ASBESTOS IN SCHOOLS

30th July 2005
Amended 4th January 2006

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BY MICHAEL LEES

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Michael Lees,
Hardsworthy House,
Bradworthy,
Holsworthy,
Devon EX22 7SD

www.asbestosexposureschools.co.uk
e-mail: michael@lees1262.fsworld.co.uk

PAPER A

Teachers' deaths from asbestos exposure

SUMMARY

1. **Mesothelioma caused by asbestos exposure.** My wife died aged 51 of mesothelioma. She had been a primary school teacher for thirty years and had taught in five independent schools and more than eighteen state schools, the majority of which contained asbestos. Mesothelioma is almost always caused by exposure to asbestos and is always fatal.

2. **Teachers and pupils exposed to asbestos.** A detailed investigation has been carried out that has discovered evidence of asbestos exposures of my wife throughout her thirty year teaching career, the evidence also shows that other staff and children were exposed. In one school that my wife taught in all the classrooms contained asbestos insulating board, which contained amosite. It was damaged on a daily basis for many years while the classrooms were occupied.

3. **Typical exposure.** I believe that my wife's exposure was typical of a primary school teacher of her age.

4. **Schools contain large amounts of asbestos.** Asbestos was widely used in the construction of schools particularly during the 1950s, 1960s and 1970s. The asbestos has been damaged over the years through fair wear and tear, accidental damage, maintenance work and vandalism, consequently fibres have been released. Much of that asbestos remains in place to this day.

5. **Asbestos was used in school workshops and laboratories.** Asbestos was used in school laboratories, workshops and domestic science classes. Amongst other applications, this was in the form of bunsen burner stands, wool, cement sheeting, ironing boards, gloves and fire-blankets, all of which were either heated, manhandled, cut or abraded. This would have released asbestos fibres.

6. **Vulnerability to mesothelioma varies.** A person's susceptibility to developing the disease varies considerably, and given the same exposures only a small percentage of people will develop the disease. It is not known who are the most vulnerable.

7. **All types of asbestos used in schools.** All types of asbestos were used in schools. Chrysotile (white asbestos) is dangerous, Amosite (brown asbestos) is 100 times more dangerous and Crocidolite (blue asbestos) is 500 times more dangerous.

8. **Cumulative low level exposures cause mesothelioma.** There is no known threshold for the number of asbestos fibres that can cause mesothelioma. However the chances of developing the disease are greatly increased by large exposures and cumulative low level exposures.

9. **Children most vulnerable.** If a child and an adult are exposed to the same amount of asbestos then the child is far more likely to develop the disease than the adult. If a child of 5 and an adult of 30 are exposed to the same amount of asbestos over the course of a

year, then the child is three and a half times more likely to develop mesothelioma by the age of 80 than the adult.

10. **Long latency.** The latency period from the first asbestos exposure to the appearance of the symptoms of disease is from about ten years to over sixty. Latencies of less than fifteen years are unusual, and latencies of between 20-40 years are common. It must be stressed that these latencies are from the first exposure to asbestos, and any subsequent exposures have a cumulative effect. In theory a single asbestos fibre can cause cell mutation, subsequent fibres also cause mutation and in addition decrease the body's ability to fight the development of cancerous cells. Each small exposure therefore increases the likely-hood of a cancerous tumour developing.

11. **Lack of asbestos management.** Amongst the schools that my wife taught in the standard in the management of asbestos ranged from reasonable to non-existent. At least four of the schools had no asbestos management plan and were unaware of the existence and whereabouts of asbestos. One school had no idea that any asbestos existed at all, let alone that every ceiling, wall and radiator contained asbestos. Because of this maintenance staff, teachers and children inadvertently damaged the asbestos and released asbestos fibres on a regular basis over many years.

12. **America took effective measures in 1979.** Since 1979 the American Government has taken practical steps to ensure the safe management of asbestos in their schools. Whereas in this country we have failed to protect our teachers and children. As a direct result of the actions, and lack of action, by the HSE and the Department of Education, teachers, ancillary staff and children have been exposed to asbestos in schools and many have died as a result. The Department of Education and the Health and Safety Executive have failed in their duty.

13. **Statistics show an unexpectedly high death rate among teachers from mesothelioma.** HSE statistics show that there are an unexpectedly high number of deaths in the teaching profession from mesothelioma. HSE statistics list mesothelioma deaths under 200 occupations which show that between 1980 and 2000 female school teachers had the fourth highest number of deaths from mesothelioma. Female teachers had the fourth highest Proportional Mortality Ratio (PMR) because of their number of deaths from mesothelioma. The only occupations with a higher PMR were Foremen/Labourers, Textile workers and Sewers/Embroiderers.

14. **In a profession where there should be little or no asbestos exposure, teachers have been exposed to significant levels of asbestos.** In the teaching profession one should expect little or no asbestos exposure, and the PMRs and the number of deaths from mesothelioma should reflect the fact, however the opposite is so. The number of deaths and the high PMRs amongst teachers demonstrates that they have been exposed to significant quantities of asbestos, with the consequence that they are dying from asbestos related cancers.

15. **Female teachers' Proportional Mortality Ratio twice that of nurses.** Among female occupations one would consider that nursing and teaching should be comparable in the context of asbestos exposure. However, although the number of deaths in each group is on par, the teacher's PMR is twice as high. It can therefore only be concluded that female teachers have been exposed to considerably more asbestos than female nurses have.

16. **Significant deaths among male teachers.** The numbers of mesothelioma deaths amongst male teachers is also significant. It must therefore be concluded that both male and female teachers have been exposed to significant quantities of asbestos.

17. **Children exposed to asbestos.** Children are particularly vulnerable to asbestos exposure. The HSE will not give an estimate of how many children have, and will, die from mesothelioma as a result of asbestos exposure at school. However if teachers are being exposed and dying then so are their pupils. Any subsequent deaths among the pupils will happen once they have left school and the statistics will record the death under their final occupation and not as the result of asbestos exposures that first occurred at

school. There are considerably more children in a school than there are teachers, and given the number of teachers who have died from mesothelioma, it can only be concluded that a significant number children are exposed to asbestos at school and die as a result.

18. **This paper.** This paper is specifically about the deaths from asbestos amongst teachers, ancillary staff and pupils. It is based on the investigation into my wife's death and the far wider issues that this has raised. The paper has been written after taking expert opinion and after researching articles from acknowledged expert sources. There has been considerable correspondence with the HSE, part of that correspondence has been to establish their policy on asbestos in schools. The HSE recently provided me with my wife's file under the Public Interest clause of the Freedom of Information Act. This gives a valuable insight into HSE thinking and decision making. HSE statistics have been used to assess the scale of the problem of asbestos in schools and relevant extracts are included. This paper is part of a larger document which gives more detail of the various issues covered in this paper.

CONCLUSIONS FROM STATISTICS

19. **Conclusions.** It can be concluded from the statistics that:

- **"The number of deaths from mesothelioma among school teachers is far higher than one should expect in what appears to be a low risk occupation."**

- The HSE have stated in relation to teachers that:
  "**There are too many deaths among a group which are supposed to have had very little asbestos exposure."**

- If one compares teaching with other professions, it can be concluded that:
  A disproportionate number of female school teachers die from mesothelioma.

- The number of deaths among teachers is statistically significant, and therefore it must be said that:
  "**There is a direct relationship between asbestos in schools and teachers' deaths from asbestos exposure."**

- The HSE have not given an estimate of how many children have been exposed by asbestos at school and have died as a result. However if one considers the number of teachers who have died from asbestos related cancers, the greater numbers of children and their particular vulnerability to asbestos, then it is probable that:
  "**A significant number of children are exposed to asbestos at school and die as a result."**

Types of asbestos used in schools

20. **Primary school teacher died from asbestos related cancer. Majority of her schools contained asbestos.** My wife died from mesothelioma. Mesothelioma is almost exclusively a cancer caused by exposure to asbestos,[1] and is always fatal. I have attempted to determine why my wife was killed by asbestos. She was a primary school teacher who's contact with asbestos appeared to be no more than any other woman of her age. I have looked back over the whole of her life, including her thirty year teaching career. As the investigation progressed one common factor kept appearing which was that in the five independent schools and more than eighteen state schools that she taught in, the majority contained asbestos in one form or another.

21. **A High proportion of our present schools contain asbestos.** In 2004 the HSE gave an idea of the extent of asbestos in schools:

    "*Of the approximate 20,400 primary schools and 3,400 secondary schools in the UK, some 13,000 were built between 1945 and 1974, when the use of ACMs (Asbestos Containing Materials) in building was at its peak. Many other school premises would have been refurbished during or since that period, providing the potential for the introduction of ACMs e.g. lagging, ceiling panels, partition walls, sprayed coatings. This suggests that a high proportion of our present schools contain asbestos and represent the potential to release deadly fibres."*[2]

    Much of that asbestos remains to this day. All types of asbestos were used in a huge variety of applications; for walls, ceilings, suspended floors, acoustic insulation/ attenuation, fire insulation, loft insulation, damp insulation, storage heaters, pipe/boiler lagging, roofs, window sills, guttering, floor tiles, doors, blackboards[3], banisters and sanitary-ware amongst many other applications.[4] By 1976 approximately 5,000,000 tons of asbestos had been imported into the United Kingdom.[5] There are three types of asbestos that have been used commercially, crocidolite, amosite and chrysotile, all of them have been used in schools.

22. **Crocidolite.** Crocidolite was used for most applications either loose, sprayed or contained in building boards and sheeting. [6]Loose crocidolite was used as loft and floor insulation. Until 1962 it was the most common sort of asbestos sprayed on columns, beams and the underside of roofs as fire protection, acoustic, thermal and damp insulation, it continued to be sprayed to a lesser extent until 1971, however other kinds of asbestos continued to be sprayed until 1974. The boards were used for heat insulation, and fire protection, being either millboard or insulating board (AIB). As a cloth the asbestos content was about 100%, and it was used for thermal insulation, curtains, oven gloves, fire blankets, aprons and lagging. In one year alone 500 tons were used in the manufacture of cloth.[7] Crocidolite was also manufactured into asbestos cement used for roofs, walls, guttering, drinking water pipes[8] and cisterns, windowsills, worktops and draining boards. Because of its particular resistance to chemicals it was commonly used as a work surface in school chemistry and biology classrooms.[9] In 1964 alone 3,500 tons were used in asbestos cement

[1] HSE press release E077:03-15 May 03
[2] HSE Asbestos Campaign- Education Sector. Background to the Education Sector Initiative. Nov 04
[3] US Environmental Protection Agency (EPA) Asbestos in Schools "Where can Asbestos be Found?"
[4] HSE MDHS 100 Surveying, sampling and Assessment of Asbestos-containing Materials.
[5] Asbestos R. Howie.
[6] Unless otherwise stated all information on the use of asbestos was extracted from HSE Method for Determination of Hazardous Substances MDHS 100 Table 1
[7] Problems arising from the use of Asbestos. Memorandum of the Senior Medical Inspector's Advisory Panel. Ministry of Labour 1967. Table 2
[8] HSE Working with asbestos cement HSG 189/2 1996 p 3
[9] US EPA How to Manage Asbestos in School Buildings Ch 2 page 5,6 Jan 96

products.[10] Its use in millboard continued until 1965, in cement products until 1969, and in lagging until 1970. (NB: Crocidolite was first used in millboard in 1896)

23. **Amosite.** Amosite was widely used in many similar applications including, lagging, thermal slabs, and blocks, some of which contain 85% amosite. It was used for thermal insulation including sprayed coatings, 7000 tons being applied in 1964 alone.[11] It was extensively manufactured into insulating boards used in classroom ceilings, interior walls, acoustic attenuators and fire doors. Amosite was used to produce about 130 million square metres of Asbestos Insulating Board.[12]As a cloth the asbestos content was about 100%, and it was used for thermal insulation, curtains, oven gloves, fire blankets, aprons and lagging. It was also used in a wide variety of asbestos cement products including roofing, worktops, water-pipes, cisterns, window sills, draining boards, tiles, roller skating rinks, fencing etc. In one year alone 1000 tons were used in the manufacture of moulded plastics[13]used for, batteries, banisters, lavatory seats etc. Its use in manufactured products continued in this country until 1980 or 1983, 200,000 tons being imported just between 1954 and 1963[14]. Its importation was not prohibited until 1985.[15]

24. **Chrysotile.** Considerably more Chrysotile was imported into this country than the others kinds of asbestos, and it was used in most of the applications that the others were, being the most common type used in asbestos cement products. However in addition it was also used in asbestos cloth, ropes, asbestos paper, felt, cardboard and tape, thermoplastic and PVC flooring and underfelt for carpets and linoleum. Its use in mastics and floor tile cement ceased in 1992. Ceiling finishes such as Artex contained asbestos and were applied until 1984, and its use in roofing felt ceased in the same year. Its widespread use in cement products and car/lift/machinery brakes, fan belts and clutches continued until 1999. Its use is still permitted in certain applications including gaskets and washers.[16]

25. **Asbestos cement. Difficulty in visually identifying type of asbestos.** It is normally difficult to determine the type of asbestos contained in a material by visual examination. It can be identified by expert sample analysis or else identification can be made if the date of manufacture, the identity of the product and the name of the manufacturer is known. I was told by one headmistress that her school was safe as it only had asbestos cement roofs which did not contain the harmful kind of asbestos.[17] This is a popular misconception that asbestos cement is “Safe” as it only contains “White” asbestos. Asbestos cement can be easily damaged, and as it weathers it releases considerable quantities of asbestos fibres, this is relevant with roofs as the asbestos precipitates out on drying, however considerable numbers of fibres are also released from drinking water cisterns and water pipes. [18] As an example of its use it is known that the water supply pipes for some RAF married quarters were asbestos cement.[19] The asbestos in asbestos cement products is most likely to be chrysotile, but as has been seen many thousands of tons of crocidolite and amosite were also

[10] Problems arising from the use of Asbestos. Memorandum of the Senior Medical Inspector’s Advisory Panel. Ministry of Labour 1967. Table 2
[11] Problems arising from the use of Asbestos. Memorandum of the Senior Medical Inspector’s Advisory Panel. Ministry of Labour 1967. Table 2
[12] Howie “Asbestos”
[13] Problems arising from the use of Asbestos. Memorandum of the Senior Medical Inspector’s Advisory Panel. Ministry of Labour 1967. Table 2
[14] HSE Working with asbestos cement HSG 189/2 1996 p 3
[15] Asbestos (Prohibition) Regulations 1985
[16] Unless otherwise stated all information extracted from HSE Method for Determination of Hazardous Substances MDHS 100 Table 1
[17] Name withheld but available/ Lees 24 May 01
[18] Incidence of cancer amongst lighthouse keepers exposed to asbestos in drinking water. Andersen, Glattre, Johansen Cancer centre of Norway. Institute of Epidemiological Cancer Research. American Journal of Epidemiology vol 138, 1ssue 9 682-687. Mesothelioma: cases associated with non-occupational and low dose exposures. Hillerdal Occup Environ Med 1999; 56 505-513
[19] MAR/2711/3/ORG RAF Marham Station Health and Safety Officer/Lees 29 Mar01

used. Chrysotile is less dangerous than the other types of asbestos, but it can still cause mesothelioma,[20] it is often contaminated by tremolite, which has an even greater propensity in causing the disease. [21] As has been seen above some asbestos cement contains purely amosite and crocidolite, and it is difficult to tell which it is by appearance alone.

26. **Use of asbestos in school craft, science, home economics. In higher education workshops and laboratories.** Asbestos was used in school workshops, laboratories and home economics classrooms in the form of asbestos wool, heat mats, paper, bunsen burner tape, fire-blankets, saucepan stands, hair dryers, ironing boards, and asbestos sheeting, all of which was either man handled, heated, abraded, cut or drilled. Crocidolite, amosite and chrysotile were used in the manufacture of fire blankets, curtains, gloves and aprons until 1960, after that the vast majority used was chrysotile. Students cut and drilled asbestos cement sheeting in school workshops.[22] The asbestos cement sheeting, draining boards, ironing boards, saucepan stands and extraction hoods were manufactured with all types of asbestos until 1969. Crocidolite in particular was used in chemistry and biology laboratory work surfaces because of its particular resistance to chemicals.[23] Amosite and chrysotile were used until 1980, and chrysotile alone until 1999. Although all kinds of asbestos were used in asbestos cement products chrysotile was the most common kind. Crocidolite and chrysotile were used in radiators, boiler, oven, furnace and flue sealing until 1970 although only chrysotile has been used since then.[24]

27. **In 1966 DES knew of dangers but allowed its continued use.** In 1966 the DES were made aware of the dangers of asbestos by the Head of the Medical Inspectorate of Factories who specifically advised them that asbestos wool and sheeting should no longer be used in school science laboratories and workshops.[25] However against his expert advice it was not banned, indeed DES publications were still recommending its use in school workshops in 1968.[26] Eight years later in 1976 they acknowledged that asbestos continued to be used in craft, science, home economics, car maintenance and building classes.[27] In 1986 they again acknowledged that it remained in use in vocational and higher education establishments workshops, and in addition its use continued with fire blankets and as insulation in pottery furnaces.[28] The relevant Department of Education files have been obtained from National Archives, and copies of the Factory Inspectorate reports have been made available. The involvement of the Department of Education, the Factories Inspectorate and the HSE are detailed in Paper D

28. **Precautionary approach. Preventative measures must be taken**. The Factories Inspectorate report of 1966 acknowledged that more research and epidemiological studies had to be undertaken over many years before many of the answers could be provided about asbestos. They gave a warning that in the interim a precautionary approach had to be adopted:

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[20] Doll, Peto Asbestos effects on health of exposure to asbestos . HSE 1985.J. McDonald. Armstrong. Edwards, Gibb, Lloyd ,Pooley, Ross, Rudd Case referent study of young adults with mesothelioma Annals of Occupational Hygiene vol 45 no 7 p513-518 2001. Hodgson. Darnton The quantative risks of mesothelioma and lung cancer in relation to asbestos exposure. Annals of Occupational Hygiene. Vol 44. No 8 p565- 601 2000 . Hansard 2 Apr 98column 599 Angela Eagle Average lifetime risk of mesothelioma per million men exposed to chrysotile. HSE confirms white asbestos remains a threat. HSE press release E010:02 5 Feb 02

[21] Mortality in a cohort of vermiculite miners exposed to fibrous amphibole in Libby, Montana. McDonald, Harris, Armstrong. Occupational and Environmental Medicine 2004; 61; 363-366. Case Referent Survey of young adults with Mesothelioma: Lung Fibre Analysis JC MacDonald, BG Armstrong et al Ann of Occup Hyg Vol 45 no 7 p517

[22] Department of Education Special Services D. Jones Memo 12th Jan 67

[23] US EPA How to Manage Asbestos in School Buildings Ch 2 page 5,6 Jan 96

[24] MDHS 100

[25] Dr Lloyd Davies, DES file asbestos in schools 1966-68 National Archives

[26] DES pamphlet 53 Safety at school p38,42 DES file asbestos in schools 1966-68 National Archives

[27] DES Administrative memo 7/76. 2 July 76

[28] Department of Education and Science 3/86. 15 Aug 1986

"Of necessity, preventative action must precede absolute proof of the relative hazards of different sorts of asbestos…….. While such studies are proceeding the only safe course is to eliminate the escape of asbestos dust into the air."[29]

As has been seen this was precisely the approach that the Factories Inspectorate recommended to the Department of Education, and yet they chose to ignore it.

Release of asbestos fibres

29. **Asbestos fibres released.** For many years asbestos was used in school laboratories , workshops and domestic science rooms. It was cut, drilled, manhandled and heated and consequently would have released asbestos fibres to be breathed in by the pupils, teachers and ancillary staff. In addition considerable quantities of the Asbestos Containing Materials (ACMs) were used in the construction of school buildings where they remain to this day. Over the years they have been damaged through fair wear and tear and vandalism, in addition exterior ACMs have deteriorated through exposure to the elements.[30] Building and maintenance work has also damaged the ACMs, and such activity can release considerable quantities of asbestos fibres.[31] It is also frequently overlooked but the simple act of handling, dropping or hitting AIB can release high levels of asbestos fibres.[32] Although the front of the panel might be painted or encapsulated it is most unlikely that the reverse face and sides will be, therefore fibres released will accumulate in any void and eventually filter through any cracks or openings.

30. **Lack of asbestos management allows fibre releases in schools**. Many schools have not had adequate systems to manage their asbestos, some have not even been aware of the whereabouts or extent of asbestos in their premises. (Paper B,C,D) One of my wife's schools was not even aware that any asbestos existed at all, let alone that every classroom, corridor and hall ceiling was AIB which contained amosite. The column panels were asbestos, and all the storage heaters contained asbestos. (Paper C) There had been constant leaks which had involved structural work to the roof and girders and the complete replacement of the flat roof which contained asbestos.[33] One winter the hall roof and ceiling collapsed under the weight of snow and had to be rebuilt. [34]Maintenance and building work was carried out while the classrooms were occupied and storage heaters were dismantled and removed by "men in space suits" while the classrooms were occupied. Because the building and maintenance work was not carried out under controlled conditions significant quantities of asbestos fibres would have been released. The HSE consider that exposures from maintenance work is the most likely cause of mesothelioma in a school. [35]

31. **Surveyors; "Asbestos in schools generally not in good condition**." An asbestos surveyor told me that, in all the years that he had been in the business, he had only been asked to survey one independent school, and in that one school the ACMs were not in a good condition. In the state schools that he had surveyed about half of the asbestos was not in a good condition, especially where AIB was used as pin-

[29] 1966 Annual report of HM Chief Inspector of Factories on Industrial Health.
[30] HSE Methods for the determination of hazardous substances MDHS 100 Jul 01
[31] HSE A comprehensive guide to managing asbestos on premises. HSG227 2002. MDHS 100. HSE IND(G)223(l)8/96 C500 Managing asbestos in workplace buildings. HM Principal Inspector of Health and Safety Central/ Local Government. Education and Research Unit, Parkes/ Lees 2 Jul 02
[32] C.A.Veys BMJ 1996;313;615-619 7 Sep. ABC of Work Related Cancers. Mesotheliomas. HSL Jun 05 JS2003802. Concentration of airborne respirable fibres released from AIB by drawing pin damage.
[33] Managing director building contractor. Name withheld but available 14 Aug 02. Former teacher, name withheld but available 29 May 01
[34] Former teacher, name withheld but available 29 May 01
[35] HSE Principal Inspector for Education, Parkes/Lees 2 Jul 02. 4 Jul 04. 16 Aug 02. HSE Asbestos an important message to schools (undated) issued with CAW 2002

boards.[36] Another surveyor stated that there is a lot of asbestos in schools and it is generally not in a good condition, in one school the asbestos cladding on a steel column had been badly damaged with compass holes.[37] A manager of an asbestos removal firm told me that the AIB in a local school was in a dreadful state with some AIB walls kicked in.[38] The practice of kicking AIB is highlighted in the HSE document "Asbestos –an important message to schools."[39] The HSE provided me with a report that pupils in a school were "kicking the asbestos dust around like snow unaware that the dust on the floor was dangerous."[40] These cases match all the other evidence, and I have no doubt that they are not isolated cases. It is clear that asbestos fibres have been released in schools. In some cases low levels of fibres have been released but this has happened frequently and over the course of many years. Sometimes the fibre releases have been considerable. The HSE acknowledge that school caretakers have been identified as a particular group at risk from asbestos exposure.[41] However in addition teachers, ancillary staff, and children have been exposed, some of them over the course of many years. Some have died and many remain at risk.

32. **Schools' Minister "Asbestos has not always been dealt with in a professional manner."** The Minister of State for Schools wrote to the General Secretary of the NUT and stated:

    "*Asbestos in schools has not always been dealt with in a professional manner."*[42]

33. **Significant minority have still not established complete control of asbestos.** The HSE Head of Asbestos Policy confirmed this view by stating:

    "A High proportion of our schools contain asbestos and represent the potential to release deadly fibres….. Whilst many authorities have been managing their asbestos risks effectively for many years, HSE believes a significant minority have still not established complete control of asbestos on their premises."[43]

34. **My wife' exposures are typical of other teachers**. Children's levels of asbestos contamination could be estimated. My wife's exposures were low level but they were frequent, and in one school were daily and lasted for many years. Paper E gives evidence that her exposure was typical of other teachers and classroom assistants. An estimate could be made of the likely exposure levels of the children.

Health risks from asbestos

35. **Chrysotile is dangerous however amosite is 100 times more dangerous and crocidolite is 500 times more dangerous**. As has been seen considerable quantities of ACMs have been used in schools whether in the structure of the buildings or used in the laboratories and workshops. Large quantities of chrysotile have been used which if released and breathed in can be dangerous,[44] however much of the asbestos is amosite which is 100 times more dangerous than chrysotile and other ACMs contain crocidolite which is 500 times more dangerous.[45] All the ceilings in one of my wife's schools contained amosite and they were regularly damaged. (Paper C)

[36] West Country asbestos surveyor. Name withheld but available 17 Nov 04
[37] West Country asbestos surveyor. Name withheld but available 17 Nov 04
[38] West Country asbestos removal firm. Name withheld but available 23 July 01
[39] HSE Asbestos an important message to schools (undated) issued with CAW 2002
[40] HSE Principal Inspector for Education, Parkes 14 Apr 02. Assume asbestos is in buildings, S. Learner.
[41] HSE Asbestos an important message to schools (undated) issued with CAW 2002
[42] Freedom of Information Act, Public Interest Clause Milliband/Sinnott draft letter (?) Aug 04
[43] HSE Head of Asbestos Policy Briefing to the Local Authority Forum LAFORUM/04 Nov 04
[44] HSE Asbestos. Effects on health of exposure to asbestos. Doll, Peto 1985 P18, 35 Hodgson Darnton 2000, The quantative risks of mesothelioma and lung cancer in relation to asbestos exposure. P585 Table 11
[45] HSE Hodgson and Darnton 2000 Ann Occup Hyg vol 44 no 8

36. **Susceptibility to mesothelioma varies**. School Governors have expressed the opinion that the kind of exposures suffered by my wife could not cause mesothelioma otherwise most primary teachers would suffer the same disease.[46] They are wrong however for that is a false premise. Even among asbestos workers with a heavy exposure only a small percentage of them develop mesothelioma,[47] because each individual's susceptibility to the disease is different,[48] and only relatively few people will develop the disease. Regrettably however it is not known which people are amongst the most vulnerable.[49]

37. **Cumulative small exposures**. Since 1960 experts have concluded that even the smallest exposure to asbestos can cause mesothelioma,[50]and most studies consider that there is no minimum threshold exposure for mesothelioma.[51] However the risk is greatly increased with either a large exposure over a relatively short time or else repeated small exposures.[52] Some studies have agreed that a relatively brief exposure can cause mesothelioma, although they consider that the risk is low.[53] An eminent Chest Physician explained the process that takes place when an asbestos fibre enters the pleura, and how subsequent exposures have a cumulative effect until mesothelioma develops. A single asbestos fibre can in theory cause a mutation of a single cell from which a malignant tumour can develop. Each additional exposure can therefore cause cell mutation, and each exposure lowers the body's natural ability to combat mutating and mutated cells. This lowering of the body's defensive system is dose related and the effects are cumulative.[54] Consequently the greater the dose and the greater the number of times that exposure takes place then the greater the risk of developing a tumour.

38. **Low level exposure to crocidolite, amosite and possibly chrysotile can cause mesothelioma.** In 1960 a paper was first published that gave examples of mesothelioma being caused by environmental, or low level, exposures to crocidolite.[55] The 1964 Working Group on Asbestos concluded that crocidolite definitely caused mesothelioma but they stated that *"It cannot be concluded that only this type of fibre is concerned with the tumours*."[56] In the 1964 the Chief Inspector of Factories report acknowledged that mesothelioma had occurred in non-occupationally exposed people, and that it was likely that in the past mesothelioma had incorrectly been diagnosed as lung cancer.[57] Their report in 1965 acknowledged that mesothelioma had occurred after low levels of asbestos exposure *"At astonishingly low degrees*." [58] This was backed up by a report which cited exposures in the home

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[46] Names withheld but available

[47] Tyler asbestos workers mortality experienced in a cohort exposed to amosite. 98. Hillerdal Occup Environ Med 1999, 56: 506

[48] Hodgson Darnton 2000, The quantative risks of mesothelioma and lung cancer in relation to asbestos exposure. P583 Cancer research UK What's new in mesothelioma p3. Hillerdal 8 Mar 99 Mesothelioma low dose exposure. Mesothelioma Information line Robinson/Lees 3 Oct 01

[49] Cancer research UK What's new in mesothelioma p3. Hillerdal 8 Mar 99 Mesothelioma low dose exposure. Kamp, Weitzman molecular basis July 99. Hodgson Darnton 2000, The quantative risks of mesothelioma and lung cancer in relation to asbestos exposure. P587

[50] Casey M. Vaughan CJ et al Cancer 1960; 13; 449-460. 34. Rock Carling Memorial Lecture Dr Richard Doll. 1967. The Lancet Jun 67 p1311.HSE Asbestos. Effects on health of exposure to asbestos. Doll, Peto 1985 P33

[51] Hodgson Darnton 2000, The quantative risks of mesothelioma and lung cancer in relation to asbestos exposure. P583. McDonald etal 1989. Rodelsperger et al 1999. Rogers et al 1991

[52] Dr Rudd QBD Edgson v Vickers 1994. Kamp, Weitzman, the molecular basis of asbestos induced lung injury July 99. HSE Managing asbestos in premises, INDG223 10/03. Ann Occup Hyg vol 44 no 8 p465 Hodgson Darnton 2000, The quantative risks of mesothelioma and lung cancer in relation to asbestos exposure. P577-579

[53] Hodgson Darnton 2000, The quantative risks of mesothelioma and lung cancer in relation to asbestos exposure. P583

[54] Dr Rudd QBD Edgson v Vickers 1994.

[55] Casey M. Vaughan CJ et al Cancer 1960; 13; 449-460. 34

[56] Working Group on Asbestos and Cancer New York 1964

[57] 1964 Annual report of HM Chief Inspector of Factories on Industrial Health.

[58] 1965 Annual report of HM Chief Inspector of Factories on Industrial Health.

being associated with mesothelioma.[59] In 1967 the Factories Inspectorate concluded that it was most probable that amosite could also cause the disease[60] This was confirmed by studies of asbestos related deaths among shipbuilders in WWII which were published in 1972 and 1979.[61] Later studies concluded that even low levels of amosite were capable of causing mesothelioma.[62] In 1998 the World Health Organisation stated in relation to the levels of chrysotile needed to cause cancer *"No threshold value has been identified for carcinogen risks."*[63]

39. **Cumulative low level exposure in a school**. The investigation discovered evidence of my wife's exposure to asbestos at school and, although perhaps no large exposures took place, there were at times constant small exposures for every working day for years. (papers C,D,E) Over the course of her thirty year teaching career these exposures gradually had a cumulative effect with the result that mesothelioma developed. It is known that her exposure was typical of other teachers.

40. **Long latency of mesothelioma.** Mesothelioma has a long latency from the first exposure to the disease developing, therefore the deaths happening now are the result of asbestos exposures that happened some years ago. An initial exposure from some years before could initiate the process, and then subsequent exposures would have a cumulative effect, as each exposure happened the chances of a tumour developing would increase. The causative potency of each exposure is considered by some to have an equal effect and the earlier exposures are no more or less causative than later exposures. Others consider that earlier exposures have a greater effect. [64]All are agreed that the greater the intensity and longer the duration of exposure then the greater contribution it makes. This cumulative process has been assessed as continuing to have an effect on tumour growth until about ten years before the onset of symptoms.[65] Consequently any investigation has to look back over the whole of a person's life to identify any likely occasions when exposure could have occurred.

41. **Latency periods vary considerably.** Each individual is different and their susceptibility to developing mesothelioma varies significantly as does their individual period of latency,[66] for instance my wife's mesothelioma developed rapidly,[67] and such increases in tumour doubling can indicate a comparatively short latency.[68] It is also considered likely that the larger the exposure then the shorter the latency,[69] and that environmental exposures, which tend to be lower, will cause a longer latency than occupational exposures.[70]

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[59] Newhouse M.L Thompson H Mesothelioma of pleura and peritoneum following exposure to asbestos in the London area. Br Ind Med 22,P 261 1965.

[60] Seikoff I.J. Churg J. Hammond EC New England J.Med 1965, 272, 560. O'Donnell WM. Mann RH. Grosh JL Cancer NY 1966 19, 1143.`xx1966 DES file asbestos in schools. Head of Medical Inspectorate of Factories, Dr Lloyd Davies. Gilson JC Wagner JC Nature Land 1967, 213, 1170.

[61] Tyler asbestos workers; mortality experienced in a cohort exposed to amosite. J. Levin et al Occup environ med 1998 55 155-160. Schikoff IL, Hammond EC, Churg J. Carcinogenicityof amosite asbestos. Arch Environ Health 1972 25 183-186.

[62] Hodgson Darnton 2000, The quantative risks of mesothelioma and lung cancer in relation to asbestos exposure. P583

[63] International Programme on Chemical Safety. (1998) Environmental Health Criteria 203 Chrysotile asbestos. WHO Geneva

[64] Edgson v Vickers QBD 1994 expert witnesses Dr Britton. P525

[65] Edgson v Vickers QBD 1994 expert witnesses Dr Rudd, Dr Britton. P524

[66] Macmillan cancer relief. Mesothelioma Information service. Robinson/ Lees 22 Nov 01. 3 Oct 01

[67] Mrs Gina Lees NDDH/RD&E medical notes, x-rays and CT scans. Mar 2000 to Sep 2000

[68] Dr Rudd/ Lees 7 May 03

[69]Bianchi.Brollo Ramani Asbestos exposure in malignant mesothelioma of the pleura; Ind health 2001;39 161-167 . p164 Table 7

[70] Malignant mesotheliomas due to environmental exposure to asbestos.S.Metintas. M. Metintas Chest (American College of Chest Phtsicians) 2002; 122:2224-2229 p 2228

42. **Latencies from 10 to 60 years.** The latency from first exposure to the symptoms of mesothelioma has been recorded in a few cases as being from less than 10 years[71] to over 60, but opinion on the average latency varies considerably between different studies and experts. This variation depends on the quality of the patients history of exposure, the sample of those people studied, the size of the study, the type of asbestos inhaled and the expert's experience and the weight he places on the available data to make his conclusions. A leading British doctor considers that the average range in latencies is from 20 to 35 years and he readily accepts latencies of ten years[72] as does the leading British cancer advice body Cancerbacup.[73] Whereas a study of Turkish villagers gave a mean latency of 59.2 years. [74] The people in this Turkish study had inhaled mainly tremolite and some chrysotile, which would inevitably explain the longer latencies as the fibres are less potent than amosite or crocidolite. In a separate paper the same authors quote an average latency for occupational exposure of 30-40 years derived from three other studies, and that gives a more balanced picture.[75] The HSE consider that the average latency is between 35-41 years.[76]

- **First exposure in a school may be overlooked.** It must therefore be borne in mind that in the case of multiple exposures, the first exposure, and perhaps the one that initiated the process, could have happened many years before and passed unnoticed. A heavy exposure some years later might therefore be blamed in isolation and the earlier exposure might be overlooked. This is particularly applicable to childhood exposures. Therefore one has to take into account all these factors when determining the likely latency and the occasions that the exposures occurred.

43. **Latency depends on the individual and the type of exposure.** It should always be remembered that if a person has been exposed to asbestos it is unlikely that they will develop mesothelioma at all. Amongst groups of asbestos workers who have been highly exposed only about 5% develop mesothelioma.[77] However if a person is susceptible to developing the disease then if they were exposed in 1966 they will have either died by now or, as the latency can be so long, the mesothelioma has yet to developed. A person dying in 2005 could have been first exposed in childhood and a process initiated which was regularly added to by subsequent low level exposures, and until about 1995 each exposure contributed towards the development of the tumour. It is also possible that a person dying from mesothelioma in 2005 could have been first exposed as late as 1995. It purely depends on that individual and the type of exposures they have experienced. It must be remembered that 1966 is the year that the DES were made aware of the dangers of asbestos, and hence measures could have been taken from that date to prevent subsequent exposures in schools.

44. **Other cancers caused by asbestos.** Mesothelioma is the only cancer specifically associated with asbestos, however asbestos can cause other cancers such as lung cancer and it is thought cancer of the larynx, gastro-intestinal tract and kidney.[78] In 1947 substantial evidence was available that asbestos causes lung cancer[79]and by 1964 this was confirmed beyond doubt.[80] Views about how many lung cancers are

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[71] Cancer Bacup understanding mesothelioma June 03. Hillerdal Occup Environ Med 1999, 56:p507. S. Booth,E Weaver Lancet 22 Feb 86 .Dr Rudd/ Lees 7May 03. CA Veys BMJ 1996 313: p615. Edgson v Vickers QBD 1994

[72] Edgson v Vickers QBD 1994 expert witness Dr Rudd. P524. Dr Rudd/ Lees 7 May 03. CancerBacup

[73] CancerBacup Understanding mesothelioma Jun 03

[74] Women and mesothelioma. Dr Smith. American College of Chest Physicians 2002.. G. Hillerdal M.Metinas. S. Metinas. Eur respir 1999 13:523-526

[75] Malignant mesotheliomas due to environmental exposure to asbestos.S.Metintas. M. Metintas et al Chest 2002; 122:2224-2229

[76] MacDonald Head of asbestos Policy HSE/ Lees 30 Apr 04

[77] FOI act Public Interest clause. Comments on Lees family and OC 265/48 Inadvertent exposure R.Hermanns HSE Medical Inspector.undated (Aug? 04)

[78] HSE Asbestos. Effects on health of exposure to asbestos. Doll, Peto 1985 P2. Tyler asbestos workers; mortality experienced in a cohort exposed to amosite. J. Levin et al Occup environ med 1998 55 155-160

[79] Merewhether 1947 Annual report of HM Chief Inspector of Factories on Industrial Health.

[80] 1964 New York Conference on Biological Effects of Asbestos. Deputy Chief Medical Inspector of Factories.

caused by asbestos vary, although the number is thought to be at least on par with the number of mesotheliomas.[81] The incidence varies with the type of asbestos, the length and duration of exposure, and the person's age and smoking habits, with an excess of lung cancers being recorded of up to five times. The HSE's best estimate is that asbestos probably causes one or two lung cancers for each current mesothelioma.[82]Although it is generally considered that the exposure levels have to be greater to cause lung cancer than they have with mesothelioma,[83] small exposures may cause the disease.[84] The HSE used to state that bronchial carcinoma is linked to high exposure for a long period of time,[85] however they have updated their view by stating that studies suggest that very small exposures can cause lung cancer.[86] Such studies generally agree that large levels of chrysotile are required, but demonstrate that the level of exposure from amphiboles (mainly amosite, crocidolite, tremolite) can be very low and still cause the disease.[87] The Scottish Executive state that lung cancer can only occur after heavy occupational exposures, however they have not stated the study on which they have based their conclusion.[88] It is generally acknowledged that the latency periods can be less than those of mesothelioma and symptoms can occur as little as five years after exposure, although longer latencies are more usual, with an average of perhaps 20 years.[89]

45. **Lung cancer risks increased by smoking.** It is considered that smoking does not increase the chances of developing mesothelioma, however it can greatly increase the chances of developing lung cancer after an asbestos exposure.[90] The US Government state in an EPA schools' publication:

    "The risk of contracting lung cancer as a result of exposure to asbestos increases if the worker is a cigarette smoker. Cigarette smokers are 50 times more likely to develop lung cancer than the normal, non smoking population."[91]

    This increase in risk has been assessed by an acknowledged leading expert as 30-50 times greater when associated with an exposure sufficient to cause lung cancer, and with a heavy exposure sufficient to cause asbestosis the risk is increased to 75-100 times.[92] The HSE agree that smoking interacts with asbestos to cause lung cancer,[93] although they state that the risk only exists after high exposure levels and that if a person stopped smoking the synergistic effects would be tiny.[94]

[81] HSE Asbestos. Effects on health of exposure to asbestos. Doll, Peto 1985 P8
[82] Annals of Occupational Hygiene 44:6 484-487,2000 R. Howie. HSE press release E010:02 – 5 Feb 2002. HSE Asbestos related lung cancers uk/statistics/caus/dis/lungcan 05
[83] Hodgson Darnton 2000, The quantative risks of mesothelioma and lung cancer in relation to asbestos exposure. P585 Table 11
[84] HSE Asbestos. Effects on health of exposure to asbestos Doll Peto 1985
[85] HSE 265/48 (part 3) Inadvertent exposure to asbestos: advice for general practioners.
[86] HSE Asbestos related diseases statistics FAQ March 2005
[87]Hodgson Darnton 2000, The quantative risks of mesothelioma and lung cancer in relation to asbestos exposure. P583
[88] Scottish Executive, Scottish Centre for Infection and Environmental Health (SCIEH) Guidance note asbestos GN15-06/2001
[89] HSE Asbestos. Effects on health of exposure to asbestos. Doll, Peto 1985 P3.
[90] British Medical Journal 313(7057): 615 1996 C.A. Veys p8
[91] EPA How to Manage Asbestos in School Buildings. Asbestos Health Risks Ch 3 page 11
[92] HSE Asbestos. Effects on health of exposure to asbestos. Doll, Peto 1985 P3
[93] HSE Asbestos related diseases statistics FAQ March 2005
[94] HSE Head of Asbestos Policy/ Lees 30 Apr 04. FIO Public Interest clause. HSE meeting "The Lees family" Head of Asbestos Policy MacDonald ,Hetherington, Shepherd, Johnson ALU Cairns ALU, Hermanns ALU, Piney FOD Health Team, Johnson, Haberfield, Nash.19 Mar 04

DEATHS FROM ASBESTOS IN SCHOOLS

46. **Statistics list teachers' deaths from mesothelioma**. The HSE publish statistics that list deaths from mesothelioma classified under the occupation noted on the death certificate.[95] There are two groups of teachers; professional teachers and teachers' assistants and childcare occupations. What they have in common is that they all work with children in a classroom or playgroup (Extracts from the statistics are in the annex to this paper, they are listed in tables entitled Stats 1, Stats 2 etc).

47. **During a ten year period 79 primary, secondary school and special education teachers died of mesothelioma.** My wife's death from mesothelioma was most certainly not unique amongst other teachers. Between 1991 to 2000 a total of 73 primary and secondary school teachers died from mesothelioma. 79 qualified teachers died if teachers not elsewhere classified, and special education needs teachers are included. If qualified teachers in higher education are included then there were a further 49 mesothelioma deaths. If education assistants, nursery nurses and childcare related occupations are included then the total number of mesothelioma deaths was 145.[96] (Stats 2,3,4,9)

48. **US statistics highlight primary school teachers mesothelioma deaths.** In 2003 a US Government publication listed occupational deaths from mesothelioma. They stated:

    "*Occupations associated with significantly elevated mesothelioma mortality in 1999 include: plumbers, pipefitters and steamfitters, mechanical engineers, and* ***elementary school teachers."***[97]

49. **Why should teachers die from asbestos exposure?** The question must be asked: Why should there be so many deaths among teachers from mesothelioma when it is a profession where there should be little or no exposure to asbestos? One can but draw the simple conclusion that they have indeed been exposed to asbestos. The other papers within this document give the evidence of my wife's exposure in schools over the course of her thirty year teaching career. Her exposure appears to be typical of other teachers, and such exposures are eminently capable of causing mesothelioma.

50. **Children exposed to asbestos.** What is of more concern, is that if teachers have been exposed to dangerous levels of asbestos, then so have the children in their classes. It has to be borne in mind that in state schools in England each school teacher statistically has 17.7 children in their classroom,[98] these figures will differ in other parts of the UK and in special and independent schools. However the fundamental point is that for every teacher there are many children. It is also most relevant that every single person attends school for at least 10 years of their life.

51. **Children are the most vulnerable to asbestos exposure.** In 1985 Doll and Peto estimated that once an asbestos exposure has taken place then the risk of developing mesothelioma increases dramatically with the passage of time. (Time since exposure to the power 3 for a brief exposures and to the power of 4 for continuous exposure)[99] Consequently if a thirty year old teacher and a five year old child are equally exposed to asbestos, with frequent low level exposures over the course of a year, then the child is three and a half times more likely than the teacher

[95] HSE Mesothelioma occupation statistics 1980-2000
[96] HSE mesothelioma statistics Tables 7, 8
[97] US Department of Health and Human Services. Work-Related Lung disease Surveillance Report 2002 Selected Highlights page xxvii
[98] National statistics. Statistics on Education. Schools in England 2004 Edition. Summary of main statistics. P7.
[99] Doll and Peto Doll, Effects on health of exposure to asbestos HSE 1985 p 34

to develop mesothelioma by the age of eighty.[100] Some experts consider that as well as being more vulnerable to developing the disease because of their longer life expectancy, children are more at risk because of the fact that they breath more often, they are more active and they are closer to the floor where asbestos dust accumulates.[101] Others consider that in addition because of their physical immaturity,[102] their cellular growth and metabolic rates are more rapid making them more vulnerable to any carcinogen including asbestos.[103] The Government recognised forty years ago that children are particularly vulnerable to developing mesothelioma from asbestos exposure,[104] and this remains the opinion held by experts[105] including the HSE.[106]

52. **US estimates of deaths among children from school asbestos exposure**. In 1980 the American Environmental Protection Agency (EPA) wrote a report which estimated that the numbers of deaths from school exposures could be from 100 to 7,000 with a best estimate of 1,000 over the course of thirty years. 90% of these deaths they considered would be amongst the children. [107] A later paper estimated that 1000 deaths would occur as a direct result of exposures amongst school children where asbestos was used in the walls of their schools.[108] The estimate was based on the assumption of about 8,500 schools containing friable asbestos, with 3,000,000 pupils.[109] However by law all schools were then required to identify the extent of their asbestos, and those results showed that 34,800 schools contained friable asbestos and 15,000,000 pupils were at risk. A five fold increase in the children at risk.[110]

53. **Different estimates on likely fibre release.** In 1984 a report by the Canadian Government, and in 1985 an HSC report by Peto and Doll considered that the risk from asbestos in buildings was less than the American study had found. However the HSE and Canadian conclusions were based purely on taking ambient air sampling in buildings, whereas the American EPA study had taken ambient air samples but considered that if reviewed in isolation they gave an inaccurate picture of the actual conditions. They therefore took into account the particular vulnerability of children and the special circumstances of schools and estimated the likely fibre release taking into account the peak exposures due to classroom activity, and the deterioration and vandalism of ACMs within the classroom, and they based their conclusions on that.[111]

54. **The HSE has no estimates on childhood asbestos exposure deaths.** The HSE were recently asked to give an estimate of the number of children dying as a result of asbestos exposure at school in this country, however they declined to give an estimate.[112] In addition they confirmed that there are no specific statistics that give a

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[100] Howie/Lees 27 Apr 05

[101] American Academy of Pediatrics Asbestos exposure in schools. 1987 Pediatrics vol79, 2,Feb 87 p302

[102] HSE Asbestos campaign- Background to Education Sector Initiative Nov 04

[103] Harvard Medical School, Massachusetts General Hospital Dr C.Oliver Jan 05

[104] National Archives. Head of the Medical Inspectorate of Factories 1966- 68 DES file Asbestos in schools.

[105] US EPA Asbestos in schools updated 2005. American Academy of Pediatrics Asbestos Exposure in schools Vol 79 no 2 Feb 87. R.Howie, Croner issue 38 26 Feb 03,

[106] The Quantative risks of mesothelioma and lung cancer in relation to asbestos exposure. HSE Hodgson , Darnton 2000 p581. HSE Asbestos campaign- Background to Education Sector Initiative Nov 04.

[107] EPA report Health effects and magnitude of exposure of Asbestos containing materials in school buildings. 560/12-80-003

[108] Hillerdal Occup Environ Med 1999, 56:509. P Landrigan A population of children at risk of exposure in place. Ann NY Acad Sci 1991 643. American Academy of Pediatrics Asbestos exposure in schools Committee on Environmental Hazards 1987.

[109] EPA report Health effects and magnitude of exposure of Asbestos containing materials in school buildings. 560/12-80-003

[110] EPA Fact sheet AHERA 1986 statement EPA Administrator 23 Oct 86

[111] Doll, Peto Effects on health of exposure to asbestos HSE 1985. Royal Commission on matters of health arising from the use of asbestos in Canada. Ontario Ministry of the Attorney General 1984 vol 2. American Academy of Pediatrics Asbestos exposure in schools Committee on Environmental Hazards 1987. Pediatrics vol79, 2,Feb 87 p303

[112] HSE Statistics Branch, Darnton/ Lees 8 Feb 05

likely figure.[113] As can be seen above, there is a method of calculating the proportional increase in risk of developing mesothelioma of children over adults. Hence as the number of deaths is known amongst teachers an estimate could be made of how many children have, and will develop mesothelioma from asbestos exposures they experienced at school. The Americans acknowledged there was a problem, and for the last twenty five years have taken effective measures to protect their children, whereas it appears as if our Government has avoided acknowledging the extent of the problem. Perhaps that partially explains why the measures that they have taken so far to protect our children have been woefully inadequate. The role of the DfES and the HSE is detailed in paper D.

55. **More than twenty five years ago USA ensured effective management of asbestos in schools.** In 1979 the EPA introduced a voluntary school asbestos programme which drew up guidelines. In 1982 this was made mandatory where schools had to carry out asbestos surveys and notify teachers and parents of potential exposures.[114] In 1984 the American Government allocated considerable funds in loans and grants for the removal of asbestos from schools. In 1986 it introduced specific laws to ensure the safe and effective management of asbestos in their schools, [115] and at the same time the EPA introduced an extensive training programme to ensure that the laws could be effectively implemented.

56. **Ireland will remove all asbestos from schools.** Recently the Republic of Ireland took the decision to treat schools as a special case and remove the asbestos from their buildings. They acknowledge that normally asbestos in good condition can be left in situ, however recognise that children are particularly vulnerable from asbestos, and hence the removal of asbestos is the only option.[116] Their Government has allocated significant funds so that this can be achieved. [117]

57. **Refurbish all secondary schools and half of primary schools.** In 2004 the Government launched the Building Schools for the Future Initiative (BSF) which will refurbish or rebuild all secondary schools in the country over the next 15 years. In 2005 they announced that they would also rebuild or refurbish half of the primary schools. A complete rebuild or total removal of all of the asbestos is the only way to permanently solve the asbestos problem. If this occurs and the programme is carried out effectively it will eventually result in children being safe from asbestos in state schools. As the programme will not be complete until 2020 every school must implement effective asbestos management plans in the interim. However if asbestos is left in the schools that are being refurbished then it will always have to be effectively managed. To ensure that this happens, the DfES and the Government must provide the guidance and resources so that schools can manage their asbestos, and the HSE must implement effective measures to regulate the management and the refurbishment.

58. **Independent schools are not part of the initiative.** No funds have been allocated for refurbishing or rebuilding independent schools,[118] which will mean that their asbestos will remain in situ unless the school authorities raise the necessary funds for removal. Any asbestos that is left in situ will always have to be effectively managed.

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[113] HSE Head of Asbestos Policy, MacDonald/ Lees 5 Jan 05

[114] American Academy of Pediatrics Asbestos Exposure in schools.Peadiatrics Vol 79 no 2 Feb 87 p304.

[115] US Asbestos Hazard Emergency Response act (AHERA) 1986. EPA Asbestos in schools Rule (40 CFR Part 763 subpart E)

[116] Parliament of Ireland Seanad Debate Official Report Minister of State at the Department of Education and Science 1 Mar 2000. European Agency for Safety and Health at Work- Ireland 11 Apr 05.

[117] Republic of Ireland. Department of Education and Science. 11 Apr 05 Asbestos Remedial Programme, School Building Projects. Parliament of Ireland Seanad Debate Official Report Minister of State at the Department of Education and Science 1 Mar 2000.

[118] DfES Daniels/Lees 11 Jul 2005

Teachers deaths shown in statistics

59. **HSE statistics.** Tables within the HSE mesothelioma statistics are based on the person's occupation recorded on their death certificate. Relevant extracts from those statistics are included at Annex 1. During the investigation there has been considerable discussion with the HSE about these statistics and pertinent details of the discussions are included as part of this paper.

60. **Mesothelioma deaths.** Mesothelioma is almost always caused by exposure to asbestos[119] and is always fatal. The statistics list the numbers of deaths from mesothelioma in each occupation. The number of mesothelioma deaths therefore gives an indication of the level of asbestos exposure experienced by people employed in each occupation.

61. **"Expected" deaths.** The term "Expected Deaths" is used in the HSE tables. It is a misleading term for all it shows is the numbers of mesothelioma deaths that can be "Expected " in each profession based purely on a mathematical calculation of proportions.[120] What it does not show is the number of deaths one would expect in each profession based on the assumed risk from asbestos exposure. Consequently the figure given for "Expected deaths" among teachers is comparatively high purely because there are a lot of teachers, and not because one should expect teachers to be exposed to a lot of asbestos.

62. **Proportional Mortality Ratio (PMR).** The Proportional Mortality Ratio (PMR) is shown for each profession. The number of people in each occupation is different, therefore a large number of deaths from mesothelioma in an occupation employing very few people would be more remarkable than the same number of deaths in an occupation employing many thousands of people. A system has been devised to reflect this, and that is called the Proportional Mortality Ratio. It gives a comparison of mesothelioma deaths between occupations. A PMR of 100 shows that the number of mesothelioma deaths in a particular occupation is average for all the occupations. However that includes the high risk professions such as ship-building and the construction industry where asbestos exposure is known to occur. In those occupations the number of actual deaths is understandably far higher than the number of "Expected Deaths" and consequently the PMRs are far higher than 100.

63. **Female with no asbestos exposure would have PMR of 36.** One would presume that a teacher should suffer little or no asbestos exposure,[121] and hence the number of deaths that one would expect should be in line with people who have had no exposure or only background levels of exposure. The HSE mesothelioma statistics have a section entitled "Interpretative issues"[122] which describes a hypothetical scenario where a female with no asbestos exposure would have a PMR of about 36. (this figure is derived from the number of cases where exposure is deemed as "background")[123] This figure must always be borne in mind when considering the PMRs of any of the occupations.

64. **Female teachers' deaths are three times higher than one would expect in a profession with little or no asbestos exposure.** The PMR of 100 given for female school teachers shows that the number of deaths is average

[119] HSE press release E077:03 HSE publishes updated work related mesothelioma death statistics– 15 May 2003 para 1 Notes to Editors.
[120] HSE Statistics Branch Darnton/ Lees 22 Oct 04
[121] HSE Statistics Branch Darnton/ Lees 22 Oct 04
[122] HSE Mesothelioma occupation statistics male and female deaths aged 16-74 page 5 interpretative issues.
[123] P5 Interpretative issues Mesothelioma Occupation Statistics.

for all occupations and hence the level of exposure is the average for all occupations. (using the Southampton coding)[124](Stats 5) What it certainly does not show is that the level of exposure is nil or at background levels, for that PMR would be 36. What it does show is that there has been a considerable level of asbestos exposure among female school teachers. The number of deaths is almost three times higher than one should expect in an occupation where the asbestos fibre levels should be no more than that of normal background levels.

65. **Male teachers' deaths far exceed the number that one should expect in a profession with little or no asbestos exposure.** The same interpretative issues gives a PMR of 6 for men with a hypothetical zero exposure. (This figure is less than that of females purely because the total number of male mesothelioma deaths is far greater than that of females, and the number of background cases represents a smaller proportion of the whole.)[125] Male teachers were usually the ones who taught science and workshop skills, and their greater number of deaths resulting from those exposures is perhaps reflected in these figures. It is also possible that in the past some male teachers might also have been employed in the high risk professions before becoming teachers, their deaths would therefore be recorded under this, their final profession. This is more likely in higher education. In the Southampton tables the actual PMR of male teachers in higher education is given as 121 and for other male teachers as 57.[126] When one considers that these PMRs are formulated from a comparison with other occupations, including high risk ones such as shipyard workers and builders, one can see that male teachers' deaths are respectively 22 times, and 10 times higher than they would have been if there had been no exposure. It can therefore be concluded that male teachers' deaths from mesothelioma far exceed the number that one would expect from an occupation where there should be minimal or no asbestos exposure. (Stats 10)

66. **Among 900 female occupations, primary and secondary school teachers have the sixth highest number of deaths from mesothelioma.** The HSE statistics giving occupational mesothelioma deaths lists 900 female Standard Occupational Classification (SOC) occupations. In a ten year period 25 female primary teachers died of mesothelioma and 3 female secondary teachers died. If one compares the mesothelioma deaths amongst all the occupations then female primary and secondary teachers have the sixth highest number of deaths. [127] (Primary and secondary teacher numbers have to be combined because of possible errors on death certificates)[128]

67. **Among 90 female occupational groups teachers and related childcare occupations have the fourth highest PMR from mesothelioma.** The 900 SOC occupations are grouped into slightly more than 90 groups of similar occupations. From 1991-2000 among female occupation groups with the greatest number of mesothelioma deaths "Labourers and fitters" and "Textile workers" have the highest PMRs.[129] This can be accounted for because of the known asbestos contamination occurring in these occupations. Sales assistants and then teachers/ education assistants/ childcare related occupations are the next greatest. One might question why sales assistants have such a high PMR, however that is not within the direct scope of this paper. The figures are confirmed by the HSE tables which list occupations under the Southampton coding. About 200 occupations are listed with mesothelioma deaths between 1980-2000. Female school teachers' PMR is also the fourth highest.[130] The fact that female teachers rank so high in mesothelioma deaths

[124] HSE Mesothelioma occupational statistics 1980-2000 Table 2 and 6
[125] HSE Mesothelioma occupation statistics male and female deaths aged 16-74 page 5 interpretative issues.
[126] HSE Mesothelioma occupational statistics 1980-2000 Table 1
[127] HSE Mesothelioma occupational statistics 1991-2000 Table 8
[128] HSE Statistics Branch Darnton/ Lees 22 Oct 04
[129] HSE Mesothelioma occupational statistics 1991-2000 Table 8
[130] HSE Mesothelioma occupational statistics 1980-2000 Table 6

is remarkable, especially as one considers that each death is the result of asbestos exposure. (Stats 6,7,8)

68. **American mesothelioma statistics highlight elementary school teachers**. The disproportionate number of mesothelioma deaths amongst school teachers is not unique to this country. As has been seen the latest American mesothelioma statistics highlight elementary school teachers as having *"A significantly elevated mesothelioma mortality."*

69. **Male teacher deaths from mesothelioma.** SOC classification lists 45 male primary and secondary school teachers who died from mesothelioma between 1991 and 2000. In higher and further education a further 48 teachers died, if other teaching professionals and education assistants are included then a total of 97 male teachers died from mesothelioma.[131] (Stats 9) Generally male deaths from mesothelioma are considerably greater than those of females. This is not because the male anatomy is more susceptible to mesothelioma, it is because males are more involved in occupations that disturb asbestos fibres, in addition they are more likely to take part in DIY and in consequence are liable to disturb ACMs. Perhaps some of these deaths might be accounted for by asbestos exposure experienced in a former high risk occupation. However what is most relevant is that historically males rather than females normally taught science and technology in schools and further education colleges. In addition the pupils studying science and taking part in workshop activities were more likely to be male.

70. **Explanation of occupational codings**. Southampton codes only list teachers under teachers in higher education and teachers not elsewhere classified (nec). Teachers assistants etc are therefore not included in these totals. The totals for 1981 are also not included because of civil servant industrial action. The Standard Occupational Classification coding (1990) breaks down the occupations into greater detail, but only came into force in 1991. It lists each teaching occupation under separate headings and in two groups:

- **Group 230 Teaching Professionals:** University and polytechnic teaching professionals, higher & further education teaching professionals, secondary (and middle school deemed secondary) teaching professionals. Primary (& middle school deemed primary) & nursery teaching professionals, special education teaching professionals, other teaching professionals nec.
- **Group 650 Childcare and related personal services.** Playgroup leaders, nursery nurses, educational assistants and other childcare and related occupations nes.
- The only difference between the groups being the teacher's qualifications, the age of the people that they teach, or the disabilities of the children that they teach. It is agreed that some University, polytechnic, higher and further education teachers will work with adults, however the majority of teachers work with children in classrooms, laboratories, workshops or playgroups. The concern is that too many teachers, classroom assistants and childcare related occupations are dying from asbestos exposure, and each and every one of them has a similar job in as much as they look after children.

71. **Total mesothelioma deaths amongst teachers and related occupations.** The Southampton codes list a total of 182 teachers and University lecturers who died of mesothelioma between 1980 and 2000.[132](Stats 16) The SOC classifications list a total of 145 teachers, university lecturers and related occupations who died of mesothelioma between 1991 and 2000.[133] (Stats 4,9,11)These are the deaths which can be directly attributable to asbestos exposure, however it must not be forgotten that there are other cancers caused by asbestos, but they will not be recorded as such.

[131] HSE Mesothelioma occupation statistics male and female deaths aged 16-74 1991-2000 Table 7
[132] HSE Mesothelioma occupation statistics male and female deaths aged 16-74 1980-2000 Table 5,6
[133] HSE Mesothelioma occupation statistics male and female deaths aged 16-74 1991-2000 Tables 7,8.

72. **Increasing teacher's deaths from mesothelioma.** The number of teachers dying from mesothelioma has been increasing over the years. The increase in deaths amongst females in primary and secondary education has been some fourfold since 1980.[134] Male primary and secondary teacher deaths have more than doubled, and the deaths among males in higher education have increased fourfold[135]. (Stats 12,14,15)

73. **Comparison of female teachers and nurses.** It is useful to make a comparison between female occupations as they are less likely than males to have been involved in any former high risk occupations, and they are also less likely to have carried out DIY. Therefore a comparison of the PMRs from another female occupation can be used to determine whether teachers have been disproportionately exposed to asbestos. Female teachers can be compared with female nurses as both are professions in which a similarly large numbers of females are employed.[136] In addition one would imagine that the risk from asbestos exposure in both professions should be minimal. However the statistics show that since 1980 the PMR for female primary and secondary school teachers dying from mesothelioma has been 100 and nurses 50.[137] The teachers' PMR is twice that of nurses. As there is a direct correlation between asbestos exposure and mesothelioma one must conclude that the asbestos exposure amongst teachers has been about twice that of nurses. (Stats 12,13) It can therefore be concluded that compared to a similar profession, a disproportionate number of female school teachers have died from mesothelioma.

CONCLUSIONS

74. **Conclusions.**

- It can be concluded from the statistics that:
  "The number of deaths from mesothelioma among school teachers is far higher than one should expect in what appears to be a low risk occupation

- The HSE have stated in relation to teachers that:
  "**There are too many deaths among a group which are supposed to have had very little asbestos exposure."**

- If one compares teaching with other professions, then it can be concluded that :
  A disproportionate number of female school teachers have died from mesothelioma.

- The number of deaths among teachers is statistically significant, and therefore it must be said that:
  "**There is a direct relationship between asbestos in schools and teachers' deaths from asbestos exposure."**

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[134] HSE Mesothelioma occupation statistics male and female deaths aged 16-74 1980-2000 Table 4
[135] HSE Mesothelioma occupation statistics male and female deaths aged 16-74 1980-2000 Table 3
[136] Total number female primary and secondary teachers 395,282. Total number of female nurses 578,269.Teacher numbers; DfES annual survey 618g, 727-tla 98/99. National assembly of Wales stats 3 survey Table 19,21. Teacher statistics for Scotland Table 9, 10, 1999. Independent schools England and Wales DfES 727-tla statistics of education 1999 edition. Scottish Executive statistics 2003 census Table 14 2003. Nursing and Midwifery Council statistics 2002
[137] HSE Mesothelioma occupation statistics male and female deaths aged 16-74 1980-2000 Table 4, 6.

- The HSE have not given an estimate of how many children have been exposed by asbestos at school and have died as a result. However if one considers the number of teachers who have died from asbestos related cancers, and the greater numbers and the vulnerability of children, it is probable that:
  "**A significant number of children are exposed to asbestos at school and die as a result."**

DEBATE OVER STATISTICS

75. I stated in my original paper Asbestos Exposure in Schools (14th June 2004) that "**A disproportionate number of female primary school teachers die from mesothelioma."** This statement was based on the HSE occupational mesothelioma statistics.

76. **HSE statistics misclassification of teachers.** On reading this statement the HSE Statistics Branch wrote to me saying that that their teacher statistics are inaccurate. They stated that this is because some death certificates list the occupation as school teacher, but do not specify whether the person was a primary or secondary teacher. Consequently the female deaths are arbitarily added to the primary teacher totals and male deaths are added to the secondary total.[138] The HSE have not stated how many death certificates this has involved.

77. **Minister of State for Schools "Mortality rate for female teachers is broadly in line with the average for the whole of the working female population, ie there is no higher risk for female primary school teachers."** The HSE Head of Asbestos Policy [139] also wrote to me and said that my statement was not borne out by facts. In addition he wrote to the NUT and the Department of Education reiterating the same opinion. The Minister of State for Schools[140] wrote to the General Secretary of the NUT stating that "the mortality rate for female teachers is broadly in line with the average for the whole of the female working population, ie there is no higher risk for female primary school teachers."

78. **Misleading impression.** I think that the HSE Head of Asbestos Policy and the Minister are pedantically playing with words so as to leave a misleading impression, when the whole tenor of my argument was that in an apparently safe occupation, too many teachers are dying from asbestos exposures. Nothing has changed that makes me alter that basic premise.

79. **HSE admit errors in their calculations .** After receiving my first paper the HSE Statistics Branch e-mailed the DfES and the Head of Asbestos Policy with arguments to prove my statement wrong and included their calculations concerning teachers deaths to prove their point.[141] There were a series of fundamental errors in their calculations, which would have had an effect on their conclusions. The Statistics Branch subsequently accepted

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[138] HSE Statistics Branch Darnton/ Lees 22 Oct 04
[139] HSE Head of Asbestos Policy MacDonald/ Lees 23 Aug 04
[140] NUT Fawcett 6th Oct 04 reference to letter from Minister of State for Schools Milliband. HSE file on Mrs Gina Lees released under Public Interest clause of FOI Act draft letter David Milliband /Steve Sinnott 2004/0043423PODM Aug 04
[141] E-mail HSE Statistics Branch McElvenny /DfES 20 Aug 04.

that they had made those errors. [142] It must be presumed that the HSE, and the Minister had in part based their conclusions on these flawed Statistics Branch calculations.[143]

80. **My error in using Full Time Equivalent numbers.** I accept that I had also made an error in teacher numbers in my initial calculations as I had used the Full Time Equivalent (FTE) figures for part time and occasional teachers, rather than using the actual headcount. I therefore recalculated my figures. This recalculation did not make a significant difference.

81. **Wording of my statement amended.** The fact that the HSE have cast doubts on the accuracy of their statistics which allocate teachers as primary or secondary, has made me alter the wording of my statement, although my basic supposition remains the same. The Minister for Schools and the HSE Head of Asbestos Policy dismissed my original statement. I have therefore re-examined the evidence and all the available statistics and, having compared school teachers with the other occupations, my conclusions are as follows:

- **"The number of deaths from mesothelioma among school teachers is far higher than one should expect in what appears to be a low risk occupation."**

- **"A disproportionate number of female school teachers die from mesothelioma."**

NOTES ON STATISTICS

82. **The majority of female mesothelioma deaths are not included in occupational statistics.** The number of female occupational deaths from mesothelioma listed in the statistics is less than the actual number, and probably substantially less. The exclusion of this data is for the following reasons:

- **Substantial number of female occupational deaths not included in statistics.** The HSE statistics give 456 non-working female deaths between the ages of 16-74 in 1991 to 2000.[144](Stats 1) Perhaps one could expect that some females have never worked in an occupation, in which case it raises the separate, but very serious question about why should so many women have died from asbestos exposure at home? . Some will have retired and perhaps because of this no previous occupation has been included on their death certificate. Some inevitably will have been exposed at school when they were children. Others will have been exposed by cumulative low levels of asbestos released by damage to ACMs within their homes. Some will have been exposed because of their husband's occupation or by the fact that a high risk factory or shipyard was located nearby. It is probable that not all of the deaths can be accounted for because of such exposures. The explanation for the discrepancy is partially explained by the explanatory notes in the statistics which state that "Only those deaths where the occupation given on the death certificate was that of the deceased were included in the analysis. This resulted in a substantial proportion of female deaths being excluded since the occupation given on the death certificate may often - particularly for deaths in the earlier part of the period - be those of the woman's husband." [145] As 1.87% of the total female population are

[142] HSE Statistics Branch Darnton/Lees 7th Oct 04 ,11th Oct 04
[143] E-mail HSE Statistics BranchMcElvenny /DfES 20 Aug 04.
[144] HSE MESO01 Death certificates mentioning mesothelioma. Compared with HSE Mesothelioma occupational statistics Table 8.
[145] HSE Mesothelioma occupation statistics male and female deaths aged 16-74 page 3

primary and secondary school teachers[146] and the PMR of female primary and secondary teachers is 100,[147] it is inevitable that a significant number of those women, with no occupation recorded on their death certificates, would have been teachers.

- **Deaths over 74 not included in occupational statistics.** There are also serious gaps in the statistical data as no occupational statistics are included about women and men over the age of 74. When one considers the long latency of mesothelioma, 603 deaths of women over 74 during this period would have a significant effect on the statistical conclusions if they were included.

- **1760 females died, 1,059 not included in occupational statistics.** A total of 1,760 females died from mesothelioma during this period, the fact that 1,059[148] have not been included in the occupational statistics certainly confirms the HSE's caveat that a substantial number have been excluded. Therefore it is most important to bear in mind that the number of deaths included in the female occupational statistics is substantially less than the actual number. Once again it is likely that a significant number of those women would have been teachers. (Stats 1)

- **Female cancer deaths 63% have no valid occupational code.** The Registrar General's Occupational Health Supplement gives an overview of statistical data concerning the recording of occupations on death certificates of people dying from cancer. It states that up to 63% of women did not have an occupational code provided on their death certificate.[149] This tends to confirm the presumption that the HSE occupational mesothelioma deaths list a figure for teachers' deaths which is probably substantially less than the actual number. Any calculation of corresponding deaths amongst pupils must also be assumed to be proportionally greater.

83. **It is most likely that if a female's death certificate records the occupation as teacher, then that is the occupation in which the asbestos exposure occurred**. The HSE state that the occupation recorded on a death certificate is the final occupation, and therefore may not represent the occupation where the asbestos exposure occurred.[150] That well might be the case in many occupations, but is probably not the case with female teachers. My wife's teaching career appears to be typical of many women of her age, for she entered teaching after school and then remained in the profession, only taking breaks for our children. Her death certificate records her occupation as primary school teacher. It is most likely that if a female's death certificate records the occupation as teacher, then that is the occupation in which the asbestos exposure occurred.

84. The statistics to support this Paper are at Annex 1

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[146] National statistics Population census 2001. DfEE annual survey 618G and National Assembly of Wales stats 3 survey Table 19,21. Teacher statistics for Scotland Table 9,10 1999. Independent schools DfES 727-tla statistics of education 1999 edition Table 48. E-mail Lees/ Darnton HSE Statistics Branch 10 Oct 04

[147] HSE mesothelioma occupation statistics male and female deaths aged 16-74 Tables 6&2

[148] HSE Mesothelioma statistics Tables MESO01, MESO03

[149] HMSO 1995. Occupational Health, Decennial Supplement for England and Wales. Ch7 P 77

[150] HSE Mesothelioma occupation statistics male and female deaths aged 16-74 page p2

Michael Lees

4th January 2006

Original manuscript 30th July 2005

Amended 4th January 2006

ANNEX 1 to PAPER A

Statistics - Mesothelioma Deaths among Teachers

NOTE:

1. The National Statistics/HSE mesothelioma occupation statistics use two sets of occupational coding; the **Southampton Occupational Coding** and the **Standard Occupational Classification (SOC).**
   - Tables 1 to 6 use the **Southampton** coding,
   - Tables 7 & 8 use the **SOC (1990)** coding.

2. Tables 1 to 6 list deaths from **1980 – 2000**. (excluding 1981) using **Southampton Coding.** The statistics for 1981 are excluded because of civil servant industrial action.

3. Tables 7 & 8 list deaths between **1991- 2000** using **SOC 1990 Classification.**

4. The **Southampton codes** list about 200 occupations under broad headings. Teachers are either **Teachers in Higher Education (10)** or **Teachers NEC (11).** A separate code has been added for Professional and related Education, Welfare, Health NEC **53(0).** If one cross-refers the numbers it would appear that only the "Professional teaching " groups are listed, although even then some deaths appear to be missing. The Special education teaching professionals, assistants and nursery nurses etc are lost amongst other occupations.

5. The **SOC** classification lists 900 occupations under more precise headings. It lists each teaching occupation under separate headings and in two groups:

   - **Group 230 Teaching Professionals:** University and polytechnic teaching professionals, higher & further education teaching professionals, secondary (and middle school deemed secondary) teaching professionals. Primary (& middle school deemed primary) & nursery teaching professionals, special education teaching professionals, other teaching professionals nec.
   - **Group 650 Childcare and related personal services.** Playgroup leaders, nursery nurses, educational **assistants** and other childcare and related occupations nes.
   - The only difference between the groups being the teacher's qualifications, the age of the people that they teach, or the disabilities of the children that they teach. It is agreed that some University, polytechnic, higher and further education teachers will work with adults, however the majority of teachers work with children in classrooms, laboratories, workshops or playgroups.
   - The following tables include the groups or codes/classifications that have been used.

6. In 2000 there was another change in the SOC classifications (SOC2000) which introduced new occupations and brought the system more in line with other European classifications. The job descriptions relevant to this paper remained the same. [151]

7. Tables **MESO01 to MESO05** list mesothelioma deaths from **1968 to 2002**. These include all mesothelioma deaths in Great Britain.

8. Where average PMRs have been included these are calculated <u>weighted</u> averages.

9. To avoid confusion with the HSE "TABLES" the following statistics have been entitled STATS 1, STATS 2 etc.

[151] Standard Occupation Classification 2000 Volume 1 Structure and description of unit groups. P ix, x

STATS 1

Mesothelioma deaths for Females between 1991-2000 [152]

DEATHS ALL AGES	1,760
DEATHS AGED16-74	1,156
DEATH AGED 0-16	1
DEATHS AGED 74+	603
OCCUPATIONAL DEATHS AGED 16-74	700
NON OCCUPATIONAL DEATHS AGED 16-74	456

Extracts from: HSE MESO01, MESO03

STATS 2

Mesothelioma deaths for female teachers between 1991-2000 (SOC)

DEATHS BETWEEN THE AGES OF 16-74

SOC		**DEATHS**	**PMR**
234	PRIMARY	25	94.1
233	SECONDARY	3	122.5
230	UNIVERSITY AND POLYTECHNIC	1	78.5
239	TEACHER NOT ELSEWHERE SPECIFIED	1	63.7
235	SPECIAL EDUCATION	1	286.3
	TOTAL GROUP 230	**31**	**101.6**

Extracts from HSE Table 8. Group 230

STATS 3

Mesothelioma deaths for other female childcare related occupations 1991-2000 (SOC)

DEATHS BETWEEN THE AGES OF 16-74

SOC		**DEATHS**	**PMR**
650	NURSERY NURSES	5	262.2
652	EDUCATION ASSISTANT	2	81.2
659	OTHER CHILDCARE & RELATED OCCUPATIONS	10	137.4
	TOTAL GROUP 650	**17**	**167.5**

Extracts from HSE Table 8. Group 650

STATS 4

Total Mesothelioma deaths for female teachers and other childcare related occupations 1991-2000 (SOC)

DEATHS BETWEEN THE AGES OF 16-74

	DEATHS	**PMR**
TOTAL GROUPS 230 & 650	**48**	**124.91**

[152] HSE statistics Mesothelioma Occupational statistics 1980-2000 Table 8 Females 1991-2000. HSE Mesothelioma MESO01. MESO03.

STATS 5

Mesothelioma deaths for Female teachers 1980-2000 (Southampton)

DEATHS BETWEEN THE AGES OF 16-74

SOUTHAMPTON		DEATHS	PMR
10	HIGHER EDUCATION	2	56
11	TEACHERS nec	42	100
	TOTAL	**44**	98

Extracts from HSE Table 6, 2

STATS 6

Occupations with the greatest number of Female Mesothelioma deaths (over 20) 1980- 2000 in order of PMR (Southampton)

SOUTHAMPTON CODE	OCCUPATION	DEATHS	PMR
346(O)	(FOREMEN/LABOURERS ETC) OTHER	40	312
74	OTHER TEXTILE WORKERS	20	165
100	SEWERS AND EMBROIDERERS	34	143
11	**TEACHERS NEC**	**42**	**100**
53	OFFICE WORKERS AND CASHIERS	241	100
60	OTHER SERVICE OCCUPATIONS	120	99
44	RETAILERS AND DEALERS	86	95
61	HOSPITAL PORTERS AND WARD ORDERLIES	21	89
59	COOKS AND KITCHEN WORKERS	23	76
46	CATERERS	29	63
17	NURSES	32	50

HSE Table 4. PMRs HSE Table 6

STATS 7

Occupational groups with the greatest number of Female Mesothelioma deaths 1991-2000 in order of PMR (SOC)

DEATHS BETWEEN THE AGES OF 16-74

SOC GROUPS	OCCUPATIONAL GROUP	DEATHS	WEIGHTED AVERAGE PMR
910, 990	• LABOURERS AND FITTERS	37	245 (EXCLUDING 913 PMR)
550	TEXTILE WORKERS	35	139.8
710, 720	SALES ASSISTANTS	55	127.53
230,650 EXCLUDING (230, 231)	**TEACHERS AND CHILDCARE RELATED OCCUPATIONS Excluding Higher/University Teachers**	**46**	**127.25**
410, 420,430,440 (not including 441)	CLERKS	89	126.6
450	SECRETARIES	50	115.1
956, 957, 958	CLEANERS	55	88.5
340, 640	NURSES, ASSISTANTS AND ATTENDANTS	47	85.1

Extracts from HSE Table 8

NB: 441 not included as occupation is “Storekeepers and warehouse women”

913 PMR excluded as Upper confidence level is very high at 9286.

STATS 8

Occupational groups with the greatest number of Female Mesothelioma deaths 1991-2000 in order of deaths (SOC)

DEATHS BETWEEN THE AGES OF 16-74

SOC GROUPS	OCCUPATIONAL GROUP	DEATHS	WEIGHTED AVERAGE PMR
410, 420,430,440 (not including 441)	CLERKS	89	126.6
956, 957, 958	CLEANERS	55	88.5
710, 720	SALES ASSISTANTS	55	127.53
450	SECRETARIES	50	115.1
340, 640	NURSES, ASSISTANTS AND ATTENDANTS	47	85.1
230,650 Excluding (230, 231)	**TEACHERS AND CHILDCARE RELATED OCCUPATIONS Excluding Higher/University Teachers**	**46**	**127.25**
910, 990	LABOURERS AND FITTERS	37	245 (EXCLUDING 913 PMR)
550	TEXTILE WORKERS	35	139.8

Extracts from HSE Table 8

NB: 441 not included as occupation is "Storekeepers and warehouse women"
913 PMR excluded as Upper confidence level is very high at 9286.

STATS 9

Mesothelioma deaths for Male teachers 1991-2000 (SOC)

DEATHS BETWEEN THE AGES OF 16-74

SOC		DEATHS	PMR
234	PRIMARY	2	24.5
233	SECONDARY	43	59.6
230	UNIVERSITY AND POLYTECHNIC	31	132.2
231	HIGHER/FURTHER EDUCATION	17	76.6
239	OTHER TEACHING	3	79.8
652	EDUCATION ASSISTANTS	1	408.3
	TOTAL 652+GROUP 230	**97**	**89.3**

Extracts from HSE Table 7

STATS 10

Mesothelioma deaths for Male teachers 1980-2000 (Southampton)

DEATHS BETWEEN THE AGES OF 16-74

SOUTHAMPTON		DEATHS	PMR
10	HIGHER EDUCATION	66	121
11	TEACHERS (nec)	72	57
	TOTAL 10&11	**138**	**87.6**

Extracts from HSE Table 5

STATS 11

Mesothelioma deaths for female and male teachers and childcare related occupations 1991-2000 (SOC)

DEATHS BETWEEN THE AGES OF 16-74

SOC GROUPS		DEATHS	PMR
230 & 650	FEMALE TEACHERS	48	124.91
230 & 650	MALE TEACHERS	97	89.27
	TOTAL GROUPS 230 & 650	**145**	

Extracts from HSE Tables 7, 8
PMRs not averaged between male and female

STATS 12

Increasing Mesothelioma deaths for female teachers (other than in higher education) 1980-2000 (Southampton)

DEATHS BETWEEN THE AGES OF 16-74

PERIOD	DEATHS	PMR
1980- 1985	4	79.6
1986- 1990	9	117.3
1991- 1995	13	109.3
1996- 2000	16	90.7
TOTAL	**42**	**100**

Extracts from HSE Table 4. Total PMR HSE Table 2

STATS 13

Comparison with Mesothelioma deaths for female nurses 1980-2000 (Southampton)

DEATHS BETWEEN THE AGES OF 16-74

PERIOD	DEATHS	PMR	COMPARISON
1980- 1985	4	55.7	(23.9 lower)
1986- 1990	6	52	(65.3 lower)
1991- 1995	9	47.5	(61.8 lower)
1996- 2000	13	49.1	(41.6 lower)
TOTAL	**32**	**50**	**(50%lower)**

Extract HSE Table 4. Total PMR HSE Table 6
NB:

Number of female primary and secondary teachers 395,282
Number of female nurses 578,269[153]

[153] DfES annual survey 618g, 727-tla 98/99. National assembly of Wales stats 3 survey Table 19,21. Teacher statistics for Scotland Table 9, 10, 1999. Independent schools England and Wales DfES 727-tla statistics of education 1999 edition. Scottish Executive statistics 2003 census Table 14 2003. Nursing and Midwifery Council statistics 2002

STATS 14

Increasing Mesothelioma deaths for male teachers other than in higher education 1980-2000 (Southampton)

DEATHS BETWEEN THE AGES OF 16-74

PERIOD	DEATHS	PMR
1980- 1985	11	64.8
1986- 1990	16	54.7
1991- 1995	18	49.9
1996- 2000	27	59.7
TOTAL	**72**	**57.3**

Extracts HSE Table 3. Total PMR HSE Table 1

STATS 15

Increasing Mesothelioma deaths for male teachers in higher education 1980-2000 (Southampton)

DEATHS BETWEEN THE AGES OF 16-74

PERIOD	DEATHS	PMR
1980- 1985	6	110.1
1986- 1990	12	117.6
1991- 1995	22	114.6
1996- 2000	26	95.4
TOTAL	**66**	**121.3**

Extracts HSE Table 3. Total PMR HSE Table 1

STATS 16

Total number of female and male teacher deaths from mesothelioma 1980-2000 (Southampton)

DEATHS BETWEEN THE AGES OF 16-74

SOUTHAMPTON	PERIOD	DEATHS	PMR
10	MALES HIGHER EDUCATION	66	121.3
11	MALES TEACHERS nec	72	57.3
10	FEMALES HIGHER EDUCATION	2	56.5
11	FEMALES TEACHERS nec	42	100.0
	TOTAL	**182**	

Extracts HSE Tables 1, 2. PMRs not averaged between male and female

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Michael Lees 4th January 2006