/>

25 WHO/IARC Press Release: [http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208\\_E.pdf](http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf)

26 Hardell, L., et al. (2013). Use of mobile phones and cordless phones is associated with increased risk for glioma and acoustic neuroma. *Pathophysiology: The Official Journal of the International Society for Pathophysiology / ISP*, 20(2), 85–110.



- j) Other Class 2B agents such as lead, DDT and automobile exhaust are curtailed in most school environments because of their inclusion on this list. Yet, wireless radiation exposure (possible carcinogen) has become mandatory in close to 100% of school environments in Canada.
- k) France has legislated no Wi-Fi in daycares/nursery schools and Wi-Fi off in elementary classrooms except when being used for teaching/learning purposes.<sup>28</sup>
- l) Taiwan has also legislated measures to reduce children's exposure.<sup>29</sup>
- m) The Italian State Parliament of Tyrol has mandated the state government to replace existing wireless networks in schools and preschools whenever possible with safer alternatives. Hardwired solutions can be excellent alternatives to the constant exposure of a wireless network.
- n) Cyprus has banned Wi-Fi from kindergarten and from elementary school classrooms. Brazil, Ghent, Belgium and Israel have also taken strong measures to reduce students' exposure to wireless radiation.<sup>30</sup>
- o) Over 224 scientists from 41 nations, who have published peer-reviewed papers on the biological or health effects of non-ionizing radiation<sup>31</sup>, made the following statement on May 11, 2015<sup>32</sup>:  
*"These findings justify our appeal to the United Nations (UN) and, all member States in the world, to encourage the World Health Organization (WHO) to exert strong leadership in fostering the development of more protective EMF guidelines, encouraging precautionary measures, and educating the public about health risks, particularly risk to children and fetal development. By not taking action, the WHO is failing to fulfill its role as the preeminent international public health agency."*
- p) Letters from medical doctors with more evidence that precautionary messaging and measures are required can be found at the Environmental Health Trust web site.<sup>33</sup>

## QUESTIONS:

1. Given that students, teachers and others are likely being exposed to levels exceeding Health Canada's (=unsafe) RF/MW radiation Safety Code 6 guidelines (e.g. by cell phones and tablets held too close to the body (exceeding SAR levels) and as reported in one case, exceeding Power Density above the Safety Code 6 threshold<sup>34</sup>,

- 1) Will the Government of Canada provide regular monitoring of cumulative levels, to which children in schools are being exposed?

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27 Coureau, G., et al. (2014). Mobile phone use and brain tumours in the CERENAT case-control study. *Occupational and Environmental Medicine*, 71(7), 514–522.

28 <http://www.complianceandrisk.com/france-publishes-law-on-electromagnetic-waves/>

29 <http://www.dailymail.co.uk/news/article-2929530/Does-toddler-play-iPad-Taiwan-makes-ILLEGAL-parents-let-children-two-use-electronic-gadgets-18s-limit-use-reasonable-lengths.html>

30 <https://ehtrust.org/cyprus-issues-decree-banning-wireless-kindergarten-elementary-school-classrooms/>

31 part of the EMF [electromagnetic field] spectrum that includes extremely low frequency fields (ELF) used for electricity, or radiofrequency radiation (RFR) used for wireless communications

32 As of July 25th, 2016 the appeal had 222 signatures from 41 nations.

33 <https://ehtrust.org/wp-content/uploads/Doctor-Letters-on-Wi-Fi-In-School-Full-Compilation.pdf>

34 <http://www.magdahavas.com/wordpress/wp-content/uploads/2011/06/SCDSB-Feb-9-2011-B-F-Use-of-Wi-fi.pdf>

Table 1. Power Densities, MountainView ED (Elementary School); Whereas 1.0 = SC6 Threshold. The fifth measurement is 1.32. = 32% above SC6 limits

2) Will the Government of Canada provide more precautionary messaging for wireless devices and Wi-Fi in schools and school board/industry sponsored programs such as BYOD (Bring Your Own Device)?

2. Based on evidence of harm below Safety Code 6 guidelines, the actions in other countries, and because Health Canada has been deferred to as setting authoritative thresholds on this question by school boards (who have been asked by parents to curtail wireless radiation exposure to children in school), and it has the broad responsibility for the protection of children's health across Canada:

1) Will Health Canada and Innovation, Science and Economic Development Canada issue advisories, based on a precautionary approach, to trustees, principals, teachers and parents and others who are responsible for the health of children in schools who are being exposed to Wi-Fi?

2) Will Health Canada take a precautionary approach and advise Provincial and Territorial Departments of Education, school boards and others responsible for children's health across Canada, to strive for ALARA (As Low As Reasonably Achievable) e.g. take simple, no cost measures such as turning off Wi-Fi in classrooms when Wi-Fi is not needed for teaching purposes, using hard-wired alternatives and setting devices to airplane mode with Wi-Fi turned off?

3. Given that Health Canada states on its website: *"It is true that there are no completed studies of the long term effects of Wi-Fi radiation specifically on children,"*<sup>35</sup> and given that Health Canada has published warnings for other public health concerns in *"situations where the use of -or exposure to - a product could pose a risk"*<sup>36</sup>, will Health Canada issue an advisory or warning related to use of Wi-Fi technologies in schools?

4. Based on the case presented above for a precautionary approach, will the Government of Canada run and/or provide education materials for a campaign to raise awareness of the potential harm of wireless devices and how to use them more safely, to those responsible for the health of children in schools such as trustees, principals, teachers and parents?

5. Will the Government of Canada share the best practices on methods to reduce Wi-Fi exposure in schools from countries such as France with the Provincial and Territorial Departments of Education, school boards and others responsible for children's health across Canada?

6. How have Health Canada and Innovation, Science and Economic Development Canada responded to the Canadian Teacher's Federation request for *"an education program regarding the relative safety of Wi-Fi exposure be implemented and appropriate resources be developed to educate the public regarding ways to avoid potential exposure risks of Wi-Fi"*<sup>37</sup>?

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35 <http://www.HealthCanada-sc.gc.ca/ewh-semt/radiation/cons/wifi/faq-eng.php>

36 <http://www.HealthCanada-sc.gc.ca/aHealthCanada-asc/media/advisories-avis/index-eng.php> [accessed 8 October 2016]

37 <http://www.ctf-fce.ca/en/Pages/Issues/Wi-Fi-Briefing-Documents.aspx>



7. What response has Health Canada provided to the more than 50 Canadian medical doctors and 50 international scientists who have written to Canada's Minister of Health calling for more protective wireless radiation guidelines, especially for children?<sup>38</sup>
8. Given the fact that over 33 studies on Wi-Fi frequencies and at least 60 studies on Wi-Fi and other common wireless device frequencies have been published demonstrating potential adverse effects below Safety Code 6 levels since Health Canada claimed there was "*no scientific evidence*" of harm,
  - Will Health Canada provide the counter-balancing evidence in the form of a weight of evidence analysis or a list of 10 or so of the highest quality studies, from its database and from the authorities in other countries which it frequently names, that still support that there is "*no scientific evidence*" of harm?

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## Appendix 1.

The list of 16 studies labelled "List of studies reviewed at Health Canada that are specific to Wi-Fi" that Health Canada provided to the Global Network current affairs program 16:9 The Bigger Picture (aired October, 2010). The links have been added. Added comments are in [square brackets]. Only #10 was a biological effects study conducted on real people.

1. Andersen, J. B., et al. (2010). Power variations of wireless communication systems. *Bioelectromagnetics*, 31(4), 302-310. <http://www.ncbi.nlm.nih.gov/pubmed/20112260>
2. Fang, M., & Malone, D. (2010). Experimental verification of a radiofrequency power model for Wi-Fi technology. *Health Physics*, 98(4), 574-583. <http://www.ncbi.nlm.nih.gov/pubmed/20220364>
3. Findlay, R. P., & Dimbylow, P. J. (2010). SAR in a child voxel phantom from exposure to wireless computer networks (Wi-Fi). *Physics in Medicine and Biology*, 55(15), N405-411. <http://www.ncbi.nlm.nih.gov/pubmed/20647607>
4. Foster, K. R. (2007). Radiofrequency exposure from wireless LANs utilizing Wi-Fi technology. *Health Physics*, 92(3), 280-289. <http://www.ncbi.nlm.nih.gov/pubmed/17293700>
5. Joseph, W., et al. (2010). Comparison of personal radio frequency electromagnetic field exposure in different urban areas across Europe. *Environmental Research*, 110(7), 658-663. <http://www.ncbi.nlm.nih.gov/pubmed/20638656>
6. Joseph, W., (2008). Characterization of personal RF electromagnetic field exposure and actual absorption for the general public. *Health Physics*, 95(3), 317-330. <http://www.ncbi.nlm.nih.gov/pubmed/18695413>
7. Joseph, W., et al. (2010). Estimation of whole-body SAR from electromagnetic fields using personal exposure meters. *Bioelectromagnetics*, 31(4), 286-295. <http://www.ncbi.nlm.nih.gov/pubmed/20041435>
8. Malone, D., & Malone, L. A. (2009). Ambient radiofrequency power: the impact of the number of devices in a Wi-Fi network. *Health Physics*, 96(6), 629-635. <http://www.ncbi.nlm.nih.gov/pubmed/19430215>
9. Martínez-Búrdalo, M., (2009). FDTD assessment of human exposure to electromagnetic fields from WiFi and bluetooth devices in some operating situations. *Bioelectromagnetics*, 30(2), 142-151. <http://www.ncbi.nlm.nih.gov/pubmed/18937345>

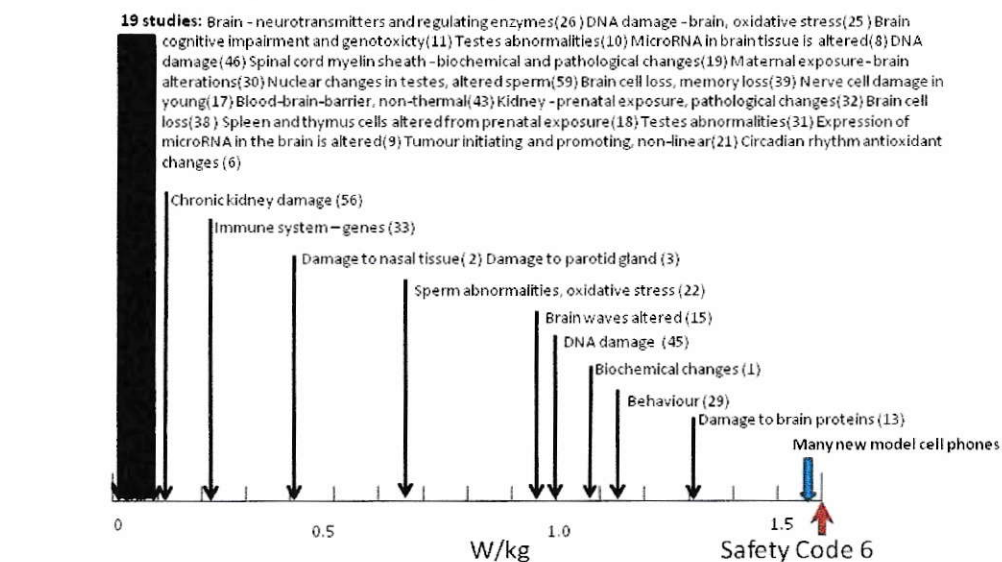
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<sup>38</sup> <http://c4st.org/category/appeals-research/>

10. Mohler, E., Frei, P., Braun-Fahrlander, C., Fröhlich, J., Neubauer, G., Rösli, M., & Qualifex Team. (2010). Effects of everyday radiofrequency electromagnetic-field exposure on sleep quality: a cross-sectional study. *Radiation Research*, 174(3), 347-356. [study group was on men and women aged 30 to 60 years exposed to various sources, not a study specific to the school environment]  
<http://www.ncbi.nlm.nih.gov/pubmed/20726726>
11. Otto, M., & von Mühlendahl, K. E. (2007). Electromagnetic fields (EMF): do they play a role in children's environmental health (CEH)? *International Journal of Hygiene and Environmental Health*, 210(5), 635-644. [supposedly a review of the literature but NONE of the studies identified in this study are referenced. Most, if not all, involve different frequencies] <http://www.ncbi.nlm.nih.gov/pubmed/17765660>
12. Parazzini, M., et al. (2010). Assessment of the exposure to WLAN frequencies of a head model with a cochlear implant. *Bioelectromagnetics*, 31(7), 546-555. <http://www.ncbi.nlm.nih.gov/pubmed/20683910>
13. UK Health Protection Agency. (no date). Wi-Fi in schools. [exposure information, not a biological effects study]  
Old link not working: [http://www.hpa.org.uk/web/HPAwebFile/HPA\\_C/1254510618866](http://www.hpa.org.uk/web/HPAwebFile/HPA_C/1254510618866)  
Link to archived report (have to copy and paste):  
[http://webarchive.nationalarchives.gov.uk/20140714084352/http://www.hpa.org.uk/webc/HPAwebFile/HPAweb\\_C/1254510618866](http://webarchive.nationalarchives.gov.uk/20140714084352/http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1254510618866)
14. Verloock, L., et al. (2010). Procedure for assessment of general public exposure from WLAN in offices and in wireless sensor network testbed. *Health Physics*, 98(4), 628-638.  
<http://www.ncbi.nlm.nih.gov/pubmed/20220371>
15. Viel, J.-F., et al. (2009). Radiofrequency exposure in the French general population: band, time, location and activity variability. *Environment International*, 35(8), 1150-1154.  
<http://www.ncbi.nlm.nih.gov/pubmed/19656570>
16. Wu, T., Hadjem, A., Wong, M.-F., Gati, A., Picon, O., & Wiart, J. (2010). Whole-body new-born and young rats' exposure assessment in a reverberating chamber operating at 2.4 GHz. *Physics in Medicine and Biology*, 55(6), 1619-1630. <http://www.ncbi.nlm.nih.gov/pubmed/20182003>

## Appendix 2.

### Examples from the 60 peer-reviewed studies published since the HESA 2015 hearings with more compelling evidence that Safety Code 6 should be revised<sup>1</sup>



Thirty (30) relevant scientific studies published in 2015 and up to April 2016 reporting potential harm at or below Safety Code 6 (2015). Specific Absorption Rate (SAR) for head, neck and trunk is 1.6 W/kg. Human, animal and cell culture studies. [numbers in brackets refer to the reference in the '60 studies' report]. Figure modified from the '200 studies' report.

<sup>1</sup> <https://www.scribd.com/document/339243060/References-and-Extracts-of-Over-60-Scientific-Studies-Published-in-2015-and-Up-to-April-2016-Reporting-Potential-Harm-at-Level-at-or-Below-Safety-Code-6-from-embed>

