

TETRA Masts - No Evidence of Health Effects??

Myths and Facts

Dr G. Blackwell

Myth: “Fears over health effects from TETRA are based on experiments way back in the 70s on dead brain cells. It has proved virtually impossible to replicate the results of those experiments since.”

See, for example, the following extract from Hansard, 10th July 2003, in which the Minister for Crime Reduction, Policing, and Community Safety refers to the Stewart Report in a Commons Debate:

Minister

“In particular, the report looked into work on pulsing signals, which is one of the key areas of concern. It noted that some researchers had found that biological effects could arise from pulsing signals even at weak powers. The experiments were carried out in the 1970s and it has since been virtually impossible to replicate them.”

Fact: As well as two studies in the 70s showing this effect - disturbance of Calcium levels in brain cells - the Stewart Report listed a further **five** studies in the 1980s and 1990s that confirmed this effect from TETRA-type radiation. Against this total of **seven** positive demonstrations of this effect, the Report listed only **four** studies that failed to show it. The NRPB Report on TETRA, one year later, listed only one further study of this effect - another successful replication, in 1999. This brings the totals to **eight** against **four**, a clear two to one majority confirming this potentially very serious health effect. The last of these successful replications was published **just five years ago**.

MP Andrew Mitchell (Shadow Minister for Business) highlighted this discrepancy in the Minister’s statement in a Commons Debate on Telecommunications Masts on 28th January 2004:

Andrew Mitchell MP

“On 10 July, in a House of Commons debate, the Minister for Crime Reduction, Policing and Community Safety told MPs that concern over the possible health effects of Tetra emissions arose from research in the 1970s and that it had since been "virtually impossible" to replicate those research findings. Given that research findings on this subject, listed in the Stewart report and the National Radiological Protection Board report on Tetra, show more successful than unsuccessful replications since 1980 - the most recent successful replication being in 1999 - how do the Government explain her claim?”

No satisfactory response to this question has yet been received.

It’s also worth noting that almost half of those positive demonstrations of this disturbance of brain chemistry were conducted *in vivo* - on **living** brain tissue. Claims that these experiments were all on dead brain tissue are at best erroneous, at worst mischievously deceitful.

Myth: “Recent research conducted at DSTL by Dr John Tattersall, attempting to replicate those earlier results, has failed to show this effect. This proves that there is no such health risk.”

- Facts:**
- 1) One more study by one more researcher is certainly of interest, but it hardly serves to set aside a very substantial majority of previous studies positively demonstrating this effect. Why this one study should carry more weight than, for example, the positive replication in 1999 or even the previous positive replication in 1996 is not at all clear.
 - 2) DSTL (formerly known as Porton Down) is a high-security Government laboratory complex. Research conducted under Government direction and Government supervision, in a top secret Government laboratory, to ‘prove’ a point in which the Government has a very substantial vested interest, is hardly likely to allay public concerns (or, indeed, to prove anything at all).
 - 3) A number of independent scientists have highlighted the fact that this study failed to take account of no less than **three** factors identified in previous studies as being of significance: background magnetic field (affected by, for example, steel benches in a laboratory), temperature, and power density. In this last respect the DSTL study apparently specifically **failed** to test at those power levels at which previous positive findings had been made. This one study is therefore **not** an attempted replication of those previous studies that showed a potential health hazard.

Myth: "Only TETRA handsets pulse, not the masts. So there's no possibility of any health risk"

Facts: 1) The assertion that TETRA masts don't pulse is based on a very narrow definition of the term 'pulsing' - a definition that doesn't fit with most people's understanding of that word, nor does it offer any reassurance as to potential health risks.

It's claimed that TETRA masts don't pulse **only** because the output signal, in its regular up-and-down pattern, never **quite** goes right down to zero. One might well say "Well, the up-and-down pressure in my arteries never quite goes down to zero either - if it did, I'd be dead. But that's a pulse, no question about it." Wrong. According to the definition used by Airwave and official scientific opinion, the blood supply travelling around your body is **not** pulsing.

According to the Airwave/Government-scientist definition, the output from a TETRA mast can be varying regularly from full-on to almost-off - as in fact TETRA mast output does, in a pattern that repeats 17.6 times a second - and it's not pulsing. This is no reassurance health-wise, it's the fluctuation that causes the health risk. A strobe light at a disco is quite capable of causing an epileptic fit even if the light goes bright-dim-bright-dim and not bright-off-bright-off regularly.

2) Even scientists cited by MM02 as endorsing the safety of TETRA don't all agree that the masts don't pulse. On a Radio Scotland interview on May 5th 2003 Alan Preece, Professor of Medical Physics at Bristol University, answered a question on TETRA as follows:

Interviewer:

"what do you say ... to Alison and Paul ... who are going to be living next to one of these masts and are very concerned about it?"

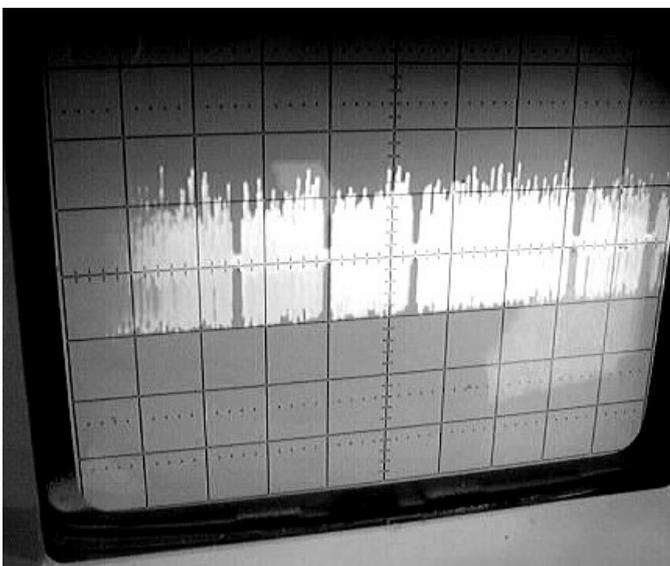
Prof. Preece:

"Right. Well, one of the things is that a TETRA mast actually pulses less than a mobile phone one, and you would need to go to the NRPB study that was done a little while ago which actually demonstrated that though there is pulsing - in fact NRPB says they do not pulse but this is, er, this is actually splitting hairs, I think, because there is a modulation on the TETRA transmission from the mast, so there is a degree of it."

One would be totally justified in questioning why it should be that those scientists whose job it is to protect the health of the public are splitting hairs in a way that appears to favour the industry.

3) The issue of 'pulsing' is anyway a red herring, since the warning in the Stewart Report referred not to 'pulsing' but to 'amplitude modulation' at around 16 Hz as potentially hazardous. It is a common practice for Airwave, establishment scientists and Government spokespersons to shift the ground of the debate to 'pulsing' and then claim that this is not applicable in the case of TETRA masts (based on the narrow non-standard definition referred to above).

The real health issue, then, is the fact that TETRA mast output is amplitude modulated at 17.6 Hz - this fact is not open to question, it is a well-documented design feature of the Airwave system. See the next 'Myth/Fact' entry.



Trace of TETRA mast emissions

Recorded from a mast near Shanklin, Isle of Wight.

Note how the mast output drops almost, but not quite, to zero at regular intervals.

This live recording matches pretty well identically the diagram in the NRPB Report on TETRA (Figure 7) that is labelled as showing emissions from a TETRA mast. That diagram is also marked to show the time for one complete (repeating) sequence as 56.7 msec - that is, 17.6 times a second.

This is the output that is claimed by Airwave and official sources to be 'not pulsing'. It is also claimed to be 'continuous'.

Is this what you would understand by those terms?

Myth: “Output from TETRA masts is not modulated at 17.6 Hz.”

See, for example, the following text from a letter circulated to MPs by Hazel Blears, Minister of State at the Home Office:

“I am aware that some members of the public are concerned about TETRA masts. However the AGNIR report confirms that signals from TETRA masts are not modulated at 17.6 Hz: *“It is notable that the signals from TETRA base stations are not pulsed, whereas those from mobile terminals and repeaters are.”* “

- Facts:**
- 1) Figure 7 in the NRPB Report on TETRA shows clearly that mast output follows a pattern that repeats with a periodicity of 56.7 msec - that is, 17.6 times a second. It is not physically possible to produce a repeating waveform **without** that waveform being amplitude modulated at the repetition frequency. The text following that figure explicitly draws out the presence of 17.6 Hz amplitude modulation.
 - 2) In a circular to local councillors dated November 2002, Airwave explicitly acknowledge that the mast emissions include a component of 17.6 Hz modulation.

Myth: “The power of the 17.6 Hz modulation in mast emissions is far too weak to cause any harm.”

- Facts:**
- 1) The Stewart Report noted that this observed health effect is not a heating effect - it isn't based on the level of energy being absorbed. To dismiss it on that basis is like dismissing the possible risk from a razor blade because it isn't very heavy. No responsible doctor would dismiss the risk of an epileptic fit from a strobe light just because that light used low levels of power.
 - 2) The human brain is an extremely sensitive electronic system. One of the simplest features for an electronic device to register is a rising or falling edge in the wave-pattern. As shown on the previous page (and in Fig. 7 in the NRPB Report on TETRA), mast emissions have very clearly defined rising and falling edges at regular intervals, spanning virtually the full height (= strength) of the emitted signal.

Myth: “A TETRA mast signal cannot pose a health risk because that signal is continuous”

Fact: At risk of being tedious, mast emissions are **only** continuous in the sense of never quite dropping to zero - much as a rope that is 2“ thick in some places and shrinks to the thickness of a strand of cotton in others is continuous. This is **no** protection against health risks. Think of an office strip-light that is faulty, flashing up and down from full-on to almost (but not quite) off. That's what the mast emissions are doing, only at a non-visible frequency. Would it be unreasonable for an office worker not to want to work under that light day after day, week after week? It appears the attitude of Airwave and their supporters would be “What's your problem? The light is continuous.”

Myth: “This calcium disturbance carries no obvious health implications, anyway.”

- Facts:**
- 1) The NRPB Report on TETRA states under ‘Biological Effects’ in its Executive Summary:
“It is recognised that calcium plays an important role in many biological processes, especially in the function of nerve cells.”
This is surely a very clear warning not to mess around with calcium levels in brain cells.
 - 2) There is a substantial body of research, quite unconnected with telecommunications, that links irregularity of calcium levels in brain cells with Motor Neurone Disease. There is also a fast-growing body of evidence of high incidence of Motor Neurone Disease close to masts. One TETRA mast currently under investigation by the Scottish NHS is at the centre of a collection of various ill-health effects, including a exceptional number of cases of this very rare condition for such a small community. The probability of so many cases occurring by chance is virtually zero.

Myth: “If we can't see why it might happen then it probably isn't happening.”

Fact: This must surely take the prize for arrogance, wilful ignorance and un-scientific thinking. Every scientific advance throughout history has started with recognition. that something is happening for which no explanation is yet available. Anyone who doesn't have the capacity for that recognition has no right to call themselves a scientist, and should most certainly not be entrusted with the health and welfare of others in respect of new scientific developments.

Finally

The following is a transcript of an interview with Professor Colin Blakemore, as broadcast on the regional news programme 'South Today' (Sussex and surrounding area) on Thursday 15th April 2004. The whole interview is copied verbatim to avoid any suggestion of quoting out of context.

Professor Blakemore was one of the authors of the Stewart Report and is understood to have authored the section that includes the warning on amplitude modulation around 16 Hz. He is now the Chief Executive of the Medical Research Council. Clearly his views carry substantial weight in Government circles.

The interview concerns the safety of the TETRA system. Passages of particular significance are highlighted in **bold**. It's interesting to consider them in the light of the myths and facts given in the past three pages. One has to ask how these particular statements can be reconciled with the documented facts in relation to the TETRA system and the evidence given in the Stewart Report and the NRPB Report on TETRA, also how assertions like these may have influenced or reinforced Government attitudes.

Interviewer:

Many people believe there are health risks; is there any evidence to substantiate their fears?

Prof. Blakemore:

No, I really think there isn't and certainly no more evidence of any risk from TETRA base stations compared with ordinary mobile phone base stations. You have to keep in mind that the emissions from base stations as felt by people in the street around them or nearby are always hundreds or even thousands of times less strong than the radiation you get from using an ordinary mobile phone. The conclusion of the Stewart Committee was that base stations really should not be considered a hazard.

Interviewer:

So; these are TETRA masts in particular — why are you so sure that they don't pose health risks?

Prof. Blakemore:

The focus of interest on TETRA is because the handsets in TETRA used by the emergency services emit pulses of radio frequency waves, but ordinary mobile phones don't have the same pulsing pattern. **And there was some evidence in the 1970s from experiments that pulsed radio frequencies might have effects on cells and tissues in the body that continuous radiation doesn't have. Now in fact one has to say those studies have not been duplicated in subsequent work, and in any case the effects that were described didn't have any obvious health implications.** But taking a really really fiercely precautionary approach, the Stewart Committee said, well maybe pulsing should be avoided if possible. Well, it's there in TETRA handsets for very very good reasons and I would still stick to the view that there's no evidence of a health risk. **But the really important thing is the base stations don't emit pulses anyway, they emit continuous radiation and at very very low levels as experienced on the ground.** So I really think people should not be worried about a health risk.