Written evidence from Professor Julian Peto (ASB0042)

I was invited to provide this further evidence because the supplementary written evidence from Mesothelioma UK (dated 5 Jan 2022) and Airtight on Asbestos (dated 18 Jan 2022) purports to discredit my remarks to your committee on Dec 15th 2021.

The Mesothelioma UK supplementary evidence is attached below as an appendix with my responses inserted. The Airtight on Asbestos case for immediate action hinges on their statement that "The acceptable level of risk as defined by HSE is one in 1,000,000. So [Prof Peto's estimate that the average lifetime risk at current exposure levels is about] 1/20,000 is 50 times greater than the acceptable risk. We may avoid a future epidemic on the scale of the current situation, but are we certain that future deaths to teachers, children, and others, will be below the acceptable level?" The fallacy in this campaigning polemic is the absurd definition of acceptable risk. An average risk of 1 in a million is less than one death a year in the UK, a reduction in life expectancy of about 10 minutes. There are now over 200 Covid-19 deaths per day, yet schools remain open despite rapidly rising infection rates in children that are likely to lead to a resurgence in older people.

Airtight on Asbestos recommend that the HSE "should assure (rather than assume) buildings are safe, through the requirement for periodic sensitive air monitoring ……[and] should use electron microscopy to measure airborne fibres up to 0.0001 f/cm^3." This applies to all public buildings containing asbestos that cannot be inspected visually, which would include a large proportion of all schools. Their supplementary evidence demands a phased asbestos removal programme beginning with CLASP schools. (CLASP, the Consortium of Local Authorities Special Programme, was a prefabricated building system using large amounts of asbestos that was widely used from 1957 until the late 1970s.) To quote:

1. "The immediate priority is to remove amosite from CLASP schools…..CLASP schools account for roughly 10% of all schools, and anecdotal evidence suggests the majority of teachers killed by mesothelioma worked in CLASP schools."

2. "It is not possible to visually inspect asbestos in some buildings (e.g. CLASP-type schools) where the most dangerous forms of asbestos (amosite – brown asbestos) are…..concealed by panels preventing a visual check. In such buildings it is not always possible to visually identify if asbestos has been disturbed. Only air monitoring can detect this."

My objections to embarking on this nationwide programme of asbestos removal and air monitoring without considering the cost-benefit implications are that it would be enormously expensive, that long-term measurement of airborne asbestos with a precision of 0.0001 fibre/cm^3 in thousands of schools is technically unfeasible, and that current exposures to staff and students are not known and might even be increased by asbestos removal. The HSE could however select a few CLASP schools in which asbestos removal is planned and a random sample of other schools. Systematic long-term air sampling with TEM fibre counting before and after asbestos removal would show both the costs and impact on long-term ambient asbestos levels of the proposal, and would also test the claim that elevated levels are largely confined to CLASP schools.

Our published dose-response results on lung burden and mesothelioma risk, together with further studies on asbestos lung burdens in teachers born since 1975 and young people born since 1995, would provide an estimate of the risk from asbestos in schools over the last 20 years.

My views on measured airborne levels and long-term exposure (i.e. what is actually inhaled) are misrepresented by the Airtight on Asbestos claim that "Professor Peto stated that air measurements will not make a difference to understanding the cumulative risks of exposure for occupants of buildings. This directly contradicts his evidence given to the Education Select Committee in 2013." My concerns include the paucity of good data on long-term airborne measurements, uncertainty over where the samplers should be placed to be representative of what is inhaled, and the possibility that most asbestos is inhaled during occasional heavy exposures that cannot be measured reliably. The pilot studies described above would contribute to a better understanding of these difficult questions.

Appendix Responses by Prof J Peto, including 3 additional references, are inserted in red.

Written evidence from Mesothelioma UK (ASB0037)

5th January 2022

Ref: HSE's approach to asbestos management: Work and Pensions Committee Hearing December 15th 2021

Members of the Mesothelioma UK team watched with interest the House of Commons Work and Pensions Committee hearing on Wednesday 15th December 2021. We were pleased to contribute to the first evidence session following which we submitted supporting information. We thank you for allowing us to submit further evidence which we feel compelled to offer following this second hearing.

This additional evidence is in response to points made by Prof Julian Peto.

i} *There is no useful estimate of exposure to asbestos and therefore risk of mesothelioma except through measuring lungs.*

This was a central claim made by Professor Peto. Recently Prof Peto's team have undertaken the TIPS study which looks at samples of lung material resected from live patients who have either had mesothelioma, lung cancer or pneumothorax.[1,2] The last of these groups is interesting because they are younger and relatively healthy. Prof Peto wishes this research to continue and suggests that it will be possible to pursue groups of interest, such as teachers who have had surgery for pneumothorax. In addition, (at ≈ 10:17.30) he says it is one that can be performed by the HSE. Overall, however, the testing of lung tissue seems to provide useful data and we are sympathetic to Prof Peto's view that this research should be funded to continue. In addition, we understand that the HSE is presenting evidence to the Work and Pensions Committee in February, where the possibility of their undertaking this work could be explored.

ii) *Other claims and attempts to estimate exposure to asbestos and risk of mesothelioma are, therefore, not useful.*

The second claim follows from the first but Prof Peto makes explicit criticism of three other attempts to estimate exposure. The first is the idea of large-scale air monitoring of the sort advocated by Airtight on Asbestos. He dismisses this with an argument that seems vague. It is that we need to know people's 10-year exposure in an environment rather than the amount in the air at one particular time, even if that is several days of monitoring. He quotes no data to support this and doesn't acknowledge the fact that this type of air monitoring is already established and routine in several European countries.

Airtight on Asbestos recommends that "The HSE should assure (rather than assume) buildings are safe, through the requirement for periodic sensitive air monitoring based upon revised risk and priority assessment. The HSE, in line with the best international practice, should use electron microscopy to measure airborne fibres up to 0.0001 f/cm3. These tests should take place when the buildings are in use."

The cost of such a survey even in a single school would be enormous, and could not provide a reliable estimate of the resulting risk to staff and students for several reasons.

1. Such studies of airborne amosite were not done 50 years ago in any environment which resulted in a measurable mesothelioma risk, so the relationship between airborne levels and mesothelioma risk is not known.
2. Most exposures may be from transient disturbances rather than the ambient level. Our results indicate that exposure in buildings fell sharply after 1980 when asbestos was no longer being installed.
3. The HSE has carried out long-term air sampling in a small number of schools and detected no asbestos fibres. Further studies in a few schools known to contain asbestos, sampling both before and after asbestos removal or remediation, should be done before considering widespread air monitoring.

Secondly, Prof Peto dismisses the use of personal histories, where people go back through their occupational and other history to look for exposure to asbestos. He supports this argument with data from the TIPS. He uses an anecdote of a worker whose lungs were heavily contaminated with asbestos but who denied any exposure to it. This weakness with personal history is clearly a problem but it is not one that has stopped such histories being used to form a clinical picture and in legal cases to fight cases for negligent exposure to asbestos by those who subsequently develop mesothelioma. In addition, based on histories provided by relatives or the deceased prior to their death, coroners can and do declare mesothelioma to be an industrial injury even where they have no evidence of asbestos in the lungs and where the person has no history of working in a high-risk industry.

The evidence that self-reported details of asbestos exposure are unreliable is not anecdotal. The primary analyses of our large mesothelioma case-control study[6] were based on a simplified classification which was strongly predictive of mesothelioma risk: carpenter, plumber, electrician, painter, other construction workers, other high-risk occupations, medium-risk industrial work, reported asbestos exposure in a low-risk occupation, and living with an occupationally exposed relative. Further analyses based on our very detailed questionnaire on possible asbestos exposures were published by the HSE.[7] This suggested that self-reported asbestos exposure was not predictive of risk within these broad groups. The fact that lawyers suing for compensation rely on self-reported asbestos exposure from mesothelioma patients is not good evidence that such self-reports are reliable. As almost all mesotheliomas are caused by asbestos and it is likely that most exposures occur at work coroners are probably right to classify them as industrial injuries, but not to attribute them to an anecdotal report of asbestos exposure in a particular employment.

The third source of data is the ONS mortality statistics. Prof Peto acknowledges their usefulness but points out two weaknesses with them. The first is that there can be a 50-year latency between exposure to asbestos and likely death from it. The second is that the ONS only records your last occupation. Prof Peto suggests that this is a problem for some groups, he cited male teachers as an example. We believe the problem to be wider than this example suggests; many women work in

deteriorating public buildings such as schools and hospitals but also have uneven occupational histories such that their last occupation is not that of, say, teacher or nurse.

The limitations of PMRs, which are based on the last occupation as recorded on the death certificate, are well known. They provide a useful indicator of possible occupational risk, particularly for very high-risk jobs, and also for occupations such as farming, medicine or the law in which many people work all their lives. However, as I mentioned those whose left the occupation are excluded and those who previously did other jobs are included. The PMR is thus likely to underestimate the effect of lifelong exposure for very high-risk occupations such as carpentry but may overestimate it for occupations which some people join after higher risk exposure in a previous occupation. Among female teachers in our case control study[7] 39% (7/18) of mesotheliomas and only 8% (3/38) of controls had also worked in other jobs with potential asbestos exposure. Their PMR may therefore be slightly exaggerated. A similar bias was seen in male teachers, with 64% (7/11) of mesotheliomas and 47% (37/79) of controls reporting previous potentially more hazardous employment.

Howie has suggested that a problem in occupational risk is created by the fact that the ONS only records occupation where the individual dies before age 75.[3,4] Prof Peto rejected this claim, suggesting that once we have the data up to that 75 years then we know the trajectory from that point onwards. Howie's point, however, is that those in high-risk industries will have been heavily exposed and be likely to die before 75. Others, such as teachers and nurses, are less heavily exposed and be more likely to die after that age such that their occupation will not be recorded. It is for this reason that the age 75 cut off skews the data against those who work in hazardous environments rather than hazardous occupations.

This reveals a misunderstanding of how PMRs (proportional mortality ratios) are calculated and what they mean. The bias referred to acts only in people at high risk of dying from other causes, because PMRs are based on the proportion of all deaths that are due to mesothelioma. An increase in the death-rate from other causes will therefore reduce the PMR in high-risk groups. Consider the contribution from deaths at age 70-74, for example. Suppose that the probability of dying from mesothelioma in the next 5 years in those who survive to age 70 is 0.01 in asbestos workers and 0.001 in the whole population (a relative risk of 10). If the risk of dying from all causes at age 70-74 is 0.2 in asbestos workers and 0.1 in the whole population their mesothelioma PMR will be (0.01/0.2) divided by (0.001/0.1), which is 5 (half the true relative risk). The mesothelioma PMR for a group such as teachers who do not have higher than average death-rates from other causes will be close to their relative risk at each age, and if their all-cause death-rate is lower than average their mesothelioma PMR will actually be higher than their true relative risk. (NB: PMRs are conventionally reported as a percentage, so a proportional mortality ratio of 5 is reported as 500.)

Prof Peto was dismissive of the Airtight on Asbestos campaign and refers, we believe, to the campaign's paper "Don't Breathe In" [4] which is one of the papers used by the campaign. He questioned why this paper does not refer to his TIPS research. We thought this might be because the papers we have read from the TIPS study do not refer to risk at school or in hospitals which is the focus of the Airtight on Asbestos campaign.

They have not even read the summary of our TIPS report[1] in which we said: "Further data are needed to discover whether asbestos still present in buildings, **particularly schools**, is a persistent or decreasing hazard to workers who disturb it and to the general population, and whether environmental exposure occurs predominantly in childhood or after beginning work." The final sentence of our report was: "We are now recruiting further young pneumothorax cases, to identify those with high lung burdens **so that their schools** and homes can be studied."

Prof Peto questioned why the Airtight on Asbestos campaign makes use of Howie's paper which Prof Peto stated to the committee had not been published in a sufficiently academic journal. We can only assume Howie, who may respond himself, was keen to publish his work in a journal suitable for the Occupational Health areas in which he works.

Professor Peto dismisses as nonsense the claim in Airtight on Asbestos paper that for every teacher that dies of mesothelioma, nine former pupils will die.

What I described as nonsense is the Airtight on Asbestos claim that "the permitted levels of airborne asbestos in the UK can expose a child to 100,000 fibres per day, compared to 10,000 fibres in Germany"[4] and their impractical demand for extensive air sampling in schools to enforce a limit of 0.0001 fibre/ml.

Although this is stated in the paper, it is not the result of work done by the group. It is, instead, a claim from statistical modelling performed in a report by the US Environmental Protection Agency.[5] As such, it can't be summarily dismissed as academically inadequate. Indeed, given the lack of any other modelling of the question of how many pupils are at risk when teachers are at risk, it deserves close attention.

The higher risk to children was addressed in 2013 by the DH Committee on Carcinogenicity, of which I was then a member. We stated that "Because of differences in life expectancy, for a given dose of asbestos the lifetime risk of developing mesothelioma following exposure to asbestos is predicted to be about 3.5 times greater for a child first exposed at age 5 compared to an adult first exposed at age 25 and about 5 times greater when compared to an adult first exposed at age 30." [8] It is not known whether teachers and children inhaled similar amounts of asbestos in schools, but if they did far more than 9 times as many mesotheliomas would probably be caused in children, as most people are not teachers but everyone goes to school.

iii) *The committee should not recommend removal of asbestos from public buildings.*

To support this point, Professor Peto refers to research from the 1980s which suggests that removal of asbestos increases the amount of asbestos in the air and therefore the risk to others. It is noteworthy here that Prof Peto is willing to use air monitoring for evidence (of what happens when asbestos is removed) even though he has dismissed it elsewhere. His suggestions are nonetheless plausible, although they are addressed in other documents and were discussed in the second half of the hearing on this day. In addition, the idea of leaving asbestos in situ has clear theoretical problems. One is how long this policy can be maintained as buildings deteriorate; and as we have noted elsewhere, schools and hospitals are subject to high rates of wear and tear. The second is that, whilst Prof Peto extrapolates a decline in the rates of mesothelioma over time, this must be subject to doubt if asbestos is left in situ in old public buildings. This policy cannot work long-term.

In passing, Prof Peto suggested in addition that removal of asbestos would be damaging to the public purse. Large scale public policy decisions cannot be made in this offhand way. In this regard, there are really two decisions to be made. The first is whether phased removal of asbestos from public buildings, starting with schools, would benefit public health. We believe a strong case can be made in favour of such a policy.

The second is whether the benefit would justify the cost involved. This is a judgement that can only be made through health economic modelling. This is performed in a number of institutions including the School for Health and Related Research (ScHARR) at the University of Sheffield and the York Health Economics Consortium at the University of York.

In summary, we felt that whilst some of Professor Peto's contribution might be supported in terms of the TIPS data, most of his points are unsupported by evidence or are theoretically questionable.

We have shown that the mesothelioma risk is roughly proportional to an individual's asbestos lung burden[2], that national rates declined in proportion to the average lung burden in successive generations born up to 1975[1], and that lung burdens have continued to decline in people born since 1975 who are still too young for their mesothelioma risk to be observed[1]. In striking contrast, Airtight on Asbestos offer no quantitative estimate of the number of mesotheliomas that would be prevented by removing all asbestos from buildings (or the number that might be caused by a resulting transient increase in asbestos levels) to support their campaign.

Thank you for considering this additional contribution from Mesothelioma UK that has been prepared for the charity by Peter Allmark, Senior Research Fellow at Mesothelioma UK's Centre for Research based at the University of Sheffield.

Yours sincerely,

Liz Darlison MBE, CEO Mesothelioma UK

Peter Allmark, Senior Research Fellow, Mesothelioma UK Centre for Research, University of Sheffield

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