

Protection: How do we Protect Children and where does the Responsibility Lie?

Moderator: Margrite Kalverboer - Netherlands Ombudsman for Children

Panel Session

- **‘Safeguarding the Health & Development of Children’** - Dr Sarah Starkey, Neuroscientist, Independent Neuroscience and Environmental Health Research





Safeguarding the health and development of children and young people: radiofrequency signals

Dr Sarah Starkey, PhD

Independent Neuroscience and Environmental Health Research

ENOC September 2019



UK definition of safeguarding

'Working together to Safeguard Children' (2018):

- protecting children from maltreatment
- **preventing impairment of children's health or development**
- ensuring that children grow up in circumstances consistent with the provision of safe and effective care
- taking action to enable all children to have the best outcomes

"Everyone who works with children has a responsibility for keeping them safe."

Most wireless technologies emit radiofrequency electromagnetic fields,
30 kHz – 300 GHz, non-ionising

Not everything on the internet is accurate

“Non-ionising radiation cannot have harmful effects because it doesn’t have enough energy to directly knock electrons out of orbit and ionise atoms.”

This is a fundamental misunderstanding of biology

You do not need to ionise atoms or directly break molecular bonds in order to have adverse biological effects.

Biological changes can occur by causing small movements of charge (within molecules or as free ions), or changes in the orientation or conformation of molecules. One effect can trigger a cascade of other responses.

Our exposures are not all the same



ICNIRP international radiofrequency exposure guidelines

ICNIRP guidelines to prevent excessive heating (1998) are Specific Absorption Rates (SARs) of :

2 W/kg in 10g tissue for head and trunk, 4 W/kg for limbs,
0.08 W/kg for whole body exposures (averaged over 6 minutes).

Reference level: field strength 61 V/m (2 - 300 GHz)

www.phonegatealert.org/en

- **Some devices exceed current guidelines when held next to the body because they are tested at a distance of up to 25mm.**
- In 2015 the French National Frequencies Agency (ANFR) tested 95 mobile phone models at zero distance. According to Phonegate, 9 out of 10 exceeded the threshold of 2 W/kg and 1 in 4 exceeded 4 W/kg.

Similar Specific Absorption Rates (SARs) for phones and tablets, according to manufacturers

	Maximum SAR value according to Apple (2019*)		Actual SAR ANFR (**)
	W/kg in 1g tissue	W/kg in 10g tissue	W/kg in 10g tissue
iPhone 8 plus	1.15 - 1.19 head or body	0.94 - 0.99 head, 0.99 body	?
iPhone 5	1.25 head, 1.18 body	0.90 head, 0.95 body	5.32 body, zero distance
iPad 11-inch Pro, Wi-Fi	1.19 body	0.99 body	?
iPad 6 th Gen, Wi-Fi & cellular	1.18 body	0.99 body	?
iPad mini 5 th Gen, Wi-Fi	1.19 body	0.84 body	?



EU measures SAR in 10g tissue: allows higher emissions from devices, and higher exposures than in 1g.

Evidence: effects on the brain

In animals, radiofrequency signals below the ICNIRP guidelines have increased **cell death** and neurodegeneration in the brain, **damaged DNA**, altered electrical properties of neurones, **changed electrical brain activity**, **changed communication between neurones and brain regions**, changed expression of genes, concentrations of **neurotransmitters**, altered enzymes, increased the permeability of blood-brain barrier, increased **hyperactivity** behaviours, **anxiety**-like behaviours and impaired **learning and memory**. Some studies have described no effects.

In humans, signals have **altered** electrical **brain activity**. Mobile phone exposures (prenatally and postnatally) were associated with increased odds of **migraines or headaches** in children. Signals decreased ability of human haemoglobin in the blood to carry oxygen.

Some studies listed in Submission to Parliamentary Science and Technology Committee Inquiry into Early Years Interventions (December 2017):
https://cdn.website-editor.net/2479f24c54de4c7598d60987e3d81157/files/uploaded/Early_Years_Inquiry_EY10062.pdf

- **Wide range of effects on the brain; large literature of adverse effects.**
- **These would be expected to affect brain development and function.**

Behaviour

- **Spanish study of 9-11 year old boys**¹ found significant associations between **radiofrequency exposures** by front door (average or above: $\geq 1.2\text{V/m}$ peak) and: ADHD, aggressive behaviour, total behavioural problems, anxious and depressed behaviours, social problems, poorer verbal expression, lower comprehension skills and lower IQ (Calvente *et al.* 2016).
 - **German study of children (8-12) and adolescents (13-17)**² found that those with highest 25% of measured **radiofrequency exposures** over 24h were significantly associated with increased conduct problems (Thomas *et al.* 2010).
 - Maternal mobile phone use during pregnancy was associated with behavioural problems in the children (**aged 5 – 11**), particularly hyperactivity and inattention (3 studies³). One reported no significant effect⁴.
 - **Korean study of children aged 8-11** found significant association between ADHD and **mobile phone voice calls**, but only where there were raised blood lead concentrations⁵. ADHD symptoms decreased when mobile phone use stopped, over 2 years (Byun *et al.* 2013).
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- **Pregnant mice** exposed to mobile phone signals during pregnancy (9, 15 or 24h/day) resulted in hyperactive offspring with impaired memory and altered brain development⁶ (Aldad *et al.* 2012).
 - **2 week old rats** exposed to radiofrequency signals 1h/day for 3 weeks were hyperactive in adulthood and had cell death in brain⁷ (Raček *et al.* 2018).
- **Some evidence for radiofrequency signals being linked with behavioural problems, particularly hyperactivity – supported by animal studies.**

1) www.ncbi.nlm.nih.gov/pubmed/26769168; 2) www.ncbi.nlm.nih.gov/pubmed/19960235; 3) www.ncbi.nlm.nih.gov/pubmed/21138897; www.ncbi.nlm.nih.gov/pubmed/18467962; www.ncbi.nlm.nih.gov/pubmed/28392066; 4) www.ncbi.nlm.nih.gov/pubmed/18467962; 5) www.ncbi.nlm.nih.gov/pmc/articles/PMC3605379/; 6) www.ncbi.nlm.nih.gov/pmc/articles/PMC3306017/; 7) www.ncbi.nlm.nih.gov/pubmed/29527915.

Cognition

- **Swiss study of 12-17 year olds** found that figural memory (remembering symbols) was significantly worse for the 25% children who used wireless devices the most¹ (Schoeni *et al.* 2015).
 - **Large number of studies in animals have described impaired learning and memory** following chronic exposures to radiofrequency signals². E.g. Wi-Fi frequency (2.45 GHz, whole body SAR 0.036 W/kg) for 2h/day for 1 month damaged DNA in the brain and decreased spatial memory in mice³. Not all studies have reported effects.
 - **Mixed results for single short-term exposures in humans** (15-60 minutes): Decreased accuracy or a measure of attention in working memory tests or slowed reaction times in spatial memory tests. But some reported no effects on cognition. Some reported improved reaction times.
 - **SCAMP** is a UK study currently investigating whether mobile phone or other device use in 11-14 year olds might damage cognition (www.scampstudy.org/).
-
- **Some evidence for radiofrequency signals causing cognitive impairment, particularly from animal studies.**
 - **Wireless devices and transmitters have been introduced into schools before we know whether they are damaging cognition in children and young people.**

1) www.ncbi.nlm.nih.gov/pubmed/26474271; 2) https://cdn.website-editor.net/2479f24c54de4c7598d60987e3d81157/files/uploaded/Early_Years_Inquiry_EY10062.pdf; 3) www.jpier.org/PIERB/pierb29/02.11011205.pdf

Mental Health

- **The Spanish study of 9 – 11 year old boys** found an association between environmental **radiofrequency exposures** and **anxious and depressed behaviours**¹ (Calvente *et al.* 2016).
 - **Many animals studies have reported increased anxiety behaviours** in rats or mice following radiofrequency signal exposures prenatally or in young or adult animals². Some reported **increased stressful behaviour patterns** and/or increased plasma corticosterone concentrations³. Some have reported no effects on anxiety⁴.
 - **Prolonged mobile phone use has been associated with depressive symptoms in adolescents**⁵. **Depression** is harder to model in animals, and most studies have not reported effects. Further research is needed.
- **Evidence for radiofrequency signals themselves increasing anxiety or stress, particularly from animal studies**

1) www.ncbi.nlm.nih.gov/pubmed/26769168; 2) www.ncbi.nlm.nih.gov/pubmed/24861496; www.sciencedirect.com/science/article/abs/pii/S019701861830634X; www.ncbi.nlm.nih.gov/pubmed/28035182; www.ncbi.nlm.nih.gov/pubmed/29153770; www.ncbi.nlm.nih.gov/pubmed/30954502; www.ncbi.nlm.nih.gov/pubmed/29113072; <https://www.ncbi.nlm.nih.gov/pubmed/29657919>; www.ncbi.nlm.nih.gov/pubmed/26546224; www.ncbi.nlm.nih.gov/pubmed/25359903; 3) www.ncbi.nlm.nih.gov/pubmed/24620965; www.sciencedirect.com/science/article/abs/pii/S019701861830634X; www.ncbi.nlm.nih.gov/pubmed/28035182; www.ncbi.nlm.nih.gov/pubmed/30954502; 4) www.ncbi.nlm.nih.gov/pubmed/25496977; www.ncbi.nlm.nih.gov/pubmed/29397508; 5) www.ncbi.nlm.nih.gov/pubmed/31450134.

Cancer

WHO IARC classification of radiofrequency fields as a possible human carcinogen (Group 2B) in 2011 <https://monographs.iarc.fr/wp-content/uploads/2018/06/mono102.pdf>

- Significant association between mobile phone or DECT cordless phone use and gliomas of the brain or acoustic neuromas in humans, particularly after 10 years of use
- **Young people who first used a wireless phone under the age of 20 were at greater increased risk of a brain tumour than adults ***
- Some, but limited, evidence from animal and mechanistic studies



- www.ncbi.nlm.nih.gov/pubmed/19513546; www.ncbi.nlm.nih.gov/pubmed/25466607.

Cancer

Since 2011, more studies have described increased risks. For example:

- French Cerenat study – significantly increased risk of brain tumours after equivalent of **15 minutes or more use of mobile phone per day for 10 years** in adults (≥ 896 h; Coureau *et al.* 2014¹).
- CEFALO study – using a mobile phone for **>2.8 years significantly increased risk of brain tumours in children** aged 7-19 (Aydin *et al.* 2011²).
- **Breast cancers** seen in some women who **carried a mobile phone in their bra** (West *et al.* 2013³).
- US National Toxicology Programme Study (2018) reported **clear evidence of Schwannomas of the heart and some evidence of brain and adrenal gland tumours** in male rats⁴. Confirmed in Italian Ramazzini Institute study (2018)⁵.
- Some evidence can act as a co-carcinogen, increasing cancer risk of other carcinogens⁶ (Lerchl *et al.* 2015; Tillmann *et al.* 2010).
- Some scientists and oncologists have called for the IARC classification to be **upgraded to definite human carcinogen**⁷ (Hardell and Carlberg 2018; Miller *et al.* 2018).

1) www.ncbi.nlm.nih.gov/pubmed/24816517; 2) <https://academic.oup.com/jnci/article/103/16/1264/898567>; 3) www.ncbi.nlm.nih.gov/pmc/articles/PMC3789302/; 4) <https://ntp.niehs.nih.gov/results/areas/cellphones/index.html>; 5) www.ncbi.nlm.nih.gov/pubmed/29530389; 6) www.ncbi.nlm.nih.gov/pubmed/25749340; www.ncbi.nlm.nih.gov/pubmed/20545575; 7) www.spandidos-publications.com/10.3892/ijo.2018.4606; www.ncbi.nlm.nih.gov/pubmed/30196934

Male fertility

Around **80% of studies** on radiofrequency signals and **male fertility** have described **harmful effects** (animals and humans).

They have damaged sperm DNA, decreased sperm motility and produced abnormally shaped sperm. They have decreased diameters of seminiferous tubules, damaged seminiferous tubule membranes, decreased weight of epididymis and seminal vesicles, increased cell death, and changed testosterone concentrations.

Review on radiofrequency signals (Kesari *et al.* 2018):

www.ncbi.nlm.nih.gov/pmc/articles/PMC6240172/.

Review on Wi-Fi (Jaffar *et al.* 2019):

www.jstage.jst.go.jp/article/tjem/248/3/248_169/pdf/-char/en.

Male fertility examples

- Oni *et al.* 2011, https://arpapress.com/Volumes/Vol9Issue2/IJRRAS_9_2_13.pdf:

1 hour exposure to Wi-Fi signals significantly decreased **human** sperm motility, 60 cm away from a Wi-Fi-enabled laptop.

- Shahin *et al.* 2014, <https://www.ncbi.nlm.nih.gov/pubmed/24490664>:

Simulated **Wi-Fi** signals for **2 hours/day** for 30 days in male **mice** (0.018 W/kg) significantly decreased sperm count and sperm viability, decreased seminiferous tubule diameters and increased degeneration of seminiferous tubules. Reduction in plasma testosterone concentrations.

- Dasdag *et al.* 2015, www.ncbi.nlm.nih.gov/pubmed/24460421:

Simulated **Wi-Fi** signals continuously for **1 year** in adult male **rats** (0.001 W/kg) significantly increased sperm head defects, decreased weight of epididymis and decreased seminiferous tubule diameters.

- **To protect fertility, keep wireless devices away from reproductive organs, off your lap, out of trouser pockets, and use wired connections**

Female fertility

Animal studies have reported significant cell death in ovaries

Authors	Female Subjects	Exposures	Results
Bakacak et al. 2015	Adult <u>rats</u> , 4 month old	15 min/day , 15days (d.); 900 MHz, 217 Hz pulses, 1.04 mW/cm ²	53% significant decrease in mean number of follicles.
Okatan et al. 2018	Young <u>rats</u> , postnatal day 34	1 hour/day , 25 d., 900 MHz continuous wave, whole body SAR 0.0096-0.0098 W/kg	30% significant decrease in secondary follicle numbers.
Shahin et al. 2017	Adult <u>mice</u>	3h/day , 120 d., 1800 MHz, phone in dialling, receiving or standby modes, SAR 0.05 W/kg , 8.9 V/m for dialling	53% sig. decrease dialling, 64% sig. decrease receiving, 76% sig. decrease standby, of total follicle numbers.
Gul et al. 2009	<u>Pregnant Rats</u> , offspring examined postnatal day 21	Mobile phone signal in speech mode 15min/day , in standby 11h 45min/day, positioned under cage	30% significant decrease in number of follicles/mm ³ in female offspring. Sig. decrease number of living pups/delivery.
Türedi et al. 2016	<u>Pregnant Rats</u> , offspring examined postnatal day 34	Exposed days 13-21 of pregnancy, 1h/day , 900 MHz, 10 V/m, 0.265 W/m ² , whole body SAR 0.01 W/Kg	45% significant decrease in number of primordial and 47% tertiary follicles in female offspring. Sig. increase follicle cell degeneration.
Margaritis et al. 2014 plus more	Fruit flies (<i>Drosophila melanogaster</i>)	Exposed to Wi-Fi (2.4-2.48GHz, 2.1V/m, 20min/day 4 d.); Bluetooth (2.4-2.48GHz, 0.3V/m 30min/day 6 d.); DECT base (1880-1900MHz, 2.7V/m 30 min/day 5 d.); GSM phone (900MHz, 22V/m, 6min/day 3 d.)	All exposures significantly increased cell death in ovaries and sig. reduced reproductive capacity.

www.ncbi.nlm.nih.gov/pubmed/26043407; www.ncbi.nlm.nih.gov/pubmed/29268055; www.ncbi.nlm.nih.gov/pubmed/28780396; www.ncbi.nlm.nih.gov/pubmed/19241083; www.ncbi.nlm.nih.gov/pubmed/27007703; www.ncbi.nlm.nih.gov/pubmed/23915130.

Are wireless signals damaging ovarian follicles in humans?



No studies done. Evidence from animals points to a need to restrict use of devices near reproductive organs, to prevent physical harm.

Animal studies have also reported changes in female reproductive hormones and increased oxidative stress in the ovaries*.

- **To protect fertility, keep wireless devices away from reproductive organs, off your lap, out of trouser pockets, and use wired connections.**
- **In my view, girls should not have to use wireless devices in the classroom, where they have no choice and any damage is irreversible.**

*E.g. www.ncbi.nlm.nih.gov/pubmed/24460416; www.ncbi.nlm.nih.gov/pubmed/26578367;
www.ncbi.nlm.nih.gov/pubmed/28780396; www.ncbi.nlm.nih.gov/pubmed/29268055

Pregnancy

- Humans: increased behavioural problems already mentioned¹. There has also been increased risk of miscarriage² or speech problems in children³, associated with maternal mobile phone use.

References: 1) <https://www.ncbi.nlm.nih.gov/pubmed/28392066>; www.ncbi.nlm.nih.gov/pubmed/21138897; <https://www.ncbi.nlm.nih.gov/pubmed/18467962>; 2) www.ncbi.nlm.nih.gov/pmc/articles/PMC4416385/pdf/40201_2015_Article_193.pdf; 3) www.ncbi.nlm.nih.gov/pubmed/26396971.

- Animal studies: hyperactivity and anxiety in offspring already mentioned. Studies also reported cognitive deficits, altered brain development, damage to DNA and increased cell death in a range of organs.

Some studies listed in Submission to Parliamentary Science and Technology Committee Inquiry into Early Years Interventions (December 2017): https://cdn.website-editor.net/2479f24c54de4c7598d60987e3d81157/files/uploaded/Early_Years_Inquiry_EY10062.pdf

- **Women could be informed about the possible risks and how to better protect their unborn children.**
- **Rights of pregnant women to safe working conditions and public spaces?**

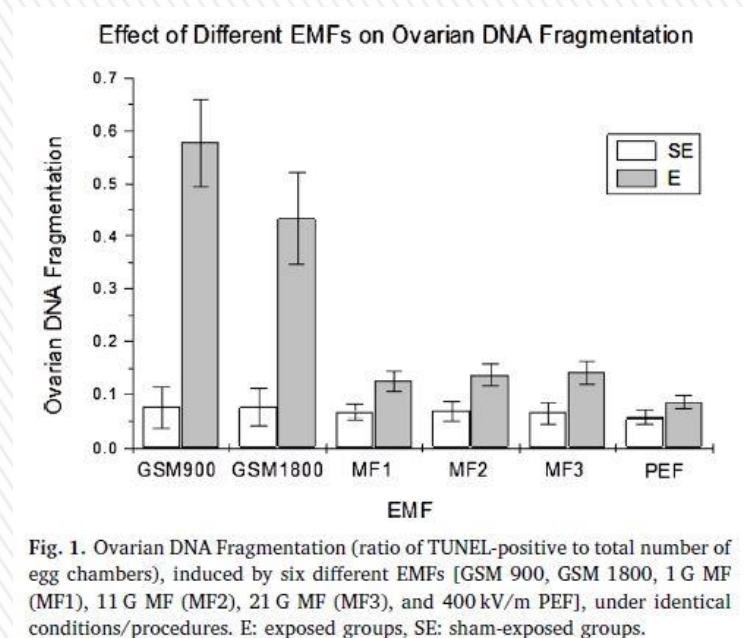
Fertility of insects decreased by radiofrequency signals (e.g. fruit fly *Drosophila melanogaster*)

Review www.ncbi.nlm.nih.gov/pubmed/31416578 Panagopoulos, 2019

Significant DNA damage in ovarian cells, cell death and decreased reproductive capacity (number of offspring).

e.g. Flies exposed for 6 minutes/day for 6 days to a mobile phone signal (19 V/m) increased DNA damage in ovaries.

Signals from Wi-Fi, Bluetooth (0.3 V/m), DECT cordless phones and baby monitors also induced cell death www.ncbi.nlm.nih.gov/pubmed/23915130.



- **Wireless signals may be contributing to the decline in insect species. How will introduction of 5G and IOT worldwide affect pollinating insects or other wildlife?**

Wi-Fi and mobile phone signals increased antibiotic resistance of *E. coli* and *Listeria m.*

<https://journals.sagepub.com/doi/pdf/10.1177/1559325816688527> Taheri *et al.* 2017

Tested antibiotic resistance of bacteria *Escherichia coli* and *Listeria monocytogenes* to six different antibiotics* after 3, 6, 9, or 12 hours exposure to a Wi-Fi router (0.13 W/kg) or a GSM 900 MHz mobile phone simulator.

➤ **Significant decrease in antibiotic effectiveness for some antibiotics.**

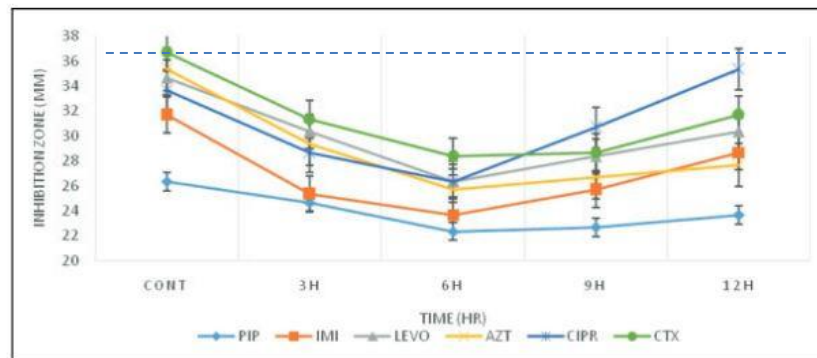


Figure 1. Inhibition zone diameters preexposure and postexposure to radiofrequency (RF) simulator radiation for *Escherichia coli*.

Phone, 6 antibiotics sig. 3, 6, 9h; 5 still sig. decrease 12h

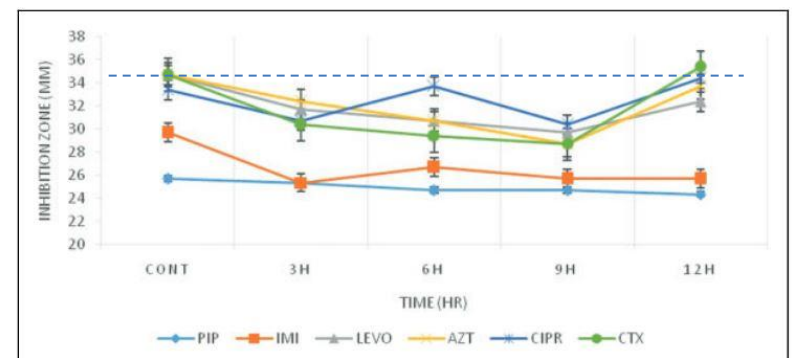


Figure 2. Inhibition zone diameters preexposure and postexposure to Wi-Fi radiation for *Escherichia coli*.

Wi-Fi router, 4-5 sig. 3, 6, 9h; 2 still sig. decrease 12h

➤ **Wi-Fi and wireless devices are in all hospital wards and departments. How will the introduction of 5G and IOT worldwide affect antibiotic resistance?**

What can we do?

Government of Cyprus is informing the public about health risks and the need to take action:

Video for teenagers:

www.youtube.com/watch?v=RCy3WfaXZkl (only 3 minutes;
English subtitles)

Video for pregnant women:

www.youtube.com/watch?v=tsRgC2yXBZo (only 2 minutes;
English subtitles)

Nicosia Resolution, 2017

Austrian and Cyprus Medical Associations, Cyprus National Committee on Environment and Children's Health:

www.cyprus-child-environment.org/easyconsole.cfm/id/428/lang/en

- **document states problem and includes practical advice for keeping children and adults safer (only 3½ pages long)**

“Schools should avoid Wi-Fi”

“All children and in particular those with existing neurological or behavioural problems as well as those with chronic diseases must be provided with wired (not wireless) learning, living and sleeping environments.”

E-Safety leaflet for parents and schools

www.wirelessriskassessment.org/e-safety

The Nicosia Resolution from the Austrian and Cyprus Medical Associations and Cyprus National Committee on Environment and Children's Health includes practical advice for keeping children and adults safer:
www.cyprus-child-environment.org/essayconsole.cfm?id/428/lang/en



E-Safety:

Wireless technologies

We help children and young people to stay safer online by discussing with them the importance of protecting personal information, issues with online content, screen time and building resilience and wellbeing. But there is another important aspect: the radiofrequency signals emitted from wireless devices and transmitters. Informing people about the risks gives them the choice to better protect themselves and those they are responsible for.

This leaflet raises awareness about the risks and gives positive advice to help keep children and young people safer, as well as where to find further information.



Includes all the benefits of advice, information on safety, health, social health, behaviour and the brain, as well as actions and links to find out more.

What actions can we take to better protect children and young people (and ourselves)?

See video for teenagers from the Cyprus Government: www.youtube.com/watch?v=RCy3WfaXZki

Ask children and young people to:

- not hold a mobile (or cordless phone) against the head – provide a wired phone at home, in school/college or in university accommodation. If they do use a mobile, use an air-tube headset or speakerphone, keeping the phone away from the body.
- keep tablet computers, smartphones or laptops away from the chest or body when texting, using the internet or streaming.
- not carry a wireless device on the body, in a pocket or bag – it can go in a bag.
- not sleep with a mobile phone or tablet under their pillow or close to their bed.
- not wear radiofrequency-emitting technology or clothing, or place wireless virtual reality headsets or smartphones in front of their eyes (up to 30x more radiation absorbed into the brain than for adults¹⁴).
- use wired connections whenever possible and switch wireless signals off on computers or devices.

Adults can protect children and young people by:

- not buying a smartphone for your children, or waiting until they are older (Nicosia Resolution suggests emergency use only under the age of 16).
- switching off Wi-Fi at home and in schools/colleges (including during exams), in university accommodation and for children in care. Wired access points/internet connections can be provided and wireless signals switched off on the computers and devices.
- providing a wired phone; if using a DECT cordless phone, keep the base station away from the bed and where people spend a lot of time.
- providing wired phones in public places.
- considering wireless risks when purchasing products.

Using wired connections is safer, healthier, more sustainable and better for the environment

Independent Neuroscience and Environmental Health Research

2018 www.wirelessriskassessment.org/e-safety

Different types of advice on the safety of wireless technologies

The report which the UK Government has based its advice on (AGNR 2012), has been shown in a peer-reviewed scientific journal to be inaccurate, incorrect and misleading¹⁴. It still being used to advise the public, schools and Parliament that there are no adverse effects below current ICNIRP exposure guidelines. We need accurate, evidence-based information; without it adults cannot protect children and young people from harm. In contrast, many scientists have called on governments and organisations to better protect the public (www.emfscientist.org) and to reject the ICNIRP exposure guidelines, as they are not protective of health (www.emfcall.org).

Cancer

The World Health Organization International Agency for Research on Cancer (IARC) classified all radiofrequency signals (as used by smartphones, tablet computers, Wi-Fi, Bluetooth, smart meters, 4G, 5G...) as a possible human carcinogen in 2011¹⁵.

We now have more evidence of increased cancer risks and some experts are calling for the classification to be upgraded to a definite human carcinogen¹⁶. IARC is expected to re-assess the classification by the end of 2024¹⁷. But we can take action to stay safer now, based on evidence.

- Using a mobile phone for the equivalent of 15 minutes or more per day over 10 years significantly increased the risk of developing a brain tumour in adults (2896 hours)¹⁸.
- Young people who first used a mobile or cordless phone under the age of 20 were at increased risk of a tumour, compared to adults¹⁹ (e.g. 100% greater increased risk of a glioma with cordless phone use compared to first use between the ages of 20-49²⁰).
- Some women who carried a mobile phone in their bra developed breast cancers²¹.
- Rats exposed to radiofrequency signals developed tumours of the heart and other organs²².
- Exposures from tablet computers can be as high as from mobile phones (similar maximum specific absorption rates, SARs)²³.

The brain

Studies have described effects of wireless signals on the brain. These are expected to affect brain development, brain function, behaviour and mental health:

changes in brain activity, increased cell death, damaged DNA, altered electrical properties and communication between neurones, changed expression of genes, altered concentrations of neurotransmitters and enzymes, increased anxiety-like behaviours, impaired learning and memory and decreased ability of haemoglobin in the blood to carry oxygen²⁴.

➤ Wireless signals themselves can have harmful effects – it is not enough to just look at screen time, use of social media or online information.

If we want to address the current increase in mental health and behavioural problems in young people, we need to include the effects of wireless signals when considering solutions.

Fertility

Studies have also reported damage to fertility, pregnancy and foetal development^{25,26}. For advice during pregnancy: Cyprus Government video for pregnant women: www.youtube.com/watch?v=BgC2Yz183b, and the BabySafe Project: www.babysafeproject.org/

References

1. AGNR 2012: www.agnr.gov.uk
2. AGNR 2012: www.agnr.gov.uk
3. AGNR 2012: www.agnr.gov.uk
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2 pages

Example risk assessment for schools and other workplaces:

www.wirelessriskassessment.org

Key for Risk Assessment Form

Likelihood of hazard happening:

Low, highly unlikely to happen = Score 1

Medium, could happen, but unlikely = Score 2

High, likely to happen = Score 3

Severity:

Slightly harmful, minor = Score 1

Harmful = Score 2

Serious e.g. irreversible damage, fatal or life threatening = Score 3

Overall Risk = Likelihood x Severity:

Score: 6 & 9 = High, urgent action required

Score: 3 & 4 = Medium, action to an agreed timetable

Score: 1 & 2 = Low, or tolerable risk no action may be required

Risk factors shown in the table below are assuming no additional controls have been put in place. If suggested further actions are introduced, then risk levels could be reduced.

SERVICE AREA:

SECTION/LOCATION:

NAME OF ASSESSOR(S):

DATE OF ASSESSMENT:

Job Type/Work Activity:

FREQUENCY/DURATION:

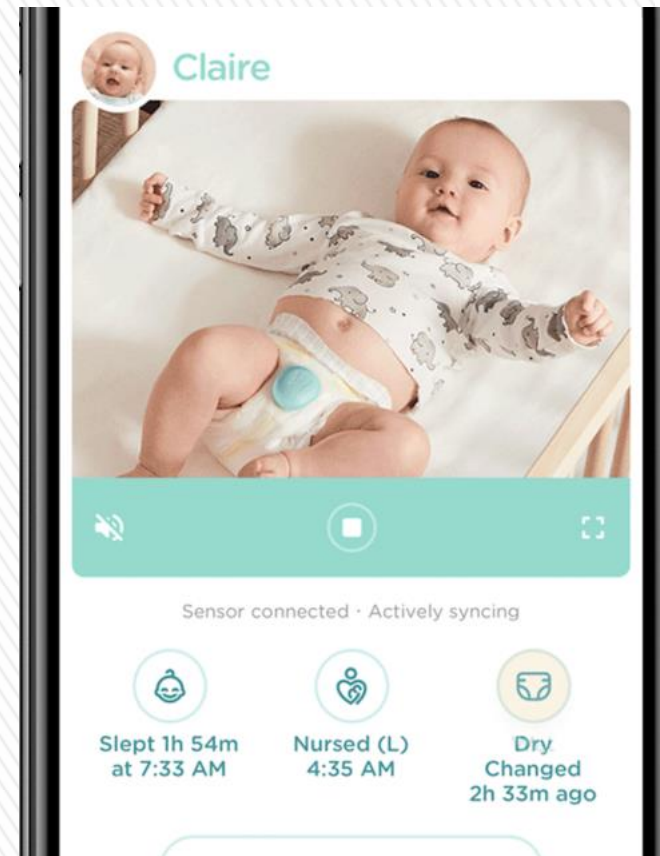
What are the Hazards?	Who might be harmed and how? (Who is at special risk?)	What are you already doing? (Current control measures, including those for people at special risk)	What further action is necessary? (Further Control Measures)	Action by whom	Action by when	Done	Risk Factor		
							Likelihood	Severity	Risk Level

- There are actions which schools can take to reduce exposures.
- Employers should take reasonable steps to remove health and safety risks for pregnant women in the workplace.
- Accessibility for all pupils and staff, as described in Accessibility Policies.

Innovations are celebrated, children are exposed, but parents are unaware of the risks

Lumi by Pampers (2019)
'Smart' nappies (diapers)
transmit to a smartphone how wet
the baby is.

➤ **Transmitter is right next to
reproductive organs**



Where does the responsibility lie?

UK: Public Health England (PHE)

EU: SCENIHR, national health protection agencies

Worldwide: WHO EMF Project

ICNIRP

- Almost all say that signals are safe below ICNIRP guidelines (but include members of ICNIRP – conflict of interest – they set the guidelines, then assess them as part of other ‘independent’ groups)

Assessment of report upon which PHE based its advice: AGNIR 2012

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Inaccurate official assessment of radiofrequency safety by the Advisory Group on Non-ionising Radiation

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Abstract: The Advisory Group on Non-ionising Radiation (AGNIR) 2012 report forms the basis of official advice on the safety of radiofrequency (RF) electromagnetic fields in the United Kingdom and has been relied upon by health protection agencies around the world. This review describes incorrect and misleading statements

(1). Conclusions from subsequent ICNIRP reviews have supported the guidelines. Within the United Kingdom (UK), Public Health England (PHE) commission scientific reviews by the Advisory Group on Non-ionising Radiation (AGNIR) to assess the safety of RF fields. AGNIR reviews, along with PHE in-house assessments of exposures, form the basis of PHE's advice on the safety of RF signals. This guides the UK government, organisations and decision makers when assessing the safety of wireless devices and

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AGNIR 2012 report conclusions were not evidence-based

“the evidence considered overall has not demonstrated any adverse health effects of RF field exposure below internationally accepted guideline levels.”

78% studies - damage to male reproductive health

97% studies - effects on proteins or cell membranes

79% studies - increase in the damaging condition of oxidative stress

80% studies - loss of cells in brain from prenatal or neonatal exposures

52% studies - evidence of genetic damage, genotoxicity

... etc.

- **Executive Summary was not evidence-based**
- **Conflict of Interest - some members of AGNIR (including Chair) were responsible for the ICNIRP guidelines which they were assessing**
- **UK radiofrequency exposures and use of wireless devices, including by schools, are based on this scientifically inaccurate, incorrect and misleading report**

Talk on PHE advice, the AGNIR 2012 report and ICNIRP guidelines:

Slides: [https://cdn.website-](https://cdn.website-editor.net/2479f24c54de4c7598d60987e3d81157/files/uploaded/S._Starkey_Presentation_5th_November_2018.pdf)

[editor.net/2479f24c54de4c7598d60987e3d81157/files/uploaded/S._Starkey_Presentation_5th_November_2018.pdf](https://cdn.website-editor.net/2479f24c54de4c7598d60987e3d81157/files/uploaded/S._Starkey_Presentation_5th_November_2018.pdf),

or at www.wirelessriskassessment.org

EMF Scientist Appeal

www.emfscientist.org

250 scientists who have published papers in this field, from 42 nations have called for actions to better protect the public .

“Numerous recent scientific publications have shown that EMF affects living organisms at levels well below most international and national guidelines. Effects include increased cancer risk, cellular stress, increase in harmful free radicals, genetic damages, structural and functional changes of the reproductive system, learning and memory deficits, neurological disorders, and negative impacts on general well-being in humans. Damage goes well beyond the human race, as there is growing evidence of harmful effects to both plant and animal life.”

“Collectively we also request that:

➤ **children and pregnant women be protected...”**

Safeguarding children and young people

- Children, parents and schools could be educated about the risks and how they can stay safer
 - We could make recommendations for safe schools, pre-schools, colleges, universities and children's and maternity wards in hospitals.
 - We could recommend that children are provided with wired connections for computers.
 - We could work towards offering safe working environments for pregnant women, to protect their unborn children.
- **Protect the digital rights of children and young people, but please do so in a way that also protects and defends their right not to have their health or development damaged.**

Take-home messages:

1. There are harmful effects of the wireless signals themselves.
2. Please see Cyprus Government video for teenagers and let other people know about it (www.youtube.com/watch?v=RCy3WfaXZkl).
3. We need to include wireless radiofrequency signals when considering the health and development of children and young people and to include reducing exposures as part of solutions. If we don't include them, we will only be partly addressing the problems.

For further information or copy of slides
email: contact@wirelessriskassessment.org

Thank you for listening