Findings of the MOBI-Kids study and their misinterpretation spread by the Federal Office for Radiation Protection

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The Federal Office for Radiation Protection and subsequently also numerous media outlets and medical journals reported that the international MOBI-Kids study would prove that the use of cell phones or other mobile devices does not raise tumor risk in children. This interpretation conflicts with known biological findings and does not do justice to the detailed findings of the MOBI-Kids study. Kundi et al. have recognized that the widely spread interpretation is a misinterpretation and have therefore presented another, appropriate interpretation and conclusive proof. They point out that most of the pediatric brain tumors included in the MOBI-Kids study have already been formed prior to or shortly after birth and not only through the use of cell phones. If at all, the MOBI-Kids study may have only captured a few tumors that would have been initiated by cell phone radiation resulting in a higher brain tumor risk because the required exposure duration of 10 to 20 years would for the most part only lead to tumors later in life than the age group of 10- to 24-year-olds studied. There can be no talk of giving the all clear. If, in addition, we consider that cell phone radiation can lead to accelerated tumor growth in affected children, as suggested by the MOBI-Kids study, the study findings can be explained qualitatively in a coherent and logically consistent manner. About this new and insightful interpretation, diagnose:funk corresponded with two authors of the MOBI-Kids study as well as further scientists and wrote its own detailed documentation regarding the arguments presented. This article reports about these findings.

Keywords: wireless communication technologies, MOBI-Kids study, cell phone, mobile phone, wireless radiation exposure, children, adolescents, brain tumor risk, tumor promotion, risk communication, prevention policy

1. Introduction

The goal of the MOBI-Kids study[1] was to clarify the following question: Does brain tumor risk in young people (ages 10 to 24, as selected by the study) increase due to their use of cell phones or the associated exposure to wireless radiation?

The MOBI-Kids study was carried out in 14 countries from 2010 to 2015; during this period, the use of mobile devices has increased rapidly. The main study investigated the tumor etiology in 671 young brain tumor patients (cases) aged 10 through 24, especially in terms of user behavior: (i) when the damaging event probably occurred, (ii) when the tumor was diagnosed, and (iii) whether there is an association with cell phone radiation exposure. These data were compared to the user behavior of 1889 healthy young people (controls).

The MOBI-Kids study is the largest multinational study of its kind. Accordingly, the findings of the MOBI-Kids study are considered to be very important, which has led to numerous reports in the media.[2] All of them seem to suggest that this study finally proves that cell phone radiation cannot cause brain tumors in children and adolescents. This is how the medical journal Ärztezeitung prominently presented the findings:

"If their children use cell phones excessively, parents won't have to worry about this point at least: according to an international study, brain tumors are apparently not initiated by the radiation from mobile devices." ... "It looks as though researchers can focus on the neuropsychological consequences of cell phone use; in terms of neuro-oncology, the case is also quite clear. And once again, there are no signs of an increased brain tumor risk."[3]

These and similar presentations of the study findings rely on a press release by the Federal Office for Radiation Protection (BfS):

"The use of cell phones and DECT cordless phones does not increase brain tumor risk in children and adolescents. This is what the results of the recently published international MOBI-Kids study suggest."[4]

The Federal Office for Radiation Protection (BfS) relies on the seemingly clear statements in the abstract and in Section "5. Conclusions" of the study:

"Overall, our study provides no evidence of a causal association between wireless phone use and brain tumors in young people."[1]
"In this … study …, no increased risk of neuroepithelial BTs [brain tumors] was observed either in relation to wireless phone use or to estimated ELF or RF dose from wireless phones."[1]

Still, what do these study findings actually mean?

2. Why the widespread interpretation of the findings of the MOBI-Kids study is inconsistent and misleading

In previous studies, a statistically significant association between cell phone use and brain tumors for long-term or heavy users (more than 10 years of use, > 1640 cumulative hours) has been demonstrated.[5] This means that in humans it takes at least 10 years from the malignant transformation of a cell to the diagnosis or appearance of brain tumor symptoms (latency period[6]). During this long latency period of 10 to 20 years and more, cell phone radiation exposures can continue to exert their harmful effects.

The MOBI-Kids study included 671 children and adolescents who had developed a neuroepithelial brain tumor (cases). Other brain tumors were excluded from the main study. Most of the children and adolescents (ca. 77.5%) were not long-term users, and even the percentage of the long-term users of all sick children was relatively low (ca. 21%), as shown in Table 1.

	1st age group: ages 10 to 14	2nd age group: ages 15 to 19	3rd age group: ages 20 to 24	Sum total
Number of study participants with brain tumor	287	217	167	671
Number of long-term users with brain tumor from all sick study participants	18 von 287 ≙ 6.3 %	39 von 217 ≙ 18 %	85 von 167 ≙ 51 %	142 von 671 ≙ **21 %**
Number of long-term users with brain tumor from all long-term users (≥ 10 years)	18 von 80 ≙ 22.5 %	39 von 173 ≙ 22.5 %	85 von 323 ≙ 26 %	142 von 576 ≙ 24.7 %

Table 1: Percentage of long-term users with brain tumor in three age groups (see also[1])

This means that for those children who were not long-time users (ca. 79%) the required usage time of at least 10 years to initiate and develop a brain tumor due to cell phone radiation exposure was not met!

In those children with a brain tumor, their brain tumor could not have been caused by their use of cell phones: The damaging event of a malignant transformation in the brain must have occurred **before** a cell phone was used, which means that the brain tumor was already there (even though undiscovered) when the person started using a cell phone! This is supported by the fact that many neuroepithelial brain tumors in childhood and adolescence are initiated prenatally or shortly after birth (see also Section 4).

The long-term users in the first age group (10 to 14 years) would also have had to start using cell phones prenatally, at least prior to the age of 4. The children, however, would not have used any cell phones at this age yet. Likewise, many adolescents in the second age group (15 to 19 years) would have had to start using cell phones in early childhood when they would not have used any cell phones yet. At best, the brain tumors in long-term users of the third age group could have been caused by exposure to cell phone radiation. And in this age group, a slightly increased brain tumor risk was indeed found. Even if the data are not statistically significant and could therefore be the result of chance, they do suggest that an increased brain tumor risk could exist, which may only be detected as statistically significant at a more advanced age. The bottom line is that in many long-term users of the MOBI-Kids study the brain tumors were most likely not caused by the regular use of cell phones.

On the other hand, when we assume that in children without a childhood brain tumor heavy cell phone use begins at the age of 14 and we apply a latency period of 10 to 20 and more years, brain tumors caused by cell phone use should only become statistically significant from age 24. This assumption has already been supported by cancer statistics from the US and Sweden.[8,9,10] In the MOBI-Kids study, however, cell phone users were at maximum 24 years old and for the time thereafter, the MOBI-Kids study did not collect any data. The study therefore cannot say anything about a (long-term) increased brain tumor risk in this user group. It is therefore not possible to generally rule out an increased brain tumor risk by referring to the MOBI-Kids study alone.

These considerations show that the MOBI-Kids study cannot make any reliable statements regarding the initiation of brain tumors in adolescent cell phone users. In our opinion, the wording of the abstract of the MOBI-Kids study only makes sense if completed by the following clause:

"Overall, our study provides no evidence of a causal association between wireless phone use and brain tumors in young people ***because the majority of brain tumors documented in our study had already developed before (!) study participants started using cell phones****."*

These contradictions and inconsistencies were discovered by diagnose:funk, while comparing the widely accepted interpretation to the framework conditions of the study. Therefore, diagnose:-funk inquired with two (of 55) authors of the MOBI-Kids study – Prof. Hans-Peter Hutter and Prof. Michael Kundi (Medical University Vienna) – what they thought about the interpretation spread in the media. Prof. Michael Kundi wrote us:

"The goal of the MOBI-Kids study cannot be and was not to investigate the initiation of brain tumors due to cell phone radiation*. Pediatric brain tumors are caused by a prenatal event. Environmental factors can exacerbate this event or lead to promoting tumor development. The problem is addressed in the section "Discussion"* [of the study results in[1] – author's note]. *Due to the decreasing incidence with increasing age between 10 and 24 years, a tumor-promoting effect is accordingly reflected in odds ratios less than 1* [77% of the study results showed an odds ratios < 1 – author's note]. *These odds ratios that tend to decrease with increasing use of cell phones therefore suggest a harmful effect of cell phone use."* (E-mail from 05 March 2022)

This statement is diametrically opposed to the all-clear message of the medical journal *Ärztezeitung*. We asked Prof. Kundi to explain this discrepancy in a professional article, which was recently published in the Austrian medical journal medi.um with the title "Stellungnahme zu den Ergebnissen der MOBI-Kids-Studie [Expert Statement regarding the Findings of the MOBI-Kids Study]".[5] The observations of this article will be discussed in more detail in Section 4 further below. The final key message of Kundi et al. is:

"That the results of the MOBI-Kids study would be associated with the assumption that there is generally ***no*** *risk due to cell phone radiation exposure or even wireless radiation exposure (therefore) lacks any basis."*[5]

So there can be no talk of giving the all clear! The above-quoted press release[4] of the Federal Office for Radiation Protection (BfS) is inconsistent and misleading: After all, the press release creates the suggestive impression that brain tumor risk will not increase for users at any time, as if no risk would exist at all. The press release would at least have to qualify that no statement can be made regarding brain tumor risk in young people after the age of 24 based on the findings of the MOBI-Kids study. Then the statement would be consistent with the study. Without qualifying the statement in this way, the media coverage has a fatal effect because physicians are told that they need not consider neuro-oncological risks of cell phone radiation anymore and because parents now believe that they can allow their children a (more) carefree use of cell phones. This is why the press release of the Federal Office for Radiation Protection (BfS) is a particularly fateful summary of the study findings.

3. Why the quantitative results of the MOBI-Kids study only seem to prove the widespread interpretation

Assuming that cell phone radiation can cause brain tumors, this would have to be reflected in increased incidence rates among users of mobile devices – especially in long-term users – in the MOBI-Kids study in comparison to non-users, and the odds ratios (OR) would accordingly have to be > 1.

This, however, only applies to the odds ratios of very few subgroups in the MOBI-Kids study:

The majority of odds ratios (199 of 259, which is 77%; see also[11]) *was below 1* (OR < 1); in the ages 15 to 19, some odds ratios < 1 were even statistically significant. The risk of brain tumor initiation due to cell phone radiation exposure *appears* (!) to have not increased, but even decreased!

This inconsistency becomes even more noticeable through the following study result: In all (!) countries involved, odds ratios even decreased with increasing intensity and duration of cell phone use, which seems to suggest a decreasing (!) risk of brain tumor development with increasing (!) duration of use. This is biologically absurd and not consistent with the scientific knowledge available to date.

Importance of odds ratios (OR)

- An odds ratio > 1 means that illness will be more likely in exposed persons compared to non-exposed persons. In other words: In case of illness, an exposure is frequently more likely than not.
- An odds ratio = 1 means that illness will occur in exposed persons as frequently as in non-exposed persons. In other words: Those who become ill are found among exposed persons just as often as non-exposed ones. The exposure will in all probability have no effect on the risk of developing the illness.
- An odds ratio < 1 means that illness will occur in exposed persons less often than in non-exposed persons. In other words: Those who become ill are found among exposed persons less frequently (rarely) than non-exposed ones.

Thus the odds ratio (OR) gives the factor by which the frequency of illness increases or remains the same or decreases in terms of being exposed in comparison to being not exposed.

Though this finding is completely unexpected and definitely needs to be explained, this is what serves as the foundation of the all-clear message spread by the Federal Office for Radiation Protection and the medical journal Ärztezeitung. The high frequency with which odds ratios < 1 occurred was not taken seriously, but seen as a result of errors[11] and classified as an artifact[4]. The authors of the MOBI-Kids study themselves, however, point out that the numerous odds ratios < 1 can most likely only partially and with considerable uncertainties be explained by unavoidable errors to achieve an odds ratio of approximately 1 after an error correction.

However, the real fallacy is that odds ratios < 1 only seem to suggest a lower brain tumor risk because "equating" odds ratio and brain tumor risk is no longer reasonably possible according to the observations stated in Section 2:

First and foremost, an odds ratio describes in completely neutral terms a relative frequency distribution; equating an odds ratio with a certain (relative) risk of disease is already an interpretation. To be able to interpret odds ratios as disease risk in case-control studies, a basic requirement must be met: The damaging event must have occurred after the exposure to the proposed risk factor – in this case, cell phone radiation – because only then a possible causal association can even be logically assumed and one can meaningfully speak of a risk.

Since the majority of brain tumors included in the study most likely developed **before (!)** cell phone use – as was shown in Section 2 – this assumption is not met. This means: It makes no sense when odds ratios are now interpreted as brain tumor risk! It follows that the odds ratios < 1 found in the study cannot be used as evidence for a reduced brain tumor risk!

As will be explained in more detail in the next section, the numerous odds ratios < 1 rather show that, in children and adolescents included in the MOBI-Kids study, not the initiation of brain tumors but a tumor-promoting effect due to cell phone radiation is predominant. The latter effect has a dominant influence on the results and, in particular, can explain the numerous odds ratios < 1.

4. How the results of the MOBI-Kids study should be interpreted appropriately (according to Kundi et al.)

4.1 Biological findings regarding early childhood brain tumors

The MOBI-Kids study suggests that in many children a brain tumor may have already been present at an early age, which was not caused by cell phone use:

"It is thought that many tumours of childhood and adolescence may be initiated prenatally or shortly after birth. Tumours eligible for the MOBI-Kids study mainly peak therefore in the 3rd year of life and decline afterwards. Hence, in the 10 to 24 years age range, many patients with tumours may have already had a growing mass of neoplastic cells leading to their diagnosed BT [brain tumour] after they started wireless phone use. Under these circumstances, ***wireless phone use could have increased the growth rate of these nascent tumours*** *and led to earlier diagnosis."* (MOBI-Kids study, p. 15)

The causes for tumor development in early childhood are mostly unknown: A still non-malignant "transformation" in the womb or influences during pregnancy or in infancy are suspected. Kundi et al. write about the subsequent course of tumor development: *"This is also the reason why the incidence (rate of new cases per year) per 100,000 children is so high in the first years of life (see also Figure 1 from [12]). Some cases are already expressed at birth and become symptomatic in the first years of life; others, which grow more slowly, occur with the highest incidence in the 2nd to 4th year of life."*[5]

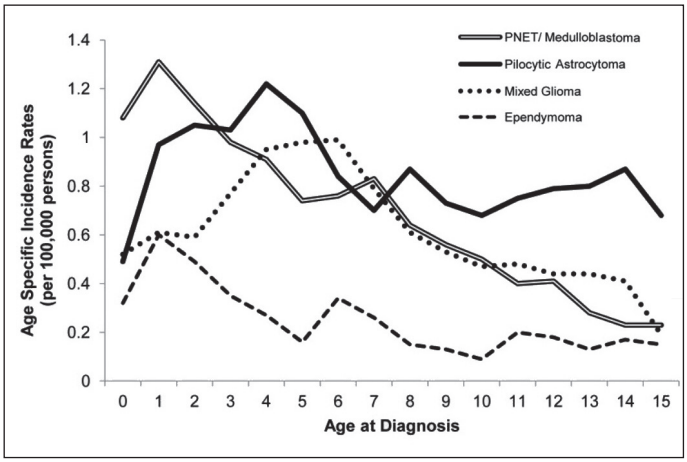

Figure 1: Incidence rates of pediatric brain tumors (from (12); evaluation for the period 1973–2009)

In the following years, the incidence of tumors, which were initiated in the early stage of life, decreases continually because the speed of tumor growth – and thus the time until symptoms occur – varies from individual to individual and depends on many factors: the slower the tumor grows, the later it will be diagnosed (see also Figure 11 in [13]).

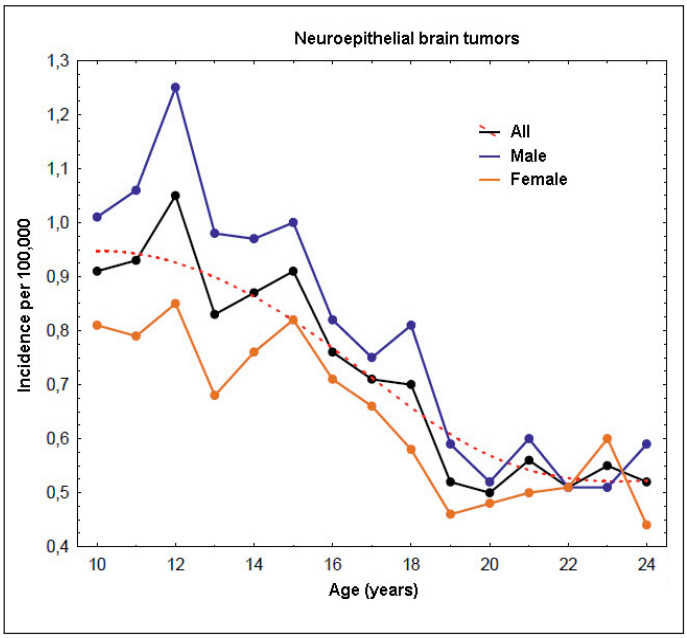

Figure 2: Incidence rate per 100,000 primary neuroepithelial brain tumors (astrocytomas, glioblastomas, oligodendrogliomas, oligoastrocytomas, ependymomas, choroid plexus tumors, gliomas not otherwise specified, and other neuroepithelial tumors) according to sex. Special evaluation of CBTRAUS (USA) for the period 2012–2016 Red line: smoothed trend line (from [5])

Since the majority of brain tumors included in the MOBI-Kids study had developed prenatally or in early childhood, it can be assumed that this declining trend of the age incidence curve will also show in the age group of 10 to 24 years, as has already been suggested in Figure 1. This is confirmed by Figure 2: The statistically reported incidence rates for the period from 2012 to 2016 (Figure 2 from [7]) only include neuroepithelial brain tumors, which exactly correspond to the cases of the MOBI-Kids study.

The incidence trend in Figure 2 does not distinguish between exposed and non-exposed children with a brain tumor, but most likely reflects predominantly exposed children with a brain tumor (in the MOBI-Kids study: 88% of all cases, see also Table 2 in [1]). It is noteworthy that the incidence rate from about 12 years shows a clear declining (!) trend, whereby the strongest decrease occurs between 15 and 19 years.

4.2 Acceleration of tumor growth as a key to interpreting the study results

It has been documented in several studies[14,15] that cell phone radiation causes tumors to grow more rapidly. This applies particularly to early childhood tumors. Kundi et al. write about this observation:

"The first step of a malignant transformation in the course of brain tumor development during childhood and adolescence usually occurs prior to birth. An exposure after birth therefore cannot affect this step. Changes in the occurrence of brain tumors in relation to the use of cell phones can therefore ***only be explained by factors that affect later steps and primarily by changing the speed of tumor growth.****"*[7]

In the MOBI-Kids study, the authors did not rule out this mechanism of action either:

"Our results, however, do not exclude a possible brain tumour growth acceleration effect of wireless phone use." (MOBI-Kids study, p. 15)

If the acceleration of brain tumor growth actually plays a role here, this would only be a convincing explanation if it can predict the trend of the study results qualitatively, especially the numerous odds ratios < 1. Kundi et al. pursue this line of argument with the following considerations:

"It is obvious that, in case of an acceleration of tumor growth, the clinical manifestations will occur earlier and thus the tumor will also be diagnosed earlier. ... Such an increase (in growth rate) would lead to an earlier diagnosis in the studied age range [from 10 to 24 years – author's note] by about 1.5 to 3.5 years."[7] To clearly illustrate the essence of the argument, the following discussion assumes a 2-year earlier diagnosis.

For the incidence trend, a distinction must be made hereinafter between exposed children with an early childhood brain tumor (with an acceleration of brain tumor growth) and non-exposed children (without an acceleration of brain tumor growth): An earlier diagnosis by approximately 2 years means that the incidence trend of exposed children roughly corresponds to the incidence trend in non-exposed children, but shifted (to the "left") by about 2 years toward the younger age, as is shown in Figure 3 for a typical incidence trend adopted from Figure 2.

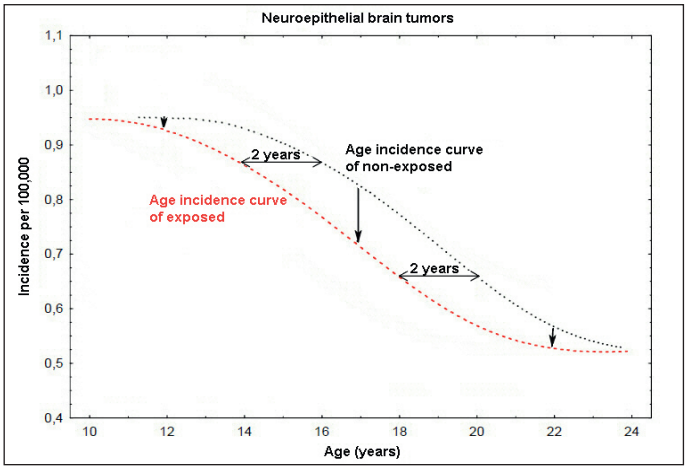

Figure 3: Fictional age incidence curve of neuroepithelial brain tumors in non-exposed children (black line) and shifted by 2 years in exposed children (red line, according to Figure 2). The exposure leads to a clear decrease in incidence across the declining part of the curve (for instance, in the range of 12 to 22 years); at the edges of the curve, the incidence remains largely unchanged.

Examples: When in non-exposed children at the age of 16 an annual rate of about 0.87 brain tumor cases per 100,000 children has been observed (Figure 3, double arrow), this exact number will already be found in exposed children at the age of approximately 14, which is about 2 years earlier.

Accordingly, the incidence rate in non-exposed 20-year-old adolescents, which sits at 0.66 brain tumor cases per 100,000 adolescents annually, will already be found in exposed adolescents at the age of approximately 18 years.

The following becomes clear:
Finding 1: The incidence rate of 14-year-old exposed children (red curve) is equivalent to the incidence rate of non-exposed 16-year-old children (Figure 3, horizontal double arrow).

Finding 2: The incidence rate of 14-year-old non-exposed children (black curve) is higher than the one of 16-year-old non-exposed children because the curve decreases with increasing age.

Conclusion from the two findings: Thus the incidence rate of 14-year-old non-exposed children is above the incidence rate of 14-year-old exposed children. In other words: The incidence rate of 14-year-old exposed children is below the incidence rate of 14-year-old non-exposed children.

In general: Due to the declining trend of the curve, the incidence rate of exposed children for each (fixed) age group is by virtue of this shift below the incidence rate of non-exposed children. This also applies to the mean value of the three age groups, which are summarized in the MOBI-Kids study (vertical arrows).

4.3 Does the acceleration of tumor growth lead to odds ratios < 1?
The relationships discussed earlier allow for a direct prediction of odds ratios. In general, odds ratios do not refer to incidence rates (rate of new diseases), but to differences in prevalence (frequency of disease) between exposed and non-exposed persons. The cases (those with the illness) are generally selected independently of whether they are newly diagnosed or not. Considerations of incidence rates can therefore not generally be associated with odds ratios (OR). The special feature of the MOBI-Kids study is that *"so-called incidence sampling was used, whereby brain tumor cases were registered with the study as soon as they were diagnosed."*[7] This means that all cases of illness included are new cases. In this scenario, it is possible to prove formally that the odds ratios (OR) are approximately equal with the incidence ratio of the exposed (values of red curve in Figure 3) to the non-exposed (values of black curve in Figure 3). Thus we have a simple association between Figure 3 and odds ratios:

- Since the age incidence curves show a declining trend and the red curve of the exposed is therefore through all ages below the black curve of the non-exposed, the ratio of incidence rates exposed / non-exposed and thus the odds ratio for every age group is < 1 as required. (Note: An increasing trend in the age incidence curve would result in odds ratios > 1).

  Example: The incidence in exposed 17-year-olds is ca. 0.72 for brain tumor cases per 100,000 adolescents (red curve); in contrast, the incidence in non-exposed 17-year-olds is ca. 0.825 (black curve). The odds ratio is as follows: OR ≅ 0.72/0.825 ≅ 0.87 < 1.

- Since the age incidence curves for the age range of 15 to 19 years show the strongest reduction, odds ratios in this range are especially far below 1. This agrees with the result of the MOBI-Kids study where odds ratios were significantly below 1, especially for parts of this particular age range.

- At the edges of the age incidence curves, which include the age groups of 10 to 12 years and 22 to 24 years, the difference between both curves is less pronounced: incidence rates or odds ratios are still < 1, but much closer to 1. The results of the MOBI-Kids study also show this.

Consequently, the assumption of an accelerated tumor growth is consistent with the results of the MOBI-Kids study and we can interpret the numerous odds ratios < 1 in a plausible and coherent manner. Furthermore, this acceleration effect must be regarded as the dominant influence of cell phone radiation in cell phone use. Kundi et al. conclude from this result:

"Since brain tumor incidence in this age group decreases with increasing age, ***an accelerated brain tumor growth*** *and thus a diagnosis at an earlier age lead to an overall shift of the age incidence curve to the left and thus to odds ratios < 1, as has been observed in the MOBI-Kids study.* ***This apparent reduction of risk must not be interpreted as such, but must be regarded as a harmful effect of the exposure****."*[7]

This statement seems to be a paradox at first glance: Odds ratios < 1 can usually be interpreted as a *reduced* risk; in this case, however, odds ratios < 1 represent a harmful exposure event and refer to an earlier appearance of clinical symptoms and thus an *increased* risk. The deeper reason for this apparent paradox lies – as discussed in more detail in Section 2 – in the interpretation of odds ratios as a *risk* that is only permissible and appropriate in case-control studies if the damaging event takes place after the exposure to the suspected risk factor. Since, as mentioned earlier, brain tumors in most sick children and adolescents in the MOBI-Kids study had already been present (though undiscovered) before using their own cell phones, nothing can be said

about a causal association between exposure and brain tumor initiation in children and adolescents, and odds ratios < 1 cannot be interpreted in any meaningful way as a reduced "brain tumor *risk*." If one sticks to the interpretation of odds ratios as a brain tumor *risk*, the strange paradox occurs.

Since this new interpretation by Kundi et al. fundamentally questions the widespread interpretation, diagnose:funk itself evaluated the findings once more. Klaus Scheler, board member of diagnose:funk, has written a documentation that goes into more detail about the arguments by Kundi et al. Anybody who would like to learn more about the criticism of the widespread interpretation of the MOBI-Kids study can check out the analyses by Scheler, Kundi et al.[7], and Hardell/Moskowitz[11], all of which are available as downloads at www.diagnose-funk.org/1861.

5. Summary

The arguments against the widespread interpretation of the findings of the MOBI-Kids study and the resulting new interpretation can be summarized as follows:

- For the initiation of tumors due to wireless phone use or wireless radiation exposure, long exposure periods of 10 to 20 years are necessary. An increased brain tumor risk therefore exists predominantly for long-term and heavy users (at least 10 years or at least 1640 hours of cumulative use), as has been demonstrated by previous studies[5].

- Since the MOBI-Kids study only covers the age range of 10 to 24 years, it cannot make any statements regarding the long-term brain tumor risk in exposed young people, also after the age of 24. Only up to 24 years of age, the MOBI-Kids study did not find any increased brain tumor risk.

- For the same reason – long exposure periods – the cause of the majority of included brain tumor cases is found in pregnancy or early childhood at a time when children have not yet used cell phones. The causes for this are largely unknown. The MOBI-Kids study therefore could not have investigated the initiation of brain tumors by cell phone radiation or not in any significant way, and certainly not in any exclusive manner.

- The highest incidence of brain tumors in early childhood occurs in the first years; incidence declines continually thereafter. In the study, the strongest decrease is found exactly in the middle age group between 15 and 19 years (Figure 3).

- Since cell phone radiation cannot have initiated brain tumors in early childhood, it primarily acts on the acceleration of tumor growth after the affected children have started using cell phones. This cancer-promoting effect is consistent with other study results.[14,15]

- Due to the decreasing incidence between the ages 10 and 24, the acceleration of tumor growth leads to odds ratios < 1, which corresponds to the numerous odds ratios < 1 found in the MOBI-Kids study. This provides an appropriate and coherent explanation for the striking result of the MOBI-Kids study for which the widespread interpretation is unable to provide any explanation. Kundi et al. evaluate this result as follows:

  "Based on the findings of the MOBI-Kids study … it is assumed that this [numerous odds ratios < 1 – author's note] *is to be regarded as a* ***clear indication of a harmful exposure effect in terms of an acceleration of tumor growth. This interpretation is particularly strengthened*** *by the fact that* ***the reduction of odds ratios*** *is generally most pronounced in the middle age group* [15 to 19 years – author's note] *and that in this group also statistically significant results were found, which correspond to the age incidence curve [Figure 2]."*[7]

Based on these insights, the findings of the MOBI-Kids study provide no evidence for sounding the all clear; on the contrary: they provide some evidence that brain tumors in early childhood become increasingly symptomatic at a younger age due to the cancer-promoting effect of cell phone radiation.

The key statement of the Federal Office for Radiation Protection (BfS) completely ignores this aspect and overlooks the main considerations on page 15 of the MOBI-Kids study that suggest the mechanism of tumor promotion and its effect on odds ratios. The Federal Office for Radiation Protection (BfS) has mainly copied from the published study without any critical analysis of its own, which suits their wishful thinking and matches their basic attitude guided by thermal dogma. The largely uncritical and one-sided adoption of statements lifted from the MOBI-Kids study has a devastating effect and, in our opinion, is irresponsible.

Conclusion: The Federal Office for Radiation Protection does not live up to its obligation to support prevention; it misses its protection mandate. The office should retract its press release regarding the MOBI-Kids study and publish a correction.

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