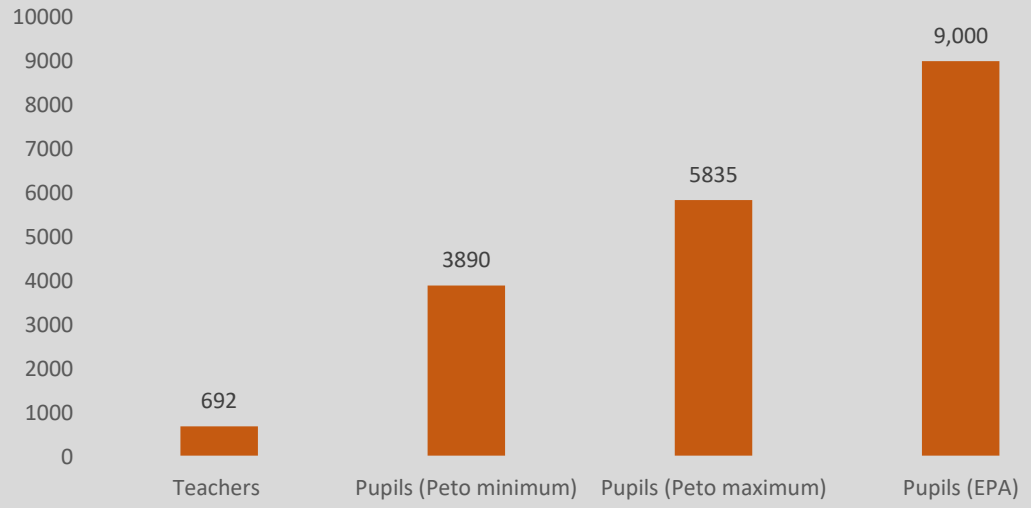
CONTINUING GOVERNMENT FAILURE LEADS TO RISE IN SCHOOL MESOTHELIOMA DEATHS:

Are pupils and staff any safer today?

Figure 1: Estimated number of former teacher and pupil mesothelioma deaths (all ages) from 1980 to 2017 due to asbestos exposure in their former schools between 1960 and 1980s (see pages 8-11).



This timely and comprehensive report highlights the ongoing failure of successive governments to deal with the asbestos problem in our education estate.

For years JUAC has campaigned for the progressive, planned removal of asbestos from schools and further education colleges plus the reinstatement of proactive Health & Safety Executive inspections and greater transparency for staff, pupils and parents.

The report highlights the issues in schools which are most likely to cause exposure to deadly asbestos fibres. This situation has gone on for too long and this report must serve as a catalyst for immediate government action.

John McClean (Chair of the Joint Union Asbestos Committee)

JUAC

RAISING AWARENESS OF ASBESTOS

Founded in 2010, the Joint Union Asbestos Committee (JUAC) is a non-party political group that seeks to protect education workers and pupils from the dangers of asbestos in educational buildings. JUAC's ultimate goal is for a government-funded phased removal of all asbestos from educational buildings, starting with the most dangerous first. JUAC also campaigns to raise awareness about asbestos in educational buildings and for improved asbestos management.

Joint Union asbestos Committee Trade Unions campaign to make all UK schools and colleges safe from the dangers of asbestos. Find out more about JUAC: Contact us | JUAC (the-juac.co.uk)

UNION COMMENTS ON THE REPORT FINDINGS

"The government simply must tackle the deadly legacy of asbestos which exists in many of our school and college buildings. Its current approach of managing the presence of asbestos is neither a safe nor long-term solution. Asbestos represents a threat to the health of pupils and to staff for as long as it remains in the buildings that they use. Ministers must take decisive action and fund a phased programme of asbestos removal as a matter of urgency. They cannot allow this problem to continue to drift."

Geoff Barton, General Secretary of the Association of School and College Leaders

"Asbestos has done a huge amount of damage in our society. Hundreds of thousands have died as a result of asbestos and the deaths are still to peak. It is staggering that our children are still being exposed to asbestos. We need action now from all the governments across the UK."

Gary Smith, General Secretary GMB

"The risk that past, present and future generations of pupils, teachers and support staff are subject to because of asbestos is inexcusable. This threat to their health must be removed. To delay is to put more lives at risk. The Government must act, and do so quickly to protect lives. This threat must be removed."

Deborah Lawson, Assistant General Secretary of Community Union (Voice Community Education section)

"*Much of the school estate in schools is old and in a deteriorating condition, which makes it even harder to avoid asbestos fibres from being released. Given the very real risk, significant and urgent Government investment is needed to fund its phased removal from all school buildings, starting with the most dangerous. This is the only way to ensure the safety of school staff and pupils."*

Paul Whiteman, General Secretary of school leaders' union NAHT

"This detailed report once again brings in to sharp relief the ongoing dangers of the asbestos that continues to be present in schools and colleges. The NASUWT has consistently called for greater action to be taken to protect school staff and pupils from exposure to asbestos.

It is unacceptable that children and the workforce are being put at risk as a consequence of the Government's failure to put in place a coherent funded national plan for the systematic removal of asbestos from schools. Asbestos is lethal. The only safe asbestos is removed asbestos."

Dr Patrick Roach, General Secretary, NASUWT - The Teachers' Union

"Asbestos in schools may have temporarily been pushed down the agenda by the Covid-19 pandemic but it most definitely has not gone away.

Data obtained and analysed by Dr Gill Reed, JUAC Technical Adviser, shows how some of our school buildings with the most dangerous asbestos may still be exposing staff and students for decades to come.

Lives will continue to be put at risk unless funding is provided to remove unsafe asbestos and pay for necessary demolition and rebuilding."

Dr Mary Bousted and Kevin Courtney NEU Joint General Secretaries

"The failure of government to act on asbestos in our schools and colleges is inexcusable. This crucial report once again demonstrates the extent of the danger posed to staff and students alike by the continuing presence of asbestos, and it must lead to urgent action to eradicate this killer substance.

Ensuring our schools and colleges are safe and healthy environments is a non-negotiable necessity, and it is beyond shameful that basic steps to rid them of fatal threats like asbestos are yet to be fully undertaken."

Jo Grady. UCU General Secretary

"This report is a sad reminder of how lethal asbestos is. The fact that this deadly material remains in our schools with pupils, school support staff and teachers continuing to be exposed to it, is nothing short of a national scandal.

The Government must act now and fully fund the phased removal of all unsafe asbestos from educational establishments.

Further delay will only add to more misery and grief in years to come."

Christina McAnea General Secretary UNISON

"There will always be a danger from asbestos, as long as this silent killer remains in our buildings.

We must protect workers, our children and future generations from exposure to this deadly substance.

This vital report sets out the extent of the asbestos problem in our schools.

Unite expects Government to act."

Len McCluskey General Secretary Unite Union

Lucie Stephens' mother, Sue Stephens, was a school teacher who died from mesothelioma in 2016.

Lucie promised her mother before she died that that she would do her best to make sure no-one else had to suffer from mesothelioma. Her mother was particularly worried about the risk to all the children that she had taught **in her school.**

Lucie is now calling on the government to proactively remove it from all schools. Her petition is at:

https://you.38degrees.org.uk/petitions/protect-our-children-and-teachers-from-asbestos-exposure-in-schools

and information about the presence of asbestos in every school should be found at:

https://toxicschools.org.uk/

Unfortunately, the Department for Education is withholding the data that tells us whether each school contains asbestos.

INDEX

REPORT AUTHOR AND ACKNOWLEDGEMENTS

Author: Dr Gill Reed PhD Biochemistry; MA Management in Education; MA Labour Movement and Trade Union Studies. **Technical Adviser JUAC**; AiS member; Past NUT Health & Safety Working Group member; Past Brent NUT Health & Safety Adviser; Past NUT Representative Willesden High School; Past Teacher Governor Willesden High School). Co-author of *Asbestos Management in Brent schools: local and national implications*[7] and author of *Why unsafe asbestos may still be in our schools in 2050.*[21]

Acknowledgements: Many organizations were involved in this report and I would particularly like to thank theAsbestos in Schools (AiS) Group and the Joint Union Asbestos Committee (JUAC) for their support and guidance throughout.

Asbestos removal campaigners Michael Lees MBE, Hank Roberts and Lucie Stephens have provided welcome research, insights and suggestions and crucially a determination to prevent further school mesothelioma deaths.

Gina Lees – wife of Michael Lees - was a primary school teacher for 30 years.

Gina died from mesothelioma, aged 51 years

Sue Stephens - mother of Lucie Stephens – was a Primary teacher for 30 years.

Sue died from mesothelioma aged 68 years

Report Context: Asbestos is classified as a category 1 carcinogen causing around 5000 deaths every year in the UK. It looks innocuous but it is a known, invisible and silent killer. Children are known to be far more vulnerable than adults. Yet over 80% of schools were built using asbestos.

In 2009 a former Brent school pupil, Sarah Jane Bowman, was diagnosed with mesothelioma cancer. She was just 40 years old and had two boys. The Brent Joint unions found the evidence that showed she was exposed to asbestos in her former system-built schools.[7]

This report outlines a further investigation into asbestos management in schools with substantial asbestos.

OVERVIEW

The United Kingdom has the highest mesothelioma rate in the world because of the extensive use of asbestos during the1950s-1980s. Most of the victims were thought to be people who worked with these asbestos materials.

This report estimates that 5-10,000 former pupils and staff have already died from mesothelioma due to asbestos exposure in their former schools in 1960-1980s. It aims to find out if they are safer today.

The outlined investigation of asbestos management in 60 CLASP schools together with the available published school airborne asbestos levels, suggest that staff and pupils are likely to be exposed to higher asbestos levels, on average, than the former teacher mesothelioma victims that were exposed in their schools between 1960-1980.

Crucially, the available evidence suggested that successive governments have ignored on cost and disruption grounds the significant risk from cumulative long-term exposure of occupants to low levels of asbestos in buildings.

Consequently, since 1980 tens of thousands of pupils and staff, attending and working in schools which contain substantial amounts of asbestos (e.g., CLASP type schools), may have an increased risk of developing mesothelioma from school-based exposure. Shockingly, pupils are particularly at risk.

JUAC calls for urgent Government action to improve the asbestos regulations, identify all CLASP-type schools with unsafe asbestos and fund asbestos removal and replacement of buildings that cannot be made safe. See RECOMMENDATIONS page 55-56

EXECUTIVE REPORT

INTRODUCTION. The United Kingdom has the highest mesothelioma rate in the world because of the extensive use of amosite asbestos between 1960-1980. Most victims were believed to be people who worked with asbestos.[1]

However**, there is now increasing evidence from GB Mesothelioma Statistics[2] and recent research[1 5] that thousands of former school teachers, support staff and pupils have also probably died from mesothelioma because they were exposed to asbestos in their schools between 1960-1980.** The average time for developing mesothelioma after exposure is 30-50 years and that is why, only now, has the actual risk from asbestos exposure come to light. However, the potential risk was actually predicted three decades ago. [52 59]

About half of all schools were system built between 1950-1980s.[9 10] **These schools include the CLASP-type system buildings that are known to have substantial amosite asbestos throughout** and so are more likely to have been attended by former teacher and pupil mesothelioma victims. Most of them are still being used and they have now reached or passed their expected life span and are deteriorating together with the asbestos within.[11]

The current GB Asbestos Regulations (2012) today require more stringent asbestos management of buildings. However, the available evidence suggests that not all schools are fully compliant with these regulations and there are concerns that the regulations do not take account of the known vulnerability of children or prevent exposure to disturbed hidden asbestos that is prevalent within system-built school structures.[7 8]

AIM: This report outlines an investigation to find out if pupils and staff in 60 CLASP Mark 4/4b school system buildings are safer today than between 1960-1980. The report includes six lines of enquiry:

A. **How many former pupils and staff have already died from mesothelioma between 1980-2017?**
B. **Asbestos management**: Do the 60 schools investigated have asbestos management arrangements that prevent exposure to accessible and hidden asbestos?
C. **Asbestos location:** Do the 60 schools have substantial amosite asbestos throughout?
D. **Airborne asbestos levels:** Are the airborne asbestos levels in CLASP schools lower today than in 1960-1980 according to published research?
E. **Asbestos Regulations:** Are the current asbestos regulations effective at preventing asbestos exposure of pupils and staff in CLASP-type schools?
F. **Asbestos management and funding:** Do schools have adequate funding for asbestos management?

METHOD: The approximate number of mesothelioma deaths was estimated using mesothelioma national statistics and research data. Asbestos management was evaluated in 60 schools with CLASP Mark 4/4b buildings as they are known to have substantial asbestos throughout. Asbestos surveys, Registers and Asbestos Management Plans were obtained by a Freedom of Information request and checked for evidence of compliance with HSE asbestos management guidance and the main asbestos locations. The published airborne asbestos levels in these schools were used to evaluate the effectiveness of the current asbestos regulations and guidance.

FINDINGS: The findings indicate an estimated 5-10,000 school pupils and staff died from mesothelioma between 1980-2017 because they were exposed to amosite asbestos in their former schools between 1960-1980s. Shockingly, the published asbestos levels for CLASP-type schools together with asbestos management data from 60 CLASP schools suggest asbestos levels in these schools since 1980 are likely to be higher, on average, than the estimated level in schools attended by former teacher mesothelioma victims in 1960-1980.

The higher asbestos levels are likely to be due in part to the substantial asbestos found throughout the 60 CLASP schools as well as the failure of their Duty Holders to provide evidence of compliance with

the detailed HSE school asbestos management guidance

However, **the main, underlying cause is the failure of successive governments to develop asbestos regulations that measure the actual risk of children and adults developing mesothelioma due to asbestos exposure in buildings and to provide the necessary funds and support for removal of all unsafe asbestos and buildings.**

CONCLUSION: Pupils and staff in CLASP-type schools since 1980 are more likely to die from mesothelioma than occupants of schools in 1960-1980. Current asbestos regulations do not identify the risk in CLASP-type schools. Shockingly, the available evidence suggests that successive governments have ignored the potential risk from long-term exposure to low asbestos levels in order to cut school asbestos management costs. Urgent Government action is therefore needed to safeguard school occupants today. See pages 55-6 RECOMMENDATIONS

INTRODUCTION

The UK has the highest incidence of mesothelioma in the world. This is thought to be largely due to the extensive use of amosite [a] asbestos in building construction in the 1950s - 1970s. The importation of amosite and crocidolite was banned in 1985 and chrysotile in 1999 but use in buildings still continues. Most victims were hitherto believed to be people who worked with asbestos. [1]

However, Great Britain (GB) Occupational Mesothelioma statistics suggest 380 former school teachers, aged under 75, have died from mesothelioma since 1980 because they were exposed to the asbestos in their former school buildings between 1960-1980s.[2] Mesothelioma records for other former school staff are incomplete.

The average time for developing mesothelioma after asbestos exposure is 30-50 years and that is why, only now, has the risk to occupants of buildings become evident. However, concerns had been expressed in the UK from the 1960s onwards [59] and notably some United States scientists predicted in 1992 a **third wave of asbestos related diseases ARDs*** (due to exposure of school children, teachers, maintenance staff and construction workers).[52] **Huncharek (1992) had stated that the first wave of ARDs occurred amongst workers in the primary mining and manufacturing of asbestos; the second in those engaged in the use of asbestos products such as insulation.*

The HSE GB Occupational Mesothelioma Statistics indicate that **the number of former teachers (aged 74 years and under) dying from mesothelioma each year each year is still rising and has increased from an average of 3 per year in 1980-1985 to 17 per year in 2011-2015.** [2] Unfortunately, these **statistics omit all those aged over 75 years and only include the last occupation reported on the death certificate** although it is known that young adults and children are more likely to develop mesothelioma after asbestos exposure. [3]

Significantly, **research published in 2009 which did include detailed occupational histories of mesothelioma victims suggests 14% of men and 62% of women die from mesothelioma each year because the available evidence indicated they were apparently exposed to asbestos in buildings like schools.** [1]

Moreover, the Committee on Carcinogenicity (2013) has confirmed that children are far more likely to develop mesothelioma after exposure to a given amount of asbestos than an adult.[4] Indeed, in that same year, **Professor *Peto (****Professor of Epidemiology, London School of Hygiene and Tropical Medicine*) **informed the Education Select Committee that an estimated 200-300 former pupils (1960-1980) died from mesothelioma each year because they were exposed to asbestos in their former schools in 1960-1980.** [5]

Professor Peto also informed the Committee (2013) that recent lung burden research indicated average asbestos lung burdens are much lower today than in 1960-1980 and so the average mesothelioma deaths across the population are likely to become lower. However, he suggested that more specific evidence about the effectiveness of the asbestos regulations and the airborne asbestos levels in schools with substantial asbestos and pupil asbestos lung burdens is needed to establish the actual level of risk to pupils in schools today. [5]

This investigation aims to find out if staff and pupils are safer in schools with substantial asbestos today than in 1960-1980. The current knowledge about asbestos management in 1960-1980 and today is outlined below.

ASBESTOS MANAGEMENT IN 1960-1980

There is little information on how individual mesothelioma victims were exposed in Great Britain (GB) schools between 1960- 1980. This is in part because the long latency period between exposure and diagnosis of mesothelioma has meant that victims are usually unable to provide evidence of exposure. It is also because the Government GB Mesothelioma Occupational Statistics only records the last occupation of mesothelioma victims although it is widely recognised that children and young adults are most vulnerable to developing mesothelioma after asbestos exposure. However, research has indicated that 14% of men and 62% of women in Great Britain develop mesothelioma because they were probably exposed in buildings like schools and homes.[1]

More recently Robin Howie (expert asbestos hygienist) has estimated that the 125 former teachers who developed mesothelioma between 2002-10 and taught in schools between 1960-1980 were exposed to asbestos levels significantly higher than found in schools with asbestos in a good condition. We do not know if they were exposed to asbestos in 125 schools or a smaller number as there is there is no official record of the schools and buildings occupied by teacher mesothelioma victims. See page 34 ESTIMATED ASBESTOS LEVELS 1960-1980

However, we do know that the schools attended in 1960-1980 by two former pupil mesothelioma victims, Sarah Bowman and Diane Willmore, had system-buildings with substantial asbestos throughout according to evidence put before the Courts. These former pupils were able to provide evidence for the Courts which indicated exposure to asbestos ceiling tiles left in corridors and the lifting of ceiling tiles to hide possessions in the ceiling voids.[6] [7]

An investigation by the Brent Joint Unions into how Sarah Bowman was exposed, concluded that Sarah and other pupils in Brent (1970s-2000s) were likely to have been exposed because unsafe asbestos was left where it could be disturbed by everyday school activities. The evidence outlined in the Brent and the Asbestos Testing and Consultancy Association (ATaC) report also indicated that asbestos management failures between 1980-2010 were a national as well as a London Borough of Brent problem. [7] [8]
See pages 58-60 APPENDIX B: SARAH JANE BOWMAN

Sarah Jane Bowman was diagnosed with mesothelioma in 2009 at the age of 40. She had twoyoung boys.

In a Press Release Sarah stated: "To be told that I had a terminal illness and had less than ayear to live was simply too much to comprehend and my family and I have struggled to overcome this."

Brent Council did not contest the evidence of asbestos exposure in her schools, presented in 2011, and agreed a settlement with Sarah.

ASBESTOS MANAGEMENT TODAY

About half of Great Britain schools are system built (late 1940s-1980s) and often contain substantial amounts of amosite asbestos integrated into the structure of the building. [9] [10] Also see footnote x below. Recent research has confirmed the major contribution of amosite asbestos to the GB mesothelioma incidence and the substantial contribution of non-occupational exposure, particularly in women.[1]

[x] The mesothelioma risk caused by amosite (brown asbestos) is two orders of magnitude greater than that by chrysotile (white asbestos) (Hodgson and Darnton, 2000)[40] …… A comparison of current mesothelioma death rates and imports to the US (Virta, 2006) and UK (MRC Institute for Environment and Health, 1997) of white, brown and blue (crocidolite) asbestos also suggests that the much higher mesothelioma death-rate in the UK was caused by its much greater use of amosite. [1]

Potentially thousands of these schools, therefore, are likely to have been attended between 1960-1980 by former pupil and staff mesothelioma victims. Many of these system-built schools today are at the end of their expected life span and deteriorating together with the asbestos within. [11] However, the improved Asbestos Regulations, Approved Code of Practice and Guidance (2012) are more stringent today than in 1960-1980.

Thus the Control of Asbestos Regulations (2012) for Great Britain require that the Duty Holder (usually the employer) has ultimate responsibility for compliance with the Asbestos Regulations and Approved Code of Practice. [12] The aim is to ensure that all asbestos which is not in a good condition or likely to be disturbed is sealed or removed, in order to minimise exposure. [13]

However, there is no requirement to check during everyday occupation the actual level of unseen airborne asbestos fibres that can pass when disturbed into occupied areas from accessible asbestos and hidden asbestos locations. This means the actual asbestos exposure level is not known.[10] See page 39-44 THE ASBESTOS REGULATIONS

The Asbestos Testing & Consultancy Association (ATaC) report, Brent Report and the responses to the DfE policy review of school asbestos management all noted that inadequate asbestos management was potentially placing occupants at risk from asbestos exposure. Each raised concern about the evident failure of Duty Holders to comply with the asbestos regulations and guidance on the assessment of risk.[7] [8] [14]

The Department for Education (DfE) policy review of schools in England (2014) led to improved DfE non-statutory asbestos management guidance for Duty Holders and others involved with asbestos management in school.[15] The DfE aimed to improve their understanding of their obligations and duties in relation to asbestos management in English schools. Thus, the DfE development of the voluntary Asbestos Management AssuranceProcess (AMAP) in 2018 aimed to enhance its understanding of the management of asbestos in schools and promote the importance of effective asbestos management in the school estate and provide participating schools with immediate advice based on their responses. **The AMAP findings indicated that there are over 22,000 schools in England alone and an estimated 83.5% of them contain asbestos**. [16]

HSE INSPECTIONS: Despite the increasing number of mesothelioma deaths and the known vulnerability of children to asbestos exposure, schools in Great Britain since the Young review in 2011 are considered a low risk and so regular HSE oversight and monitoring of asbestos management is not required. The Asbestos in Schools groups argued strongly against the low-risk status for schools. [17]

The HSE did, however, inspect 153 Great Britain schools outside Local Authority control in 2013/2014. It found that about a quarter of those schools were not complying with all the asbestos regulations. Thus, 44 of the 153 schools were given written advice following the visit and enforcement action was taken against 20 of the 44 in the form of an Improvement Notice.[18] These schools were therefore likely to have an increased risk of asbestos exposure but the regulations do not require measurement of background airborne asbestos levels. It is not known if the inspected schools had substantial asbestos. The findings of a more recent HSE inspection (2019) of schools have not yet been published.

AIRBORNE ASBESTOS LEVELS: The Medical Research Council (MRC) has found that the average level of asbestos in schools with asbestos in a good condition is 0.0005f/ml; 500f/m^3 and the Courts recognise that levels higher than this will materially elevate the risk of developing mesothelioma.[6] [19]

However, the regulations do not require Duty Holders to measure current background levels in all schools during normal / simulated school activities and recent research has indicated that the measurement of airborne asbestos levels in schools today is not a reliable measure of lifetime exposure and risk to occupants because airborne asbestos levels in schools are too low and variable.[20]

Research including occupational histories and asbestos lung burdens of mesothelioma victims suggests a minority of the general population may have unusually high environmental exposure to asbestos in buildings like schools and more work is planned to identify buildings where exposure is occurring.[20] [1]

OUTLINE OF INVESTIGATION

This report investigates whether pupils and staff are safer in CLASP-Mark 4/4b system-built schools [b] today than in 1960-1980. This building type is just one of many similar construction types that have asbestos clad structural columns and suspended ceiling throughout.[21] Today they are known to usually have substantial **amosite** asbestos [a] throughout and so are more likely to have been attended by the 125 former teachers who died from mesothelioma between 2002-2010 because they were exposed to asbestos in their former schools. See page 57 APPENDIX A: TYPES OF SYSTEM BUILDINGS

The investigation included six main lines of enquiry:

A. **School asbestos and mesothelioma deaths:** Estimation of number of former pupils and staff whodied from mesothelioma.

B. **School asbestos management**: A check for evidence that school surveys, asbestos registers and asbestos management plans, obtained from the Duty Holder of 62 CLASP Mark 4/4b schools in 23 different local authorities by Freedom of Information (FOI) requests, comply with the HSE checklists for school asbestos management including the 2008 guidance and checklist for system-built schools.

C. **Asbestos location**: The main asbestos locations, according to asbestos surveys and registers. in the 60CLASP schools investigated

D. **Airborne asbestos levels:** A comparison of the available data on asbestos levels in CLASP-type schoolstoday with the estimated average level of asbestos exposure in schools that were attended by teachers (1960-1980).

E. **Asbestos Regulations:** An evaluation of the effectiveness of the current asbestos regulations forpreventing unsafe asbestos exposure in schools today.

F. **Asbestos Management and Funding**: An evaluation of the effect of funding on asbestosmanagement.

METHOD

FIGURE 1: A TYPICAL CLASP-TYPE BUILDING

The 62 schools investigated had one or more CLASP Mark 4 /4b buildings according to FOI responses to the HSE/DCSF from their Local Authorities / Scape in 2017. These English local authorities were contacted because they had responded to the HSE/DCSF questionnaire on asbestos management in CLASP-type system buildings in 2009/2010 and provided the number of CLASP schools they were responsible for.[22] [10] See page 57 APPENDIX A and footnote Z below.

Where possible schools were chosen from local authority areas that included a range of school types and stages. However, CLASP schools in Wales, Northern Ireland and Scotland were not included because their Duty Holders did not receive the HSE/DCSF 2009/2010 questionnaire. See page 9 Table 1.

CONTEXT: CLASP (Mark 4/4b) schools were investigated because they are known to have a substantial amount of asbestos and so are likely to have been attended by many of the former staff in 1960-1980 who later died from mesothelioma between 2002-2010.

Z ***CLASP and SCOLA system buildings and others*** *where similar construction techniques have been used, built between 1945 and 1980, normally have amosite containing AIB around the steel columns (although other types of Asbestos containing materials (ACMs) and non-asbestos materials are also found). ACMs may also have been used as column packing and may be found in blind boxes to the window frames. ACMs may also have been used in these buildings as unrecorded substitute items where there were material shortages and/or poor supervision. In addition, excess or wasteACMs may have been left hidden inside columns or panels and ceiling voids. Consequently, asbestos may be found in some unexpected locations and the presumption should be that ACMs would be present in other concealed areas…*

Evidence was found by the HSE in 2006 that everyday activities in 20 CLASP schools could potentially disturb the hidden asbestos in columns and voids and so expose occupants to high asbestos levels. Guidance for all system-built schools with a CLASP-type structure was therefore issued by the HSE in 2008.

Responses to the HSE/DCSF 2009 questionnaire from Duty Holders of system buildings in England indicate there are at least 6,000 schools with one or more CLASP type buildings in England alone. See the main makes of CLASP type buildings in Appendix A: Types of system buildings page 57

A Freedom of Information (FOI) request for electronic versions of asbestos surveys/registers and asbestos management plans was sent to the Duty Holder of each of the 62 schools. This is because the Duty Holder is responsible for the management of asbestos in schools according to the current HSE guidance.

The Duty holder is usually the employer so the FOI was sent to the Local Authority for Community schools via the *WhatDoTheyKnow web site [school asbestos data]*, to the Academy Trust Duty Holder for Academy schools and directly to the Duty Holder of Foundation and Voluntary Aided. If the Duty Holder was unable to provide the data the FOI request was sent directly to the school.

Responses were received from all 62 schools. Two of the schools (one Academy and one local authority school) had demolished all their buildings containing asbestos and so were excluded from the subsequent asbestos management investigation.

Surveys, Asbestos Registers and Asbestos Management Plans were received from most of the Duty Holders /Responsible persons of the 60 schools. The schools included Academies, Community, Foundation, Voluntary Controlled and Voluntary - Aided schools (Primary, Secondary and Special).

For the purpose of the investigation the Voluntary Controlled School was included with the Local Authority schools. The two Voluntary Aided schools and Foundation school are included in the Category described as 'Other' although they are a sub-section of local authority-maintained schools. See page 9 Table 1.

TYPE AND STAGE OF CLASP SCHOOLS

Table 1: School type and stage of the 60 CLASP Mark 4/4b schools investigated

School type and stage	Local authority (% total)	Foundation (% total)	Voluntary-Aided (% total)	Voluntary-Controlled (% total)	Academy Trust (% total)	Total number of schools (% total)
All (60)	27	1	2	1	29	60
Secondary	5 (19%)	1	0	0	17 (59%)	23 (38%)
Primary	21(78%)	0	2	1	11 (38%)	35 (58%)
Special	1 (4%)	0	0	0	1 (3%)	2 (3%

The findings in the Results section are based entirely on information from the Surveys, Asbestos Registers and Asbestos Management Plans (AMPs) provided by the 60 Duty Holders of these schools. These documents wereinvestigated for evidence that each school Duty Holder had complied with HSE guidance regarding the effective identification of asbestos that was being disturbed or likely to be disturbed and expose occupants to airborne asbestos fibres. [10 13]

Criteria used in this investigation for the evaluation of the effectiveness of asbestos management in each school are based on selected HSE guidance regarding surveys, risk assessments and management plans. The detailed criteria used are outlined on page 13 CRITERIA USED FOR ASBESTOS MANAGEMENT EVALUATION

School occupants include teachers, pupils and numerous support staff. They are referred to as staff and pupils in the text except when occupational mesothelioma statistics data refers specifically to teachers.

MAIN FINDINGS

The findings are shown under five main headings:

A. School mesothelioma deaths

B. Asbestos Management

C. Asbestos location

D. Asbestos levels

E. Asbestos Regulations

F. Asbestos Management and Funding

A. MESOTHELIOMA DEATHS: SCHOOL STAFF AND PUPILS (1980-2017)

GB Mesothelioma deaths: staff and pupils (1980-2017)

This section estimates the total number of former staff and pupils who have died from mesothelioma because they were exposed to asbestos in their former schools

SCHOOL STAFF (AGED UNDER 75) MESOTHELIOMA DEATHS

Data from the GB Occupational Mesothelioma Statistics indicate that 380 former teachers aged under 75 have died from mesothelioma between 1980 and 2017. In addition, the GB Statistics show 71 of the school support-staff (aged under 75) have died from mesothelioma between 2003 and 2017. Thus, the statistics record that 8 school secretaries, 10 nursery nurses, 31 teaching assistants and 22 school midday assistants died of mesothelioma. However, the education statistics omit many support staff including school caretakers, cleaners, technicians and cooks who are more likely to work in areas known to have additional asbestos for fire protection purposes.[2]

ESTIMATED FORMER STAFF (AGED 75 AND OVER) MESOTHELIOMA DEATHS

The Great Britain (GB) Mesothelioma Occupational Statistics are an underestimate because the full GB statistics[3] clearly show that a significant proportion of mesothelioma deaths occur in people aged 75 and over (75+). Indeed, this proportion has increased since 1980-1985 (see column 4 of Table 2 below) and since 2011 more mesothelioma deaths have occurred in people aged 75 and over than in people aged under 75 (<75). Moreover, the statistics only include the last occupation although young adults and children are known to be more likely to develop mesothelioma after exposure than older adults.[2]

MESOTHELIOMA DEATHS TEACHERS AGED 75 AND OVER. The number of teachers aged over 75 who have died from mesothelioma has been estimated using information in the mesothelioma statistics (MESO03).[3] See calculation method and Table 2 below.

This estimation presumes that the ratio of number of teacher mesothelioma deaths aged 75 years and over (75+) / number of teacher mesothelioma deaths under 75 years (<75) is the same as the corresponding ratio for female mesothelioma deaths. *This appears a reasonable estimation because three quarters of teachers are female and current research evidence published in 2009 indicates that 62% of female mesothelioma victims are exposed to asbestos in buildings like schools compared to only 14% of male victims.*[1]

Example: Calculation of the number of teachers aged 75+ who have died from mesothelioma in 2001-05 #:

Between 2001-2005: 629 (aged 75+) females died from mesothelioma and 800 GB females (aged < 75) died from mesothelioma: the ratio for females is: no. females (75+)/no. females (<75) = 629/800 = 0.79
63 teachers died from mesothelioma aged <75 years and y teachers died from mesothelioma aged 75+
So the ratio for teachers is: y/63 where y is the number of teacher mesothelioma deaths aged 75+

As the ratio for GB female mesothelioma deaths is presumed to equal the teacher ratio then 629/800 = y/63 and y = 0.79 x 63 = 50. That is 50 teachers are estimated to have died from mesothelioma aged 75+.
The total number of estimated former teacher mesothelioma deaths (2001-05) is therefore 63 + 50 = 113.
The number of females aged 75 and over were calculated in a similar way for each of the year ranges.

From Table 2 below the estimated total number of teacher mesothelioma death (all ages) is 692. This compares with the 380 teachers (aged <75) according to the national occupational statistics. This number does not include the probably substantial number of former teachers whose last occupation was not recorded as teaching.

Table 2: Estimation of GB former teacher mesothelioma deaths* (75 and over) and teacher mesothelioma deaths (all ages)

Year range	Great Britain (GB) Female deaths (<75 years)[3]	GB Female deaths (75+ years) [3]	Ratio GB female deaths (75+ years / female deaths (<75) [3]	Teacher deaths (<75 years) [2]	Estimated teacher deaths # (75+ years)	Estimated total teacher deaths # (All age groups)
1980-85	428	104	0.24	15	4	**19**
1986-90	423	150	0.35	25	9	**34**
1991-95	556	208	0.37	31	11	**42**
1996-00	601	395	0.66	43	28	**71**
2001-05	800	629	0.79	63	50	**113**
2006-10	1007	839	0.83	73	61	**134**
2011-15	969	1053	1.09	85	93	**178**
2016-17	375	467	1.25	45	56	**101**
1980-2020*				**380**	**312**	**692**

**The total number of teacher deaths does not include the former teachers whose last occupation was not in teaching sothis number is likely to be a considerable underestimate.*

MESOTHELIOMA DEATHS SUPPORT STAFF AGED 75 AND OVER. The occupational statistics state that 71 support staff aged under 75 died from mesothelioma between 2003-2017. From the ratio in column 4 of Table 2 above it is likely that a further 71 died aged 75 and over and so 142 support staff died between 2003-2017. If it is presumed that the ratio of teacher deaths 1980-2000 /teacher deaths 2001-2017 = ratio of support staff deaths 1980-2000/support staff deaths 2001-2017 then number of support staff deaths 1980-2000 = 45 and total number of support staff deaths is 142 + 45 = 187. However, the GB Occupational Statistics omit the support staff most likely to work in areas with substantial asbestos. They include caretakers, kitchen staff, cleaners and technicians.[2] **It is therefore likely that the total number of support staff deaths from mesothelioma exceeds 300.**

ESTIMATED FORMER PUPIL MESOTHELIOMA DEATHS

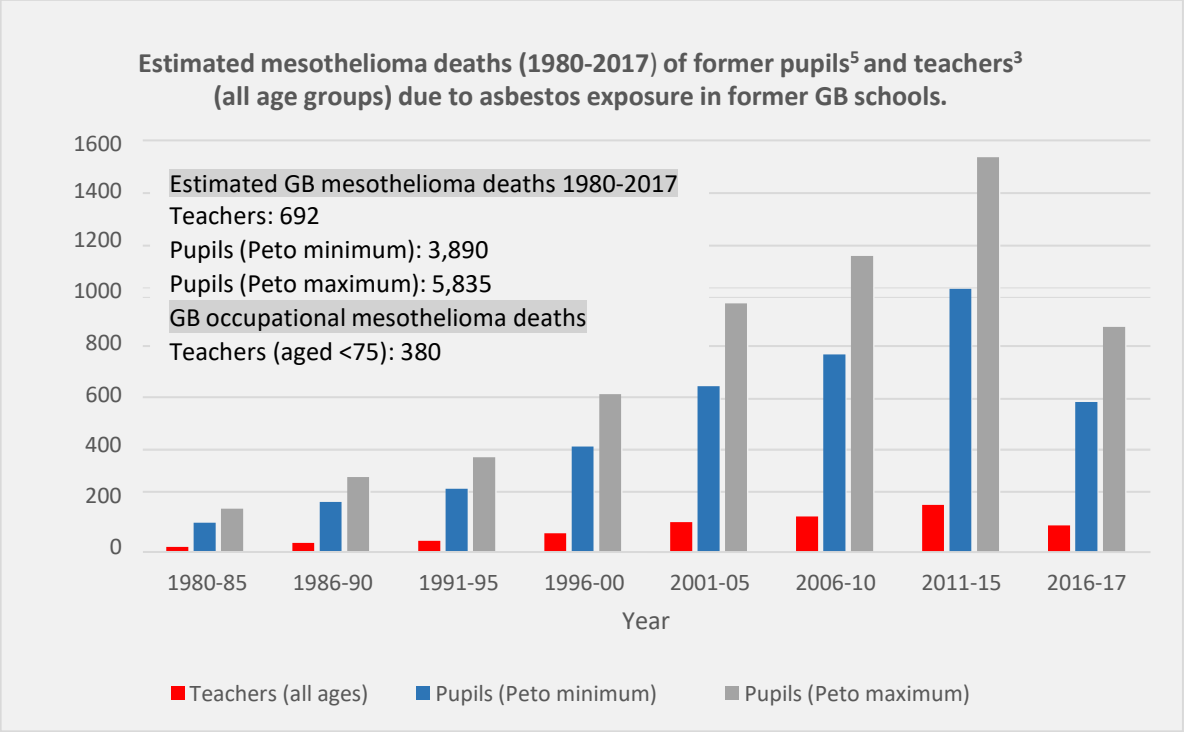
The Government does not appear to have estimated the number of former pupil deaths from mesothelioma. However, in 1980 the Unite States Environmental Protection Agency (EPA) estimated that in U.S. schools for every staff (teacher / support) member death there would be 9 pupil deaths.[23] On that basis, the estimated number of former pupil deaths from mesothelioma in GB schools (1980-2017) would be 9 (692 + 350 plus all former staff whose last occupation was not recorded as education) = over 1,000**.**

Thus over 9,000 former pupils are estimated to have died from mesothelioma according to the EPA estimate.

In 2013 in the UK, Professor Peto in Great Britain stated to the Commons Select Committee that about two-thirds of the 400 GB female mesothelioma deaths each year between 2011-2015 appear to be due to asbestos exposure in buildings like homes and schools. From this finding Peto presumed that between 100-150 of former girl pupils and 100-150 of former boy pupils (i.e., 200-300 former pupils altogether) die from mesothelioma each year because they were exposed to asbestos in their former schools in the 1960s and 1970s.[5] [1]

During 2011-2015 the national mesothelioma statistics indicate that the number of female deaths each year from mesothelioma averages just over 400.[3] It is therefore reasonable to estimate using Peto's presumption that during 2011-2015 the total number of former pupil deaths ranged from a minimum of 1000 to a maximum of 1500 deaths.[5] It is also reasonable to estimate that the number of pupil mesothelioma deaths is likely to have increased since 1980 at the same rate as the teacher mesothelioma deaths as accordingto the Committee on Carcinogenicity statement in 2013, pupils are more vulnerable to developing mesothelioma only because they live long enough after exposure to develop mesothelioma. However, the deaths of former pupils will eventually be much higher.[4]

Figure 3 below shows the estimated number of mesothelioma deaths of former pupils since 1980. See also page 62 APPENDIX D: ESTIMATED FORMER PUPIL MESOTHELIOMA DEATHS IN GREAT BRITAIN (1980-2017) and Figure 1 (cover). This indicates that from 1980-2017 the estimated number of former pupil mesothelioma deaths (all age groups) was about 3890 –5,835 while the estimated number of teacher mesothelioma deaths (all ages) was 692.



ARE THE FORMER PUPIL MESOTHELIOMA DEATHS UNDERESTIMATED?

Professor Peto informed the Education Select Committee hearing [5] just 100-150 of 400 female deaths each year are due to exposure in school buildings. This statement formed the basis of the estimated 3,890-5,835 former pupil deaths. However, the basis for that estimate is unclear and appears to disregard the fact that 83% of schools contain asbestos and up to half of schools are system built with substantial asbestos. Consequently, most former pupils will attend a school with substantial asbestos for many years. Furthermore, it is known that children are far more likely than adult to develop mesothelioma after a given level of asbestos exposure.[4]

It is therefore also reasonable to presume that asbestos exposure at school may potentially contribute significantly to the cumulative asbestos exposure of almost all former pupils including those who go on to work in high-risk occupations as well as those who appear to have just been exposed passively in buildings

In contrast the United States EPA estimate of 9,000 former pupil mesothelioma deaths is based on research into the risk of pupils developing mesothelioma in the United States and led to more stringent control of asbestos in US schools.[24] Notably calls for an audit of asbestos in the UK was turned down because 'Commissioning a nationwide survey might provoke unnecessary panic.' [25] Today there is still no systematic audit of asbestos in schools.[11]

Main Findings: GB Mesothelioma deaths of former school staff and pupils (1980-2017)

- Great Britain mesothelioma occupational statistics indicate that 380 teachers aged under 75 died between 1980-2017; an estimated 312 teachers died aged 75 and over (see Table 2). Consequently, an estimated 692 teachers of all ages, have died from mesothelioma. *
- Estimation of former GB pupil mesothelioma deaths due to exposure in schools between 1980-2017 variously indicated there were:
  - About 3,890 to 5,835 according to calculations based on recent G.B. research [5]
  - about 9,000 according to 1980 U.S. EPA research [23]
- The GB mesothelioma occupational statistics:
  - Do not have complete data from 1980 for support staff* and omit those support staff most likely to work in areas with additional asbestos like kitchens, laboratories and boiler rooms.
  - *Underestimate the number ofmesothelioma deaths because they do not include the mesothelioma victims (aged 75 and over) or former staff who did not record work in school for their last occupation.
- The estimated number of former teacher and pupil mesothelioma deaths ranges from about 5,000 – 10,000. See page 54 RECOMMENDATIONS FOR GOVERNMENT and page 51 OCCUPATIONAL STATISTICS.

B. ASBESTOS MANAGEMENT

Asbestos Management

This section looks for evidence that the 60 CLASP schools have:

- identified all asbestos locations (SURVEY)
- checked if asbestos is being disturbed or is likely to be disturbed (RISK ASSESSMENTs)
- carried out recommended action(s) to prevent exposure (ASBESTOS MANAGEMENT PLAN)

OUTLINE OF HSE SCHOOL ASBESTOS MANAGEMENT GUIDANCE

The Control of Asbestos Management Regulations 2012, ACOP and HSE Guidance require that Great Britain Duty Holders identify all asbestos that is being disturbed or likely to be disturbed and take appropriate actionto prevent exposure. The criteria used to evaluate asbestos management in the 60 schools investigated were derived from the HSE checklist for schools,[13] HSG227,[26] Control of Asbestos Regulations 2012[27] and the HSE guidance for Duty Holders of school system buildings.[10] See page 14 Criteria used for asbestos management evaluation.

The main HSE requirements are briefly summarised below together with references to the detailed HSE guidance.

The Control of Asbestos Regulations, Approved Code of Practice,[12] HSE asbestos management checklist for schools[13] and HSE guidance for Duty Holders of System built schools[10] require that:

- *A **Management Survey** is carried out which records the location, type and condition of asbestos / presumed asbestos materials (AMs) in all areas of the school premises. The HSE recommends that surveys are UKAS accredited and that asbestos management plans are based on an up-to-date survey.*
- *A **Risk assessment** should be done to find out if asbestos is being disturbed or likely to be disturbed. This should include:*
  - *The type, surface treatment and condition of the asbestos materials (Material Assessment)*
  - *Whether the AMs are being disturbed or likely to be disturbed and expose occupants to asbestos (Priority Assessment). This should be informed by the Duty Holder as knowledge of the potential level of asbestos disturbance is essential.*
  - *Adding the material assessment and priority assessment scores to obtain the Risk Assessment. Its purpose is to inform prioritisation of management action and it is not an absolute measure of risk to occupants,*
  - *The action that is necessary to remove/minimise the risk*
- ***Columns and ceiling tiles should be remediated** in order to prevent potentially high exposure to hidden asbestos passing from columns and ceiling voids into occupied areas.*

  Recommended actions[10] include:
  - *Regularly monitor, identify and seal any gaps in column casings of CLASP-type buildings*
  - *Regularly monitor and replace any damaged / missing ceiling tiles*
  - *Regularly train/inform staff as necessary about the potential risk from hidden asbestos passing from columns and ceiling voids via gaps into occupied areas.*
- *The schools should have a **written asbestos management plan (AMP)** that:*
  - *Includes all necessary information and asbestos management arrangement*
  - *Includes arrangements for staff training / awareness training as necessary and communication about asbestos location and risk in all work areas*

CRITERIA USED FOR ASBESTOS MANAGEMENT EVALUATION

The CAR2012 Approved Code of Practice,[27] HSE guidance and checklist for schools[13] together with the HSE guidance for schools with system buildings[10] provide detailed guidance for Duty Holders. Compliance with the guidance aims to ensure that Duty Holders are managing the risks from asbestos.[28]

That guidance was therefore use to develop 25 criteria (questions) – grouped into five main sections - that could evaluate the effectiveness of asbestos management. For example, if the Duty Holder provides evidence of compliance with all the Section 1 Surveys criteria a to d then the Surveys are deemed to have been managed to the required standard.

However, compliance with the criteria for this report is based only on the surveys and asbestos management plans received and as such may not indicate compliance with the regulations according to HSE inspection criteria. See Discussion page 50 LIMITATIONS OF THE CLASP SCHOOL INVESTIGATION
The 25 criteria used in this report are grouped into 5 main sections:

Section 1. Surveys

a. Has a management survey been carried out?
b. Is the survey up to date?
c. Is the survey UKAS accredited?
d. Does the survey include the location of all accessible and presumed asbestos?

Section 2. Is accessible asbestos likely to be disturbed?

e. Has the Duty Holder considered the type and condition of the asbestos materials (Material Assessment)?
f. Are asbestos materials (AMs) likely to be disturbed (Priority Assessment)?
g. Has the Duty Holder taken action to manage the risks from easily accessible asbestos?

Section 3. Inaccessible asbestos in system buildings

h. Has the Duty Holder checked for asbestos clad columns?
i. Have gaps in columns been sealed and missing / damaged ceiling tiles been replaced?
j. Are the columns regularly monitored for gaps that would let asbestos pass into occupied areas?
k. Are ceiling tiles regularly monitored for missing/damaged ceiling tiles would let asbestos pass into occupied areas?
l. Have all school staff made aware of risk from gaps in unsealed columns and contaminated ceiling voids?
m. Have all school staff made aware of procedures for reporting and rectifying column/sealant damage and damaged ceiling tiles?
n. Are there arrangements for making contractors aware of risk from asbestos in columns and ceiling voids?

Section 4. Asbestos management plans 1- *All necessary information and actions*
In particular does the asbestos management plan:

o. Show clear lines of responsibility?
p. Provide specific information regarding the school
q. Include historic information?
r. Include an Asbestos Register?
s. Have information based on a recent survey - since 2017?
t. Include an action plan for what is going to be done, when it is going to be done, and how it is going to be done – both for any remedial work and for ongoing management action like periodic checks/review?

Section 5: Asbestos Management Plans 2- *Arrangements for training and communication*
In particular does the asbestos management plan:

u. Have arrangements for asbestos awareness training for all staff?
v. Have arrangements for appropriate training for in-house staff?
w. Have arrangements to ensure AMP is readily accessible to all staff?
x. Have arrangements to ensure AMP is readily accessible to in-house staff and contractors?
y. Have arrangements for asbestos emergency incidents?

PRESENTATION OF FINDINGS

The evaluation of asbestos management is divided into 7 sections:

- Section 1: Surveys (criteria a-d);
- Section 2: Risk Assessments (criteria e-g):
- Section 3: Inaccessible asbestos in system buildings (Criteria h-n);
- Section 4: Asbestos Management Plans 1- *All necessary information and actions (*Criteria o-t);
- Section 5 Asbestos Management Plans 2- *Arrangements for training and communication* (Criteria u-y).
- Section 6A: Compliance of schools with asbestos management criteria
- Section 6B: Compliance of each school with asbestos management criteria.

See page 13 CRITERIA USED FOR ASBESTOS MANAGEMENT EVALUATION

Each asbestos management section 1 to 5 contains:

- a brief summary in a text box of the relevant asbestos regulation requirements/guidance.

Tables 4A page 21 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA shows the number and percentage of each school type* that satisfy each of the criterion listed in Sections 1 to 3.

Table 4B page 22 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA shows the number and percentage of each school type* that satisfy each of the criterion listed in Sections 4 and 5.

**The findings for each school are grouped according to type of Duty Holder (Local Authority, Academy, Other, all Duty Holders) in order to ascertain the impact, if any, of the Duty Holder on asbestos management.*

Table 5 page 23 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA shows the % of schools for each Duty Holder type that comply with all the criteria in each section as well as the range (maximum and minimum % values).

**In order to do this the proportion of criteria in a section that each school had complied with was converted to a percentage. For example, compliance with 2 criteria out of the 4 criteria (say a and c) in Section 1 would be 2/4 x 100 = 50%. The average level of compliance was then calculated for all 60 schools as well as all schools with the same Duty Holder type.*

Figure 4A and Figure 4B show the level of compliance by individual schools with the criteria in each section for local authority schools and Academy/other schools respectively. See page 24 SECTION 6B: COMPLIANCE OF EACH SCHOOL WITH ASBESTOS MANAGEMENT CRITERIA

Figure 5 shows the number of schools that complied with all the criteria in each of the 5 asbestos management sections. See page 25 SECTION 6B: COMPLIANCE OF EACH SCHOOL WITH ASBESTOS MANAGEMENT CRITERIA

SECTION 1: SURVEYS

Asbestos Surveys

This section looks for evidence that asbestos surveys in the 60 CLASP schools:

- are Management surveys
- are UKAS accredited and up to date.
- include all asbestos locations
- presume areas not accessed contain asbestos unless there is firm evidence to the contrary.

SURVEY FINDINGS: Compliance with Section 1 (criteria a to d) was used to check if each school had the required asbestos survey arrangements in place.

Table 4A shows the average level of compliance with Survey criteria (a to d) for the 60 schools and compares compliance by schools with different Duty Holders. See page 21 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

The main findings included:

- 55 out of 60 schools (92%) provided evidence that a management survey had been done (Criterion a)
- 37 out of 60 schools (62%) provided up to date surveys (Criterion b) carried out in 2017-2019
- 29 out of 60 schools (48%) had used a UKAS accredited organization (Criterion c)
- 17 out of 60 schools (28%) had included all asbestos locations (Criterion d). The reasons included:
    - locked rooms, access blocked by storage items, ceiling voids inaccessible due to height being higher than agreed for the survey.
    - Reinspection surveys (5 local authority and 6 Academy schools) that only investigated previously surveyed asbestos. Evidence was not given that all areas were previously surveyed
    - Most surveys did not investigate all the less accessible places like ceiling voids and ducts for a variety of reasons that included height restrictions to areas accessed and concern that any asbestos disturbance would impact on school usage.
    - 21 of the 60 schools did not presume asbestos in areas not accessed, so were deemed not to include all asbestos locations.

Table 5 showed that on average 63% (maximum 100 %; Minimum 25 %) of the survey criteria (a to d) were complied with by the 60 schools investigated. See page 23 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

Figure 4A and Figure 4B indicate the wide variation in the level of compliance by individual schools with the Section 1 Survey criteria for local authority schools and Academy/other schools respectively. See pages 24 SECTION 6B: COMPLIANCE OF EACH SCHOOL WITH ASBESTOS MANAGEMENT CRITERIA

Only 10 of the 60 CLASP schools complied with all the survey criteria so it is likely that all asbestos has not been identified in 50 of the 60 schools.

Main findings: Surveys

55 of the 60 schools provided a management survey. However, only 10 of the 60 schools compliedwith all of the survey criteria (see Figure 4A, 4B pages 25-6).

According to the evidence provided by Duty Holders:

- Only 37 of the 60 school surveys were up to date
- Only 29 of the 60 CLASP school surveys provided evidence of UKAS accreditation.
- 43 of the 60 of the school surveys had not included all asbestos locations.
- 21 of the 60 schools had not presumed asbestos in areas not accessed and did not haveup to date surveys.

These findings suggest that most of the 60 schools investigated had probably not identified all asbestos locations in their surveys and so potentially placed occupants and contractors at risk from unknown asbestos exposure.

See Page 17 RISK ASSESSMENTS; pages 20 and 21 ASBESTOS MANAGEMENT PLANS

SECTION 2: RISK ASSESSMENTS

Risk assessments

This section looks for evidence in the 60 CLASP schools that the Duty Holders had ensured the required checks (risk assessment) for potential asbestos disturbance in each location had been carried out.

RISK ASSESSMENT FINDINGS: In this section compliance with Section 2 (criteria e to g) was used to ascertain if each school had risk assessment arrangements in place according to HSE guidance. Table 4A shows the average level of compliance with Risk Assessment criteria (e to g) for the 60 schools. It also compares compliance for schoolswith different Duty Holders. See Table 4A page 21 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

The main findings included:

- 53 out of 60 asbestos surveys (88%) included a Material Assessment (Criterion e) and referred to the HSE guidance. However, the assessment was often provided as a number or a letter and so it was not known if there was compliance with the detailed HSE guidance
- 18 out of 60 schools (30%) of Duty Holders had not provided a priority and risk assessment (Criterion fand g) but
- Just 3 schools out of 60 school provided evidence that the Risk/Priority ratings took account, as required, of the actual level of disturbance caused by everyday school activities in the different locations. This means they are likely to have underestimated the actual risk. See page 20 SECTION 5: ASBESTOS MANAGEMENT PLANS -2 (TRAINING AND COMMUNICATION) ; pages 50 LIMITATIONS OF THE CLASP SCHOOL INVESTIGATION
- No asbestos register/material assessment indicated the type of sealant used for asbestos encapsulation in each location. Some sealants are not resilient and are only used in areas where there is no likelihood of mechanical disturbance. Others can strengthen the asbestos containing material if it is in good condition. If the risk assessment has been wrongly described as low riskor the use of the area changes then the choice and/or use of encapsulant should be reviewed.
- 9 out of 60 schools still had easily accessible asbestos in low level classroom walls where the risk of disturbance by classroom activities is likely to be high according to the HSE model guidance for schools. However, only one of these schools recorded a medium to high risk assessment. Two of these schools ignored the surveyor recommendation to remove the asbestos. Inadequate funding / asbestos awareness training are likely to be the underlying reason for this failure to remove asbestos.

Table 5 shows that on average 75% of the Risk Assessment criteria (e to f) were complied with by the schools investigated. This included schools with unclear criteria for priority and risk assessments as well as those that used HSE guidance to calculate priority and risk assessments. See Table 5: page 23 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

Unfortunately, it is not possible to ascertain if Material and Priority assessments complied with the HSE guidance because the surveys often provided these assessments in the form of a final score expressed as a letter or number. It was therefore decided to record compliance if the surveyor/Asbestos Management Planstated that they had complied with the HSE guidance. This is discussed on page 50 LIMITATIONS OF THE CLASP SCHOOL INVESTIGATION

Figure 4A and Figure 4B graphically indicate the wide variation in the level of compliance by individual schools with the Section 2 Risk assessment criteria for local authority schools and Academy/other schools respectively. See page 24 SECTION 6B: COMPLIANCE OF EACH SCHOOL WITH ASBESTOS MANAGEMENT CRITERIA**.**
40 of the 60 CLASP schools had complied with all the risk assessment criteria but 20 of the 60 schools had not identified the risk of exposure from the asbestos located.

Main Findings: Risk Assessments

- The evidence provided indicated that:
  - 40 of the 60 CLASP schools complied with all the Risk assessment criteria
  - 43 of the 60 schools provided evidence of carrying out a Priority assessment.
  - 53 of the 60 schools had carried out the required Material assessment
  - Only 3 schools stated that staff had informed the Duty Holder about the actual level of asbestos disturbance in their work areas as required
- However, 43 out of 60 schools had not identified all asbestos locations. See page 15 SURVEYS

The above findings suggest most Duty Holders are likely to have underestimated the actual level of disturbance in areas occupied by staff and pupils and so left unsafe asbestos in place.

See pages 49-50 LIMITATIONS OF THE CLASP SCHOOL INVESTIGATION; pages 20 and 21 ASBESTOS MANAGEMENT PLANS

SECTION 3: COLUMN AND CEILING TILE REMEDIATION

Column and ceiling tile remediation

Gaps in column casings and between ceiling tiles means that any disturbed asbestos may be able to pass from columns and ceiling voids into occupied areas. This section therefore looked for evidence that Duty Holders had ensured:

- Gaps in column casings were sealed and missing or damaged ceiling tiles replaced.
- Asbestos arrangements were in place for:
- Regular checks for gaps in columns and missing/damaged ceiling tiles
- Remediation of column gaps and ceiling tile replaced
- Staff awareness training of risk from asbestos in columns and ceiling voids andthe procedures for reporting gaps in column and ceiling tile damage.

COLUMN REMEDIATION FINDINGS: In this section compliance with Section 3 (criteria h to n) was used to ascertain if each school had the requiredcolumn remediation arrangements in place in order to prevent the potentially high level of exposure from hidden asbestos in columns and ceiling voids.

Table 4A shows the average level of compliance with column remediation criteria (h to n) for the 60 schools. Italso compares compliance for schools with different Duty Holders. See page 21 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

The main findings included:

- 11 of the 60 school Duty Holders (15%) did not provide evidence that asbestos clad columns were present (Criterion h) although the local authorities had indicated in their response to the CLASP schoolFOI in 2017/8 that the school did have CLASP system buildings. However, two of the 11 schools had columns clad in non-asbestos materials like concrete and wood. In view of the Duty Holder response, it was presumed that these schools did have asbestos clad columns but clearly a follow up investigation is necessary to clarify whether asbestos is actually present in the column cladding

- Only 22 of the 60 schools (37%) provided evidence that column gaps had been sealed and missing and damaged ceiling tiles replaced (Criterion i)
- Only 23 of the 60 schools (38%) provided evidence that columns were regularly monitored for gaps (Criterion j)
- Only 17 of the 60 schools (28%) provided evidence that ceiling tiles were regularly monitored for gaps (Criterion k).
- Only 21 of the 60 schools (35%) provided evidence they had informed staff about the risk of asbestos passing through any gaps in columns and ceilings into occupied areas (Criterion l).
- Only 23 of the 60 schools (38%) provided evidence that staff were aware of procedures for reporting column and ceiling tile damage (Criterion m).
- Only 30 of the 60 schools (50%) provided evidence of arrangements to ensure contractors wereinformed of the risk from asbestos in columns and ceiling voids (Criterion n).

Table 5 shows that on average schools complied with just 42% (range 100%-0%) of the ColumnRemediation criteria (h to n) investigated. See Table 5: page 23 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

Figure 4A and Figure 4B show the wide variation in compliance by individual schools with the criteria for Section 3 column remediation criteria for local authority schools and Academy/Other schools respectively. Just 4 of the 60 schools had complied with all the criteria. See pages 24 SECTION 6B: COMPLIANCE OF EACH SCHOOL WITH ASBESTOS MANAGEMENT CRITERIA

Main Findings: Column and ceiling tile remediation

Although 49 of the 60 CLASP schools provided evidence for asbestos clad columns, just 4 schools provided evidence they had complied with all the criteria that aim to prevent exposure to asbestos passing from columns and ceiling voids into occupied areas (see pages 25-26). Moreover, just:

- 22 of the 60 schools provided evidence for sealing of gaps in column casings and the replacement of damaged/missing ceiling tiles.
- 23 of the 60 schools had procedures for staff reporting columns/ceiling tile damage
- 21 of the 60 schools made staff aware of the risk from unremediated columns and ceiling tiles.

The main findings indicate that nearly two thirds of Duty Holders have failed to provide evidence of compliance with the HSE guidance for Duty Holders of system buildings. This potentially places staff and pupils at an elevated risk of developing mesothelioma in future as high levels of asbestos can potentially pass via gaps from columns and ceiling voids into occupied areas. See pages 36-37 ASBESTOS LEVELS TODAY; pages 47-48 SIGNIFICANCE OF MAIN FINDINGS; pages 40-42 THE ASBESTOS REGULATIONS

SECTION 4: ASBESTOS MANAGEMENT PLANS -1 (ALL RELEVANT INFO AND ACTION)

Asbestos Management Plans-1 (All available and relevant information and actions)

This section investigates if the asbestos management plans of the 60 CLASP schools included:

- All available and relevant information
- Clear lines of responsibility
- An action plan for checks, monitoring and remediation tasks

This section investigates compliance with the criteria (o to t) for Asbestos Management Plans - 1 (AMP-1), to ascertain if each school asbestos management plan had all available and relevant information and detailed action to manage the risk.

THE MAIN FINDINGS FOR AMP - 1 [ALL RELEVANT INFORMATION AND ACTIONS] are shown in Table 4B* and include:

- Although each school provided an Asbestos Register (Criterion r) it is important to note that two-thirdof school surveys had not included all potential asbestos locations (Section 1) and risk assessments were apparently not carried out by a quarter of all schools (Section 2).
- Only 31 of the 60 school (52%) Duty Holders provided an AMP that was specific for each of their schools (Criterion p). 29 AMPs (48%) were generic and were essentially guidance for all the DutyHolder's schools. There was often no evidence of compliance with the generic AMP.
- Only 32 of the 60 (53%) school Duty Holders ensured a relevant historic record of work involving asbestos was included in the AMP (Criterion q). This may explain why some schools were not apparently aware of the risk from asbestos in columns and ceiling voids of their CLASP schools.
- Just 37 out of the 60 schools (62%) based their AMP on a recent survey (Criterion s)
- Just 38 out of 60 schools (65%) had clear lines of responsibility.
- Only 27 of the 60 school (45%) provided detailed action plans in the AMP for work to be done to remove any risks from asbestos outlined in the survey (Criterion t).

*See page 21 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

Table 5 graphically shows the wide variation between the level of compliance with Section 4 criteria (o-t) for each of the 60 schools. On average the 60 schools complied with only 61% (range maximum 100%- minimum 17%) of the Asbestos Management 1 criteria (o to t). See Table 5 page 23 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

Figures 4A and 4B show the significant variation in the level of compliance by individual schools with the Section 5 criteria u to y for local authority schools and Academy /other schools respectively.

Just 6 of the 60 CLASP schools provided evidence of compliance with all the Asbestos Management -1 criteria. See Figures 4A and 4B PAGES 24 SECTION 6B: COMPLIANCE OF EACH SCHOOL WITH ASBESTOS MANAGEMENT CRITERIA

Main findings: Asbestos Management Plans-1 (Relevant Information and Action)

The main findings showed that just 6 of the 60 CLASP schools had complied with all the Asbestos Management Plan – 1 criteria. See **pages 25-26 SECTION 6B: COMPLIANCE OF EACH SCHOOL WITH ASBESTOS MANAGEMENT CRITERIA** and only:

- 31 of the 60 schools provided a specific Asbestos Management Plan for their school
- 38 of the 60 schools provided evidence of clear lines of responsibility.
- 27 of the 60 schools provided evidence action plans for necessary checks, monitoring and remediation tasks.

The failure of so many the 60 CLASP schools to provide evidence of asbestos management plans with up-to-date surveys of all asbestos locations and effective risk assessments means that action plans may not identify and prevent asbestos exposure in all asbestos locations. **See** page 15 SURVEYS; Page 17 RISK ASSESSMENTS; pages 20 and 21 ASBESTOS MANAGEMENT PLANS See also page 36 ASBESTOS LEVELS TODAY; See pages 34-36 SOURCES OF ASBESTOS EXPOSURE IN CLASP-TYPE SCHOOLS

SECTION 5: ASBESTOS MANAGEMENT PLANS -2 (TRAINING AND COMMUNICATION)

Asbestos Management Plans (Training and Communication)

This section investigates if the asbestos management plans of the 60 schools included arrangements for training, communicating and informing staff, as appropriate, about the location and risk from asbestos in their work areas.

This section investigates compliance with the criteria (u to y) for Asbestos Management Plans-2 (AMP-2) in order to ascertain if each school had arrangements for appropriate staff training / awareness training and communication arrangements regarding asbestos location and risk in all work areas.

THE MAIN FINDINGS FOR AMP - 2 [STAFF TRAINING AND COMMUNICATION] criteria u to y are shown in Table 4B* and include:

- Only 22 of the 60 schools (37%) provided evidence of appropriate asbestos (awareness) training for staff (Criteria u) and in-house staff (criteria v)
- Only 21 of the 60 schools (35%) provided evidence of procedures for making AMPs accessible to all staff (Criterion w); 17 out of the 60 schools provided evidence for making AMPs accessible to in- house staff and contractors. (Criteria x).
- Only 31 out of the 60 schools provided evidence of arrangements for asbestos emergency plans (Criterion y)
- Most schools provided no evidence in the AMPs of specific arrangements, where necessary, to prevent unauthorized access to asbestos containing areas such as under the stage, ceiling voids,storerooms, cupboards, boiler rooms, cold stores, out buildings and plant rooms

*See page 22 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

Table 5 indicates that on average the 60 schools complied with just 38% [Range maximum 100%; minimum 0%] of the Asbestos Management 2 criteria (u to y).
See **Table 5**: page 23 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

Figures 4A, 4B show the considerable variation in the level of compliance by individual schools with the Section 5 criteria u to y for local authority schools and Academy/other schools respectively. Just 14 of the 60 CLASP schools complied with all the Asbestos Management Plan-2 criteria.
See **Figures 4A and 4B** on pages 24 SECTION 6B: COMPLIANCE OF EACH SCHOOL WITH ASBESTOS MANAGEMENT CRITERIA

Main findings: Asbestos Management Plan-2 (Staff training and communication)

Investigation of the 60 CLASP-type schools found that only 14 schools (see pages 25-6) complied with all the Asbestos Management Plan-2 criteria and only:

- 22 of the 60 CLASP schools provided evidence of arrangements for staff training
- 21 schools made the asbestos management plan accessible to all staff.
- 31 of the 60 schools provided evidence of arrangements for asbestos emergency incidents in their work areas.

The failure of nearly two thirds of Duty Holders to provide evidence of appropriate training and information for all staff about the location and risk from asbestos in their work areas means that they may not be aware of locations where asbestos is disturbed by everyday activities and so fail to take appropriate action to prevent exposure. See Asbestos management failures page 47 SIGNIFICANCE OF MAIN FINDINGS; page 17 SECTION 2: RISK ASSESSMENTS; page 15 SURVEYS

SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

TABLE 4A: NUMBER (%) OF SCHOOLS COMPLYING WITH ASBESTOS MANAGEMENT CRITERIA*

Duty Holder	Local Authority	Academy	Other	All schools
Total number of schools	**28**	**29**	**3**	**60**
Section 1. Surveys				
Criterion a Is the survey a Management Survey?	26 (93%)	26 (90%)	3 (100%)	55 (92%)
Criterion b Is the survey up to date?	17 (61%)	18 (62%)	2 (67%)	37 (62%)
Criterion c Is the survey UKAS accredited?	16 (57%)	11 (38%)	2 (67%)	29 (48%)
Criterion d Does survey include the location of all asbestos (easily accessible and presumed)	11 (39%)	6 (21%)	0 (0%)	17 (28%)
Section 2. Risk assessments				
Criterion e Has Material Assessment been done?	23 (82%)	27 (93%)	3(100%)	53 (88%)
Criterion f Has the Priority Assessment been done?	21 (75%)	21 (72%)	1 (33%)	43 (72%)
Criterion g Has the Risk Assessment been done?	21 (75%)	20 (69%)	1(33%)	42 (70%)
Section 3. Column remediation				
Criterion h Has Duty Holder checked for asbestos-clad columns?	22 (79%)	27 (93%)	0 (0%)	49 (82%)
Criterion i Have column gaps been sealed and damaged/missing ceiling tiles replaced?	13 (46%)	9 (31%)	0 (0%)	22 (37%)
Criterion j Are columns regularly monitored for gaps?	12 (43%)	11 (38%	0 (0%)	23 (38%)
Criterion k Are ceilings regularly monitored for gaps due to damaged and missing ceiling tiles?	7 (25%)	9 (31%)	1 (33%)	17 (28%)
Criterion l Have all staff been made aware of risk from unremediated columns and tiles?	9 (32%)	12 (41%)	0 (0%)	21 (35%)
Criterion m Have all staff been made aware of procedures for reporting column/ceiling tile damage?	12 (41%)	11 (38%)	0 (0%)	23 (38%)
Criterion n Are there arrangements for informing contractors of risk from asbestos in columns and ceiling voids?	14 (50%)	15 (52%)	1(33%)	30 (50%)

***Key showing Table cell colour for results falling within each percentage band**

Colour for each percentage band.	0-25 %	26-50%	51-75%	76-100%

For example, in Table 1 of Section 1: 57% of local authority schools provided evidence for a UKAS accredited survey. The cell in Table 1 for this result is therefore coloured yellow as it is in the percentage band 51-75%.

TABLE 4B: NUMBER (%) OF SCHOOLS COMPLYING WITH ASBESTOS MANAGEMENT CRITERIA*				
Duty Holder	**Local Authority**	**Academy**	**Other**	**All schools**
Number of schools	**28**	**29**	**3**	**60**
Section 4. Asbestos Management Plan 1 [Relevant information and action]				
Criterion o Are there clear lines of responsibility?	18 (64%)	19 (66%)	1 (33%)	38 (65%)
Criterion p Does it provide specific information about school	12 (43%)	17 (59%)	1(33%)	31(52%)
Criterion q Does it include relevant historic information?	16 (57%)	15 (52%)	1(33%)	32 (53%)
Criterion r Does it include an Asbestos Register?	28 (100%)	29 (100%)	3 (100%)	60 (100%)
Criterion s Is it based on a recent survey?	17 (61%)	18 (62%)	2 (67%)	37 (62%)
Criterion t Does it include an action plan -what, when how?	14 (50%)	12 (41%)	1(33%)	27 (45%)
Section 5. Asbestos Management Plan 2 [Training and communication]				
Criterion u Does it have arrangements for staff asbestos awareness training?	8 (29%)	14 (48%)	0 (0%)	22 (37%)
Criterion v Does it have arrangements for in-house training?	9 (32%)	12 (41%)	1 (33%)	22 (37%)
Criterion w Is AMP readily accessible to all staff?	8 (29%)	12 (41%)	1 (33%)	21 (35%)
Criterion x Is AMP readily accessible to in-house staff and contractors?	6 (21%)	11 (38%)	0 (0%)	17 (28%)
Criterion y Does it have arrangements for asbestos emergency incidents?	12 (43%)	18 (62%)	1 (33%)	31 (52%)

***Key showing Table cell colour for results falling within each percentage band**

Colour for each percentage band.	0-25 %	26-50%	51-75%	76-100%

For example, in Table 1 of Section 1: 57% of local authority schools provided evidence for a UKAS accredited survey. The cell in Table 1 for this result is therefore coloured yellow as it is in the percentage band 51-75%.

TABLE 5: PERCENTAGE OF CRITERIA* IN EACH ASBESTOS MANAGEMENT SECTION COMPLIED WITH BY THE 60 SCHOOLS

Duty Holder	Local authority	Academy	Other	All Duty Holders
Total number of schools	28	29	3	60
Surveys (% complied all criteria in Section 1)	63% (Range: max. 100 – min. 0)	61% (Range: max. 100 – 0 min.)	75% (Range: max. 75 – 75 min)	63% (Range: max. 100 – 25 min)
Risk assessments (% complied all criteria in Section 2)	77% (Range: max. 100 – 33 min)	78% (Range: max. 100 – 33 min)	55% (Range: max. 100 – 0 min)	77% (Range: max. 100 – 0 min)
Column / ceiling tile remediation (% complied with all criteria in Section3)	45% (Range: max. 100 – 0 min)	43% (Range: max. 100 – 0 min)	10% (Range: max. 29 – 0 min)	42% (Range: max. 100 – 0 min)
AMP-1 includes necessary **d**ata (% complied with all criteria in Section 4)	60% (Range: max. 100 – 17 min)	64% (Range: max. 100 – 17 min)	50% (Range: max. 67 – 17 min)	61% (Range: max. 100 – 17 min)
AMP-2 includes staff **t**raining/communication **(**% complied with all criteria in Section 5)	31% (Range: max. 100 – 0 min)	48% (Range: max. 100 – 0 min)	20% (Range: max. 60 – 0 min)	38% (Range: max. 100 – 0 min)
Average (% complied with all criteria in Sections 1 to 5)	52% (Range: max. 79 – 23 min)	56% (Range: max. 92 – 21 min)	43% (Range: max. 54 – 28 min)	56% (Range: max. 92 – 21 min)

***** *See page 14 **[**Criteria used for asbestos management evaluation**]***

Table 5 above indicates that on average the 60 CLASP schools only complied with 56% (Range maximum 92% - minimum 21%) of the criteria for all asbestos management sections.Particular concerns were:

- **the failure to comply with criteria regarding column / ceiling tile remediation. On average just 42%of schools complied with the criteria (range maximum 100% - minimum 0%) and**
- **the failure to comply with Asbestos management plans 2 (staff training and communication). Onaverage just 38% of schools complied with the criteria (range maximum 100%- minimum 0%).**

Figure 4A, Figure 4B show graphically the considerable variation in compliance by individual schools with the criteria in each section for local authority schools and Academy/other schools respectively. See page 24 SECTION 6B: COMPLIANCE OF EACH SCHOOL WITH ASBESTOS MANAGEMENT CRITERIA

Figure 5 page 23 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA shows the number of schools that complied with all the criteria in each of the 5 asbestosmanagement sections. Most schools complied with all the criteria in just one asbestos management section.

SECTION 6B: COMPLIANCE OF EACH SCHOOL WITH ASBESTOS MANAGEMENT CRITERIA

Compliance with asbestos management criteria by individual schools

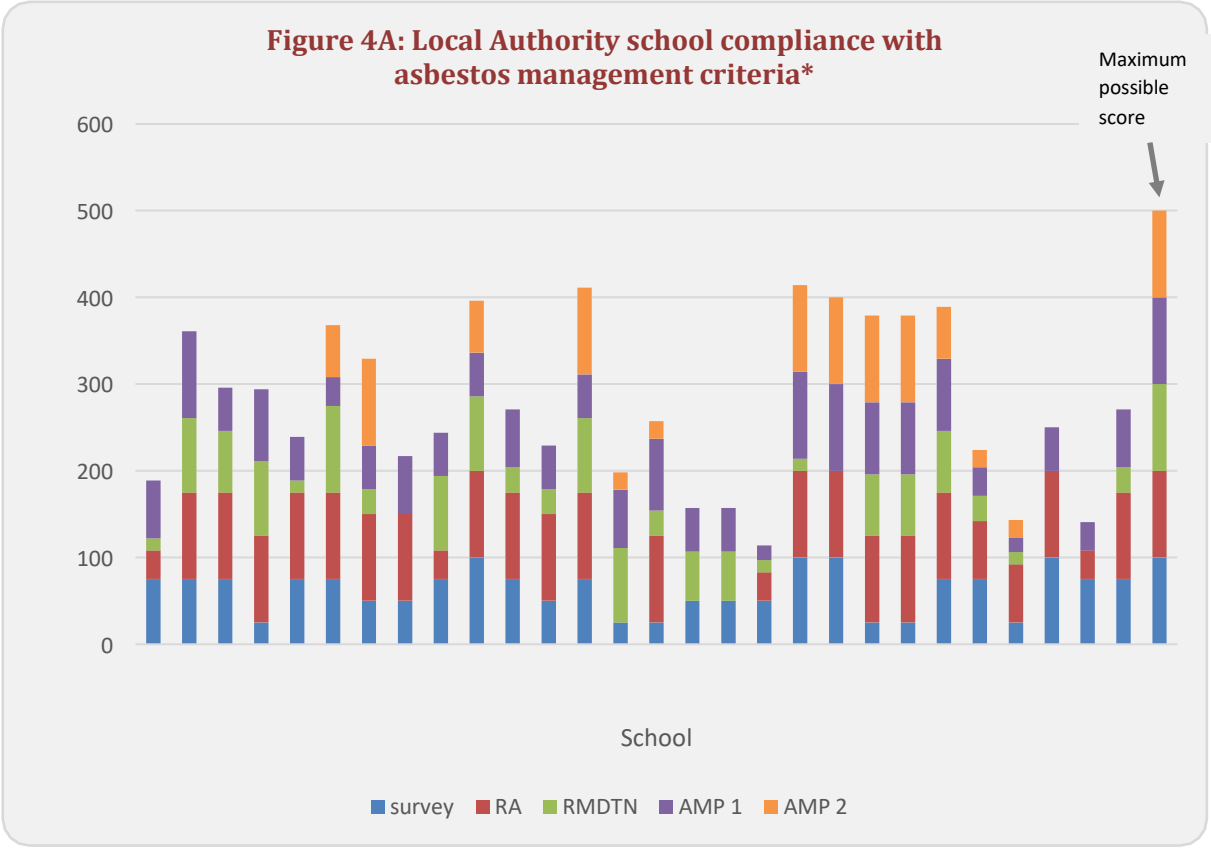
This section investigates the variation in the level of compliance with the 25 asbestos management criteria

The level of compliance by individual schools is shown in Figures 4A and 4B below. Each school was ascribed a number and its Duty Holder was indicated by a letter. Local authority schools were preceded by the letter L; Academy schools by the letter A and other schools by the letter O.

Figure 4A below shows the compliance of local authority schools with the criteria used to evaluate asbestos management and Figure 4B shows the compliance of Academy and Other schools. See page 13 CRITERIA USED FOR ASBESTOS MANAGEMENT EVALUATION

The maximum score for compliance with all criteria in each of the 5 sections is 100. The maximum possible score for all sections by each school is therefore 500 and denoted as Lmax, Amax and Omax for Local Authority, Academy and Other schools respectively.

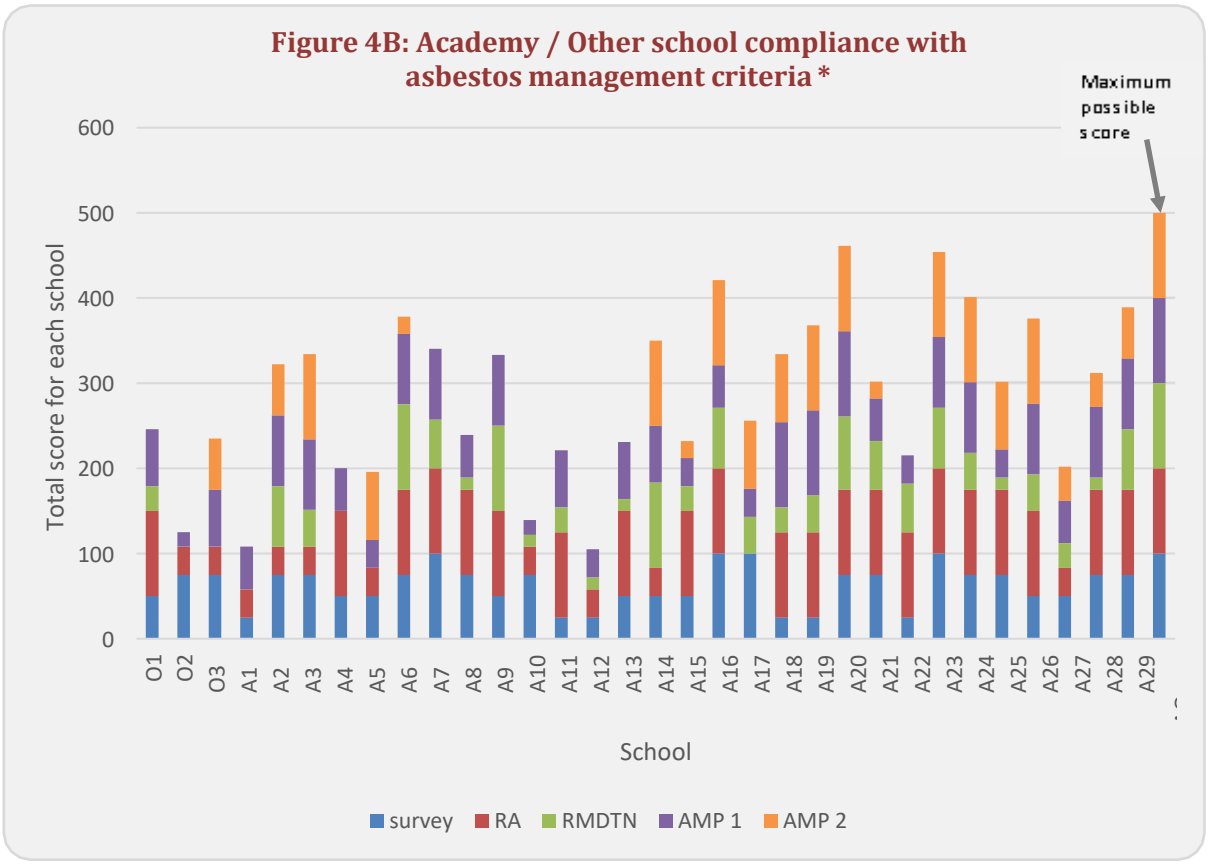
Figure 4A: Local Authority school compliance with asbestos management criteria*



Key for Figures 4A and 4B:

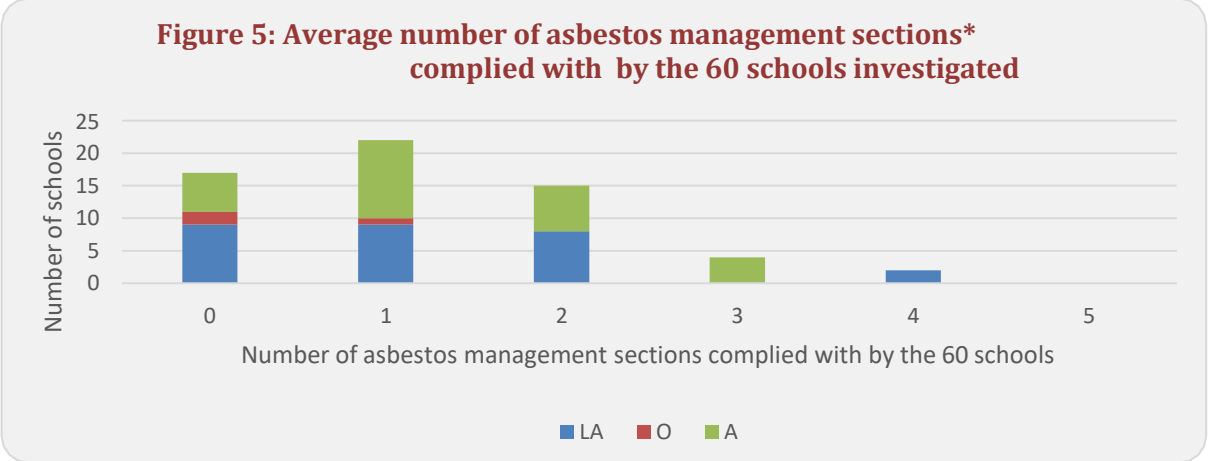
Survey: (Section1 criteria a to d)
RA: Risk assessments (Section 2: criteria e to g)
RMDTN: Remediation of columns and ceiling tiles (Section 3: Criteria h to n)
AMP1: Asbestos Management Plans (Section 4: Criteria o to t)
AMP2: Asbestos Management Plans (Section 5: Criteria u to y)

* See page 13 CRITERIA USED FOR ASBESTOS MANAGEMENT EVALUATION



The data in Figures 4A, 4B indicate that none of the 60 schools investigated have complied with all the asbestos management criteria and so their occupants potentially have a materially elevated risk of developing mesothelioma in future. Only 6 schools achieved scores over 400/500. 10 schools achieved levels below 200/500.

Figure 5 below shows the number of schools that complied with all the criteria in each of the 5 asbestos management sections. Most schools complied with all the criteria in just one asbestos management section.



* See page 13 CRITERIA USED FOR ASBESTOS MANAGEMENT EVALUATION

Main Findings: Compliance with asbestos management criteria by individual schools

There was considerable variance between the compliance of individual schools with the criteria. Most schools complied with all the criteria in just one of the five asbestos management sections.

C. ASBESTOS LOCATION

Asbestos location

This section finds out if the 60 CLASP schools provided still have substantial asbestos throughout.

In particular it looked for evidence of asbestos in locations where it could be disturbed by everyday school activities such as:

- Easily accessible asbestos in occupied areas like classrooms
- Inaccessible asbestos within the building structure which could pass into occupied areas when disturbed

The text box below outlines HSE guidance and Scape information about asbestos locations in CLASP buildings.

Context: HSE guidance[10] and Scape* information about asbestos in CLASP-type buildings

The location and management of asbestos in CLASP-type system buildings is detailed in the 2008 HSE guidance for Duty Holders of system buildings. This guidance was sent to all Duty Holders in 2008 because of the discovery that such buildings could potentially expose occupants to high levels of asbestos.

The guidance informs Duty Holders that: 'Within all buildings of the period, ACMs were used extensively for heat insulation and fireproofing, as well as in floor and ceiling tiles and wall panels (a more complete list is given in MDHS 100 and HSG227). Many of the system buildings used lightweight steel frames that required fire protection, particularly in ground floor locations of multi-storey buildings. One particular type of ACM, asbestos insulating board (AIB) was often used for this purpose.'

The guidance warns that: 'There is potential for asbestos fibre release from damaged column casings in system buildings. Gaps in the column casings can occur as a result of previous alteration, removal or direct physical impact on the casing… '

'Asbestos fibres can escape from these casings if:

- *There is damaged asbestos present under the casings; and*
- *The casings are vibrated in some way, e.g., by an adjacent door being slammed; and*
- *There are gaps or openings in the casings.*

When these gaps and openings are sealed – asbestos fibres cannot escape into rooms. '

'ACMs may also have been used in these buildings as unrecorded substitute items where there were material shortages and/or poor supervision. In addition, excess or waste ACMs may have been left hidden inside columns or panels and ceiling voids. Consequently, asbestos may be found in some unexpected locations and the presumption should be that ACMs would be present in other concealed areas.'

'Maintenance workers, cleaners and building occupants (including school staff and pupils) in the course of their normal activities, will have their potential for exposure to asbestos fibres minimised, if asbestos materials are being managed in accordance with this and other relevant guidance.'

The HSE guidance on asbestos in system buildings 2008 specifically states that school buildings were considered to be a priority due to the nature of the school environment, the age of the occupants potentially exposed and because schools make up the largest stock of system buildings.

The Scape Asbestos Awareness Handbook [29] *has detailed location schedules showing:*

Where asbestos was used in the original construction of the building as part of CLASP standard details and where asbestos could have been used in a CLASP building but was not part of the standard detailing. Scape advise that the above information should be used as a guide only as in practice there are many variations in asbestos location. It advises that asbestos in areas where it can be easily disturbed by mechanical damage / furniture/fittings should be removed via a licensed specialist. It also advises asbestos removal from numerous areas like casings that are likely to be disturbed by renovation work.

Scape** is a Public Sector organisation that evolved from CLASP in 2014. It also goes under the name of **Scape System Build.

MAIN ASBESTOS LOCATIONS

The main locations of asbestos in the 60 CLASP type schools investigated were identified from the surveys and Asbestos Registers. The main locations are shown in Tables 6A and 6B below. However only 17 of the 60 schools had identified all asbestos locations in the survey. See pages 15-16 SECTION 1: SURVEYS

Table 7 below shows the number and percentage of the 60 CLASP schools with surveys that indicate the presence of accessible and inaccessible asbestos in occupied areas. This includes accessible asbestos in ceiling tiles, walls, doors, cupboards, storerooms, window / door surrounds and warm air cabinet heaters and inaccessible asbestos in columns and boxing. The likelihood of disturbing accessible and inaccessible asbestos locations is outlined in on page 26 ASBESTOS LOCATION.

Table 6A: Number (%) of schools with asbestos in each specified location

Asbestos location	Column cladding	Ceiling tiles in all areas (includes offices, kitchens and boiler rooms)	Ceiling tiles in pupil occupied areas	Low level walls in pupil occupied areas	Low level walls in all areas (includes offices kitchens and boiler rooms)	Walls at high level in pupil occupied areas	Walls at high level in all areas (includes offices kitchens and boiler rooms)	Flooring in all areas
All schools (60)	49 (82%)	39 (65%)	31 (52%)	12 (20%)	28 (47%)	16 (27%)	32 (53%)	44 (73%)
Local authority (28)	23 (82%)	14 (50%)	12 (43%)	4 (14%)	16 (57%)	4 (14)	17 (61%)	19 (68%)
Other (3)	0 (0%)	1 (33%)	1 (33%)	1 (33%)	1 (33%)	1 (33%)	1 (33%)	2 (67%)
Academy (29)	27 (93%)	24 (83%)	18 (62%)	7 (24%)	11 (38%)	11(38%)	14 (48%)	23 (79%)

Table 6B: Number (%) of schools with asbestos in each specified location

Asbestos location	Ceiling void inspected	Ceiling void debris	Cupboard	Store room	Boxing	Window surrounds in pupil areas	Warm air heater baffles & casing	Door surrounds
All schools (60)	19 (32%)	16 (27%)	18 (30%)	29 (48%)	19 (32%)	17 (28%)	26 (43%)	19 (32%)
Local Authority (28)	6 (21%)	5 (18%)	5 (18%)	13 (46%)	7 (25%)	5 (18%)	10 (36%)	8 (29%)
Other (3)	1 (33%)	0	1 (33%)	1 (33%)	1 (33%)	1 (33%)	2 (66%)	1 (33%)
Academy (29)	12 (41%)	11 (38%)	12 (41%)	15 (52%)	11 (38%)	11 (38%)	14 (48%)	10 (34%)

Table 7: Number (%) of the 60 CLASP schools with accessible [A] and inaccessible asbestos in occupied areas [IA]				
Duty Holder	LA	Other	Academy	All schools
Number of schools	28	3	29	60
Schools with accessible asbestos in all occupied areas except boiler, tank and plant rooms	25 (89%)	2 (67%)	27 (93%)	54 (90%)
Schools with asbestos in columns and boxing	24 (86%)	1 (33%)	26 (90%)	51 (85%)
Schools with asbestos in boiler, tank and plant rooms	16 (57%)	2 (67%)	13 (45%)	31 (52%)

[A] *Accessible areas include ceiling tiles, walls, doors, cupboards, storerooms, window /door surrounds and warm aircabinet heaters.*

[AI] *Occupied areas included all rooms and corridors except for boiler, tank and plant rooms*

ACCESSIBLE ASBESTOS LOCATIONS

The HSE has advised in their model guidance for schools that easily accessible asbestos in classroom walls is highly likely to be disturbed by classroom activities[30] and it is noted that 48 of the 60 schools did not provide evidence for asbestos in easily accessible, low level walls in classrooms. See page **28** **Table 6A** This suggests either that it has either been removed, boarded or was never present.

However, 12 of the 60 schools still provided evidence of asbestos in low level walls in some classrooms where it can be easily disturbed and despite the recommendation of the surveyors in two of the nine schools.Inadequate funding / underestimation of the risk may explain why it is still in place.

Table 6A on page 28 indicates that there is more asbestos in the walls and ceilings of offices, boiler and plant rooms than in classrooms, halls and corridors. This suggests that over three quarters of Duty Holders have prioritised the removal or boarding up of asbestos from classrooms presumably because of the HSE guidance and the known increased vulnerability of children to asbestos.[26] [4]

However, Table 7 above shows that 54 (90%) of the 60 schools still had some accessible asbestos in occupied areas according to the evidence provided. This variously included sealed, unsealed and boarded asbestos. No information was provided by any school on whether any sealant used, was suitable for areas where it was likely to be disturbed. See page 16 SECTION 2: RISK ASSESSMENTS

The accessible asbestos locations variously included asbestos in walls, doors, window and door surrounds, store rooms, cupboards and ceiling tiles. Table 6B on page 28 indicates that 29 (48%) of the 60 schools hadasbestos in store rooms and 18 (30%) had asbestos in cupboards. Almost all schools had some unsealed asbestos in these locations. 26 (43%) of the 60 schools had warm air cabinet heaters many of which were apparently not checked to ensure the asbestos had either been removed or encapsulated, as necessary. Several schools had boarded up their heaters.

The asbestos in the cupboards, store rooms, ceiling tiles, walls, cabinet style warm air heaters, doors and window surrounds all potentially result in significant levels of asbestos exposure if disturbed. See **Table 8** page 34 SOURCES OF ASBESTOS EXPOSURE IN CLASP-TYPE SCHOOLS

INACCESSIBLE ASBESTOS LOCATIONS

The HSE guidance on asbestos management in system buildings states that asbestos should be presumed in allinaccessible areas unless there is firm evidence to the contrary**.** However, 21 of the 60 schools had not presumed asbestos in areas not accessed. See page 14 SECTION 1: SURVEYS. This section outlines the evidence from the surveys for asbestos or presumed asbestos in inaccessible areas of the 60 CLASP schools investigated. The main findings are outlined on pages 27 MAIN ASBESTOS LOCATIONS **Tables 6A,6B and 7**.

Asbestos clad columns and boxing; window heads: 49 (82%) of the 60 schools presumed or were known to have hidden asbestos in asbestos clad columns and boxing. The HSE had warned Duty Holders in 2008 that gaps in the column casings can occur as a result of previous alteration, removal or direct physical impact on the casing due to maintenance, construction or window installation works. However, only a third of Duty Holders provided evidence of the required remediation of columns and damaged/missing ceiling tiles and 10 of the schools did not cite asbestos clad columns in their survey/asbestos register and asbestos management plans which are typically found in CLASP Mark4/4b schools.[10] Scape specifically warns window heads can be damaged during renovation but they were generally not presumed in surveys.

Door surrounds: In 1987 ILEA found that in some system-built schools, high levels of asbestos were produced when doors were slammed/closed or opened. See page 34 AIRBORNE ASBESTOS LEVELS **Table 8.** It is not known if asbestos in the door surrounds in the CLASP schools have been sealed/checked to prevent asbestos exposure when doors are slammed/closed/opened as that is not required by the current guidance.[31]

Asbestos wall panels and linings: Similarly, asbestos wall panels and linings are also known to be a potential source of disturbed asbestos and were commonly found in CLASP Mark 4/4b school buildings.[29] See also the Scape Asbestos Awareness Handbook. The visible side is checked by surveyors and the likelihood of disturbance risk assessed by Duty Holders and surveyors.

However, it is known that the unsealed reverse side and asbestos in the wall voids may also be disturbed by knocks and the slamming of doors and windows. If there are gaps round the edges of the panels the disturbed asbestos can pass into occupied areas. While some schools clearly had wall panels it is not known from the information provided if panel edges were sealed down the sides, top and skirtings.

Boarding: Boarding to prevent disturbance of asbestos wall panels and old ceiling tiles may also be ineffective if asbestos fibres can still pass via gaps between panels into occupied areas. Many schools had wooden panels / Plaster board /other materials covering the walls but it was not evident from the information provided if they were covering the original asbestos lining/panels and, if so, they were adequately sealed.

Ceiling and wall voids: TABLE 6B on page 27 indicates that 41 out of the 60 CLASP schools did not inspect theceiling voids as required for the management survey. Reasons included a height restriction imposed on some surveys by the Duty Holder, the potential risk of exposure to asbestos debris and because some ceiling tiles were fixed in place. 16 of the 19 schools that did inspect the ceiling voids found asbestos debris which presumably came from damaged asbestos above the suspended ceiling e.g., from tops of unsealed columns, fire breaks, asbestos board over windows and asbestos rope.

Disturbance of this asbestos debris by lifting or damaging ceiling tiles during everyday activities potentially exposes occupants to high levels of asbestos. Unfortunately, the HSE guidance presumes everyday school activities will not disturb the ceiling tiles and so there is no requirement to remove asbestos from ceiling voids. In fact, two former pupil mesothelioma victims successfully gained settlements after they provided evidence tothe Courts showing they were exposed when they and others lifted ceiling tiles to hide objects in the ceiling voids.[6] [7] **Ceiling tile disturbance was cited in staff responses to the NEU asbestos survey 2019 report and** balls, umbrellas, scuffles, graffiti, standing on desks, water ingress and draughts have variously been cited as ways in which ceiling tiles and high-level walls can be disturbed.

The Public Accounts Committee 2017 inquiry into Capital Funding in Schools heard in 2017 how pupils and staff at **Hetton School (a CLASP system-built school)** became contaminated with asbestos when ceiling tiles lifted on windy days and had to go through a 'fumigation van' to be hosed down.[32] When questioned about this, Peter Colenutt,
Chair of the Educational Building and Development Officers Group (EBDOG) said this was 'fairly typical' while the Education Funding Agency (EFA) / DfE said they were unable to comment on how typical the asbestos exposure scenario at Hetton school was because they had not yet carried out a national asbestos condition survey.[33]

The Public Accounts Committee criticised the DfE's lack of knowledge about the school estate and recommended that it: '*needs to understand the prevalence, condition and management of asbestos.*' [32 page 7]

Identification of asbestos clad columns: According to Local Authority Duty Holder responses to a CLASP school FOI request in 2017, the 60 schools investigated had one or more CLASP buildings. [34] However, 11 of the 60 school surveys / asbestos management plans did not cite asbestos clad columns and column remediation in their surveys, asbestos registers and asbestos management plans although their local authority in 2009/2010 had satisfied the HSE that they had identified their CLASP-type schools and the recommended arrangements were in place for column and ceiling tile remediation.[35] [36]

In 2017/18 the local authorities provided the names of these CLASP schools in response to the CLASP schools FOI request. Three of the 11 schools had left local authority control since 2009/2010.[21]

According to information provided by Scape in response to the FOI request (2017) for a list of pre 2000 CLASP schools, 4 of the 11 schools were not built according to the CLASP project.[37] Three of the four came from the same authority and, after investigation, Scape suggested that: '*the local authority may have been misinformed or it may be that a number of both CLASP and SCOLA elements were incorporated into the build of the schools, but we have no record of that.*' [38]

The reason that asbestos clad columns were not identified, if present, is not known. Notably half of the 60 schools investigated did not provide historic evidence regarding previous work / checks and only just over a third provided evidence of the required column remediation. See pages 21,22 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA **TABLES 4A and 4B**.

As the local authorities / Scape had asserted these schools were CLASP Mark 4/4b in 2017 it has been presumed that they do have asbestos clad columns which have not been identified in the surveys. However, if that is so, it is clearly a concern that their presence is not stated in the asbestos registers and they are not checked for gaps and evidence of damage.

ASBESTOS LOCATION IN EACH SCHOOL

Figures 6A and 6B on page 31 below indicate that **according to the surveys most of the 60 CLASP schools have accessible and inaccessible asbestos in many locations but there is considerable variation between schools although they are all recorded as CLASP Mark 4/4b. It is presumed the differences may reflect different renovation and maintenance histories, architects, surveyors, survey remit or perhaps mistaken identificationof the school type by the Duty Holder as outlined in the Asbestos Clad column identification** above**.**

Figures 7A and 7B on page 32 indicate that occupied areas of most of the 60 CLASP schools generally contained both accessible and inaccessible asbestos. For example, 39 of the 60 CLASP schools had accessible asbestos in store rooms and cupboards; 51 had accessible asbestos (e.g., in walls, ceilings, door and window surrounds) and 52 had inaccessible asbestos in columns / boxing.

Figure 6A: Main asbestos location in Local Authority schools

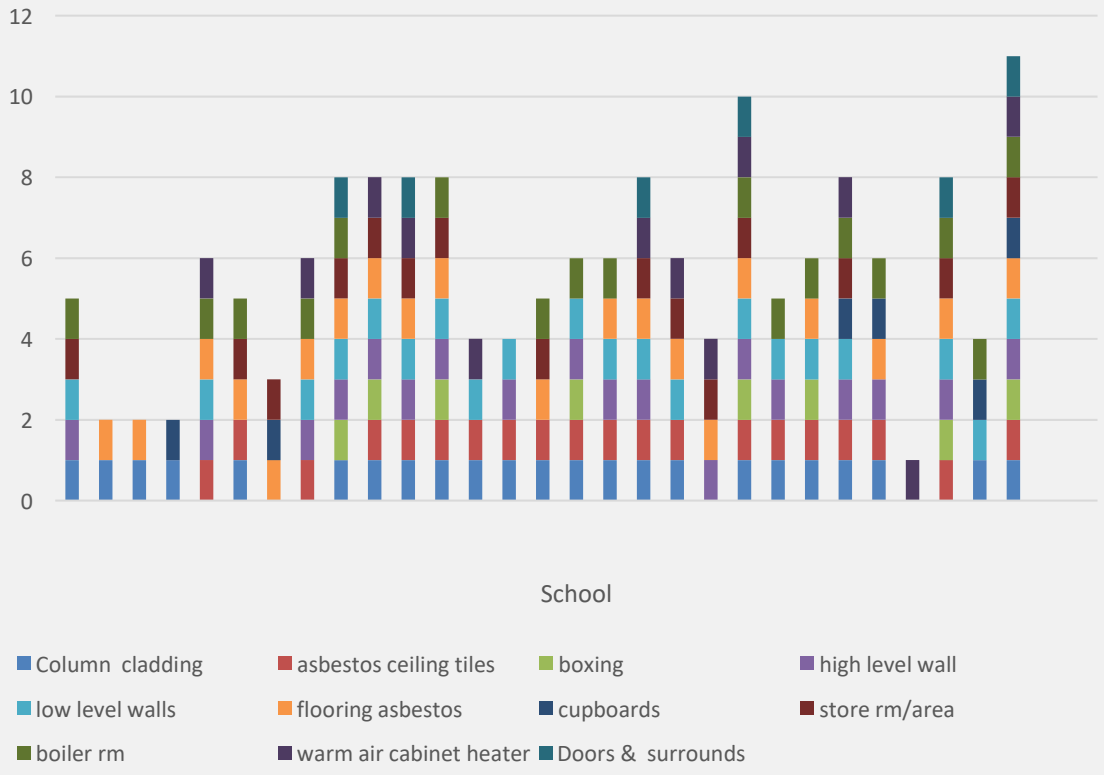
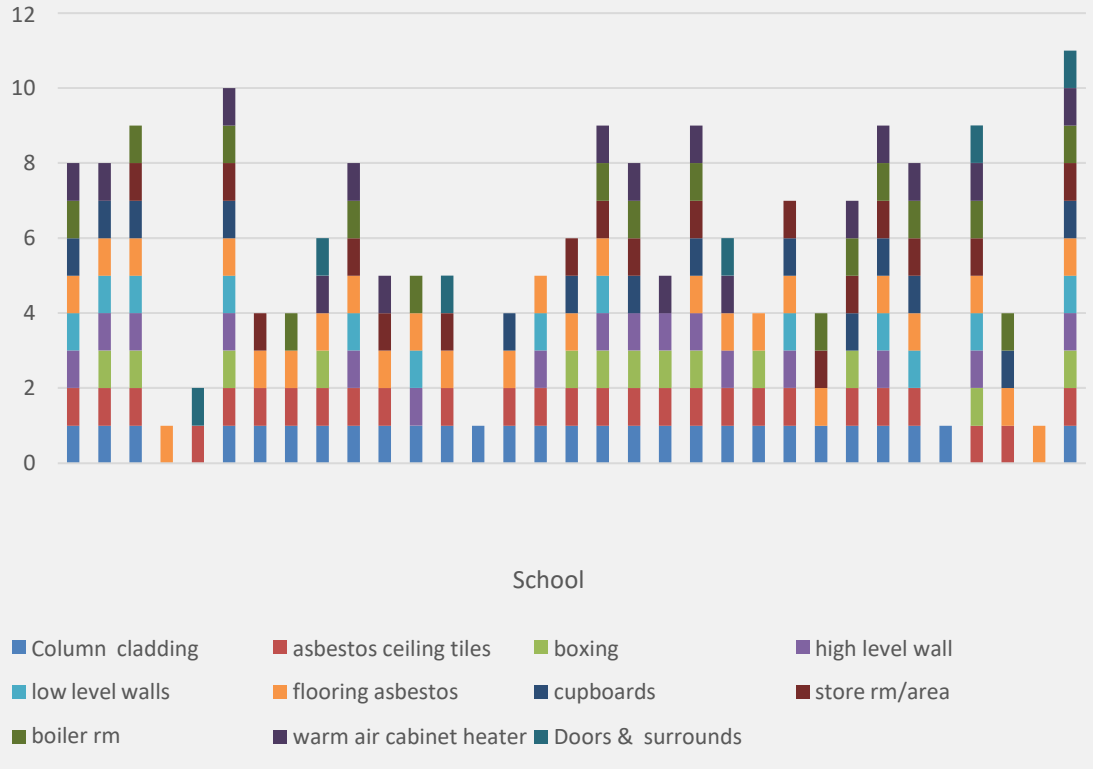


Figure 6B: Main Asbestos location in Academy and Other schools



LMax *and* **AOMax** *show total number of locations investigated in local authority and Academy/Other schools respectively.*

Figure 7A Accessible and inaccessible asbestos in local authority schools

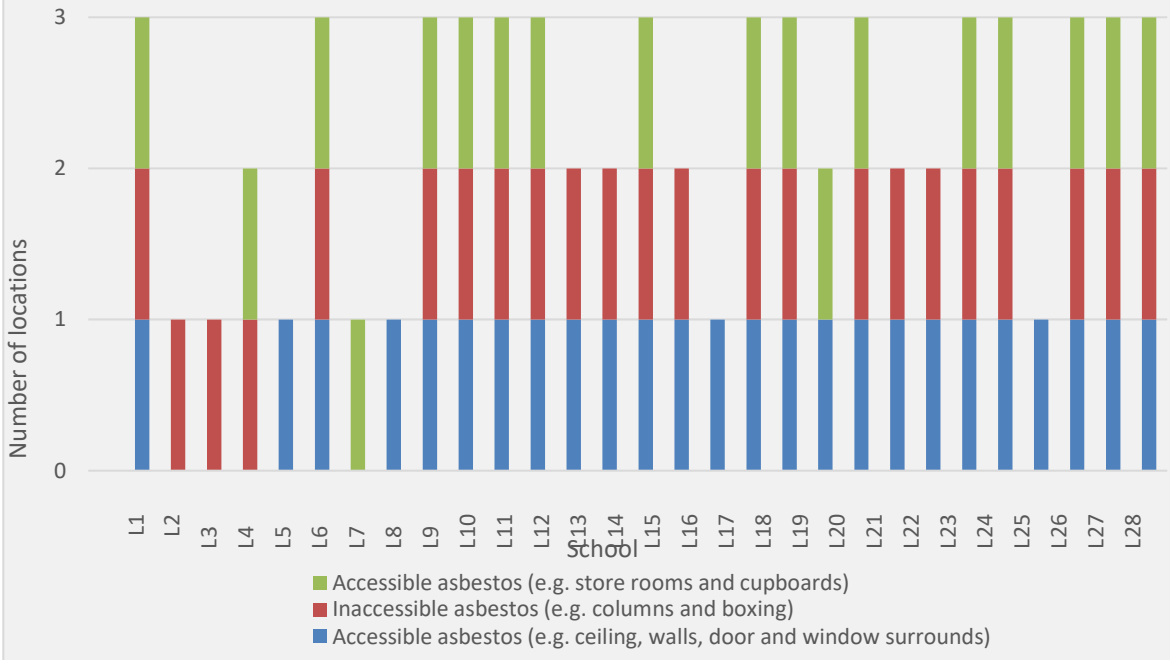
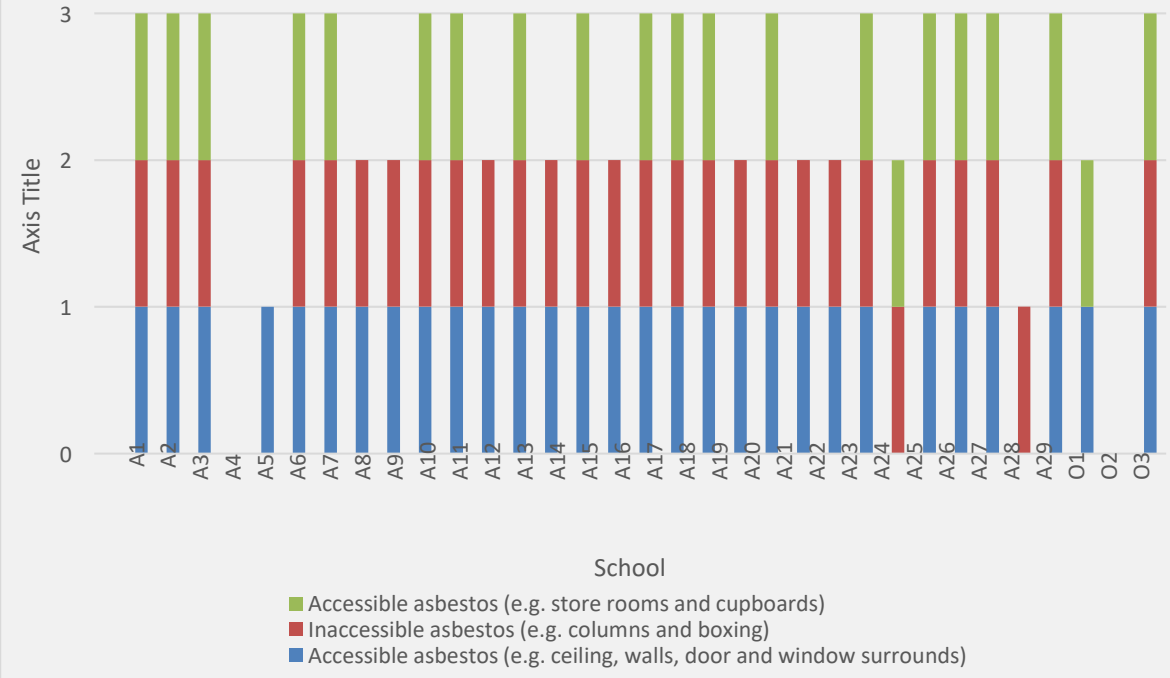


Figure 7B Accessible and inaccessible asbestos in Academy / other schools



LMax *and* **AOMax** *show total number of locations investigated in local authority and Academy/Other schools respectively.*

Main findings: Asbestos locations *

Most of the 60 CLASP schools investigated had substantial accessible and inaccessible asbestos throughout but there was a considerable variation between the actual locations.
Surveys indicated that:

- 49 of the 60 schools provided evidence for asbestos clad columns
- 51 of the 60 schools no longer had asbestos in easily accessible low-level classroom walls but
- 54 schools cited other sources of accessible asbestos in occupied areas.
- 2 of the 60 schools provided no evidence of accessible asbestos and asbestos clad columns although both had asbestos in the flooring throughout.
- Just 17 of the 60 school surveys investigated asbestos in all locations and 21 of the schools did not presume asbestos in areas not accessed. See page 15 SURVEYS

*See page 35 TABLE 8 SOURCES OF ASBESTOS EXPOSURE IN CLASP-TYPE SCHOOLS

D. AIRBORNE ASBESTOS LEVELS

Airborne Asbestos Levels

This section outlines published evidence regarding accessible and inaccessible asbestos levels in CLASO0type schools
It compares these asbestos levels with the estimated asbestos levels of teacher mesothelioma victims in their former schools between 1960 and 1980 and considers the implications of the findings.

Asbestos Regulations and HSE Guidance regarding airborne asbestos levels in schools

The Control of Asbestos Regulations (CAR2012) in Regulation 4 covers the duty to manage asbestos in non-domestic premise like schools. It requires dutyholders to identify the location and condition of asbestos in non-domestic premises and to manage the risk to prevent harm to anyone who works on the building or to building occupants.[12]

Regulation 6 of CAR 2012 requires employers to carry out a risk assessment to identify the risks of exposure to asbestos. It sets out the requirement to record any significant findings and put in place steps to prevent, or reduce, exposure to employees.

CAR2012 states *'Regulation 6 should be read with regulation 11(1), which places a duty on employers to entirely prevent the exposure of their employees to asbestos so far as is reasonably practicable and this should be the first consideration. If this is not possible, the exposure must be reduced to the lowest level reasonably practicable. Details of expected exposures should be recorded and include:*

- *data on the concentration of asbestos fibres likely to be present, including the source for this information;*
- *whether they are liable to exceed the control limit and the number of people likely to be affected;'*

This regulation requires employers to arrange regular monitoring of airborne asbestos fibres and keep records of the results. However, this does not apply where the exposure of an employee is not liable to exceed the control limit and most exposure in schools is below the Control limit.

After work involving asbestos, the regulations require that airborne fibre levels in the asbestos work area are below the clearance level indicator (the limit of quantification 0.01 f/ml) prior to removal of the asbestos work enclosure and reoccupation of the area.

In practice levels below 0.01f/ml; 10,000f/m^3 are deemed to be safe for reoccupation of schools after asbestos work and incidents although the HSE advises that that *'the threshold of less than 0.01 f/ml; 10,000f/m^3 should be taken only as a transient indication of site cleanliness, in conjunction with the thorough visual inspection, and not as an acceptable, permanent environmental level.*[12] *Regulation 17 para 453*

SOURCES OF ASBESTOS EXPOSURE IN CLASP-TYPE SCHOOLS

This section investigates the published asbestos levels regarding CLASP-type schools and compares them with the average estimated asbestos level in schools attended by teacher mesothelioma victims in 1960-1980.
Finally, it considers the particular implications of the findings for current asbestos management in CLASP-typeschools such as the 60 schools investigated. See also page 61 APPENDIX C: ASBESTOS LEVELS FOUND IN SCHOOLS

Table 8 below shows reported asbestos levels from a variety of accessible and inaccessible asbestos materials commonly found in many of the CLASP-type schools investigated. See also pages 27 MAIN ASBESTOS LOCATIONS

ESTIMATED ASBESTOS LEVELS 1960-1980

Robin Howie, expert asbestos hygienist has estimated that the number of teacher mesothelioma deaths observed in Great Britain between 2002 and 2010 (125 deaths) substantially exceeded the number of deaths expected in populations not exposed to asbestos (12 deaths), from exposure to asbestos-containing materials in good condition (30 deaths) or from idiopathic mesotheliomas (12 deaths) in the general population.
Howie concluded that:
'The observed excess mesothelioma deaths suggest that both teachers and nurses were likely to have been exposed to airborne asbestos fibre concentrations significantly higher than typical in buildings containing asbestos-containing materials in good condition.' [39]

Howie further estimated from the observed number of teacher mesothelioma deaths that the cumulative asbestos exposure over 30 years was about 0.15fibres/ml.years. This level of cumulative exposure indicatesthat teachers were exposed to average asbestos levels* of about 0.005f/ml, 5,000f/m^3 during the 30 years of exposure. This is 10 times higher than the level of asbestos found in schools with asbestos in a good condition (0.0005f/ml; 500f/m^3) and it is noteworthy that the Courts have accepted that such raised levels materially elevate the risk of mesothelioma developing.[6] See also page 42 RETROSPECTIVE RISK ANALYSIS

**Howie's estimations are based on the Hodgson & Darnton 2000 research findings.[40] This makes statements about the lifetime risk of exposure to amosite asbestos accumulated over short (up to 5 year) periods from age 30 and how they can be used to apply the mesothelioma estimates to other ages at exposure. However, in view of the uncertainty over some of the historic asbestos level measurements the Watch Committee recognised that the asbestos levels are not reliable, absolute risk values although they provide an approximate indicator of the risk from various asbestos levels*. See also page 42 CUMULATIVE ASBESTOS EXPOSURE AND RISK

Robin Howie, expert asbestos hygienist, estimated that former teacher (1960-1980) mesothelioma victims were exposed to asbestos levels significantly higher than that found in schools with asbestos in a good condition.[39] The Courts recognised in 2009 that such levels materially elevate the risk of developing mesothelioma.[6]

ASBESTOS LEVELS TODAY

Airborne asbestos levels in published research indicate that levels of airborne asbestos in CLASP-type schools during normal occupation may be at least as high as in the schools attended by mesothelioma victims in 1960-1980. See Table 8 page 36 SOURCES OF ASBESTOS EXPOSURE IN CLASP-TYPE SCHOOLS. However, there has been no systematic investigation of disturbed asbestos levels from all sources in all CLASP-type schools although the level after asbestos disturbance is much higher than found in schools with asbestos in a good condition. Even the systematic HSL review of asbestos levels in 20 CLASP-type schools before and after column remediation in 2006-2007 only investigated 20 schools.[41]

The HSE has provided guidance for Duty Holders on the remediation necessary to reduce exposure to asbestos from within columns and ceiling voids. In addition, the HSE/DCSF also checked compliance via a questionnaire and followed up inadequate responses with inspections, guidance and improvement notices as necessary. [35] [36]

According to the initial HSL review of the evidence[41] the average level of exposure to asbestos from disturbed unremediated columns within enclosures is 0.094f/ml; 94,000f/m^3. Range 0.441 – 0.001f/ml; Range 441,000-1,000f/m^3 so it is evident that **occupants of school buildings with unremediated columns will be potentially exposed to levels about 200 times higher on average than found in schools with asbestos in a good condition** i.e., 0.0005f/ml; 500f/m^3 and so have a greatly elevated risk of developing mesothelioma in future. **See Table 8** page 36. Asbestos contractors are required to wear protective gear and reduce exposure time at levels above the Control level. Pupils and staff, unknowingly exposed, have no such protection.

The average level of exposure to asbestos from remediated columns within enclosures (see Table 8) is 0.005f/ml; 5,000f/m^3. Range 0.058 - <0.001f/ml; Range 58,000f/m^3 - <1,000f/m^3. Clearly the average level of exposure in schools with remediated columns is also not safe because it is, on average, 10 times higher than the average level of asbestos in a good condition, and appears similar to the estimated, average level of asbestos in schools attended by teacher mesothelioma victims between 1960 -1980.[39]

The use of enclosures around the columns clearly would elevate the recorded airborne asbestos levels inside above the normal classroom level because the fibres could not disperse into the classroom. However, in practice this effect may be counteracted in normal classroom occupation by disturbed asbestos from other sources that could not enter the enclosure. Exposure to asbestos from other sources may explain the wide variation in effectiveness of the column remediation. See below: HOW ASBESTOS MAY BE DISTURBED TODAY.

Only 22 of the 60 CLASP schools provided evidence that columns had been sealed and damaged / missing ceiling tiles replaced. This suggests that 38 of the 60 CLASP schools may potentially have very high levels of exposure due to disturbed asbestos passing freely from columns and ceiling voids into occupied areas. See page 22 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

HOW ASBESTOS MAY BE DISTURBED TODAY

Table 8 on page 36 SOURCES OF ASBESTOS EXPOSURE IN CLASP-TYPE SCHOOLS indicates that there are many other sources of asbestos that produce unsafe asbestos levels when disturbed by everyday activities. They include accessible asbestos in wall linings, cupboards, store rooms, ceiling void debris, cabinet style warm air heaters, window surrounds and inaccessible asbestos in wall and ceiling voids. See disturbed asbestos in Figure 8 on page 37.

The disturbances described for columns and ceiling voids include everyday school activities. For example:

- The asbestos in columns can be disturbed by water ingress, slamming doors and windows, knocking columns. See Figure 8 below.
- The asbestos in ceiling voids can be disturbed by water ingress and lifting ceiling tiles. Ceiling tiles may be lifted by pupils (hiding bags, balls, poking with umbrellas) and draughts caused by opening windows and doors.

Asbestos rains down in school

Evidence given by head teacher to the Public Accounts Committee 2017. *

"When the ceiling tiles lifted at Hetton School on windy days so much asbestos came into the classrooms *'students had to go into the defumigation van—the emergency van—to make sure that they were de-dusted, hosed down and cleaned.'*

***** *House of Commons. Public Account Committee. Capital Funding for Schools. 57th report of Session 2016-17*

Other examples of disturbance are shown on page 37 Figure 9.

TABLE 8: SOURCES OF ASBESTOS EXPOSURE IN CLASP-TYPE SCHOOLS			
Source of asbestos (year)	**Asbestos level f/ml**	**Evidence source**	**Conditions of disturbance, if any**
AIB panels surrounding door frame	0.17-0.87 (EM found majority appeared to be amosite).	ILEA (1987)	Kicking AIB panels around door frames (painted/good condition)
Infant school toilet dividers (asbestos panels in good condition	(i)All air samples > 0.015f/ml (chrysotile, amosite and tr. Crocidolite (EM measurements	ILEA report LSS/AP/78 (1987)	(i) Slammed every half minute for 10times.
Stationery cupboard	0.017f/ml to 0.04 f/ml with average of 0.027 fibres/ml EM measurements	IOM Strategic Consulting Report: 629-00224 April (2009)	Removing books from cupboard with unsealed asbestos back in good condition
Stationery cupboard	0.12f/ml to 0.84 f/ml with an average of 0.36 fibres/ml. SEM	As above	Cleaning cupboards
Drawing pin insertion into AIB	*0.05f/ml in a 25-minute period of drawing pin activity*	WATCH committee minutes 1 Feb 2006 Conclusions (para 3.63 p15)	Inserting drawing pins into AIB frequently for 25 minutes
Recirculated warm air cabinet heater baffles	"*rooms served with by warm-air heaters whose ducts were lined with Asbestolux"* found a level of 0.025 f/ml.	Scape CLASP asbestos handbook. Standard details. HSE (1983) Asbestos in warm air heating systems. (Revised) LAAIC/C 3/5 HSE. Bootle UK	
Warm air cabinet heaters +/- disturbance	0.0043 f ml−1 with a pooled average of 0.0019 f ml−1. TEM 1 heater.2 CLASP sch heater levels <LOQ	*Ann.Occup. Hyg.*, 2015, 1–13 doi:10.1093/annhyg/mev062	Vigorous disturbance of all the accessible AIB panels + heating cupboard panels
Sealed sprayed amosite and chrysotile on ceilings with some damage	<0.003 f/ml to 0.012 f/ml with an average of 0.002 f/ml	HSE Airborne asbestos concentrations in buildings. Burdett and Jaffrey. Ann Occup. Hyg. Vol 30 No 2	
Column disturbance before remediation	Mean 0.094f/ml; Range 0.441 – 0.001f/ml	HSL/2007/22	Disturbance testing of enclosed columns (amosite)
Column disturbance after remediation	Mean 0.005f/ml; Range 0.058 - <0.001f/ml	HSL/2007/22	
Unremediated column disturbance	Two classrooms: 0.0005f/ml; 0.0007f/ml	AS/2007/14	Column (Chrysotile cement} disturbance
Column disturbance before remediation	Two areas TEM: 0.007f/ml; 0.009f/ml	AS/2007/14	Disturbance testing of columns (amosite) in good condition in a Rhondda school previously tested in HSL/2007/22
Column disturbance after remediation	Three areas TEM: 0.007f/ml; 0.044f/ml; 0.005f/ml	AS/2007/14	
Column disturbance before remediation	One column PCM 2.53f/ml	G&L Consultancy Ltd Report Hay Lane School Brent/2007	Disturbance testing
Lifting of ceiling tiles	0.034f/ml in enclosure	As above 2007	Lifting ceiling tile disturbs asbestos debris on top
Lifting of ceiling tiles	0.01f/ml	HSL RR624 2008	
Floor tiles	Atypical but unsafe fibres not counted by PCM	HEI 1991	Worn floor tiles (Chrysotile)

Table 8 above cites examples of asbestos disturbance by every day activities. They include thelevel of asbestos produced when:

- Removing books from cupboard with unsealedasbestos back in good condition and also when cleaning cupboards
- Kicking walls and slamming doors
- Inserting and withdrawing drawing pins intoasbestos material
- Scuffing/etching asbestos wall linings
- Blows/kicks to asbestos containing walls whichdisturb the accessible asbestos and the inaccessible asbestos on reverse side.

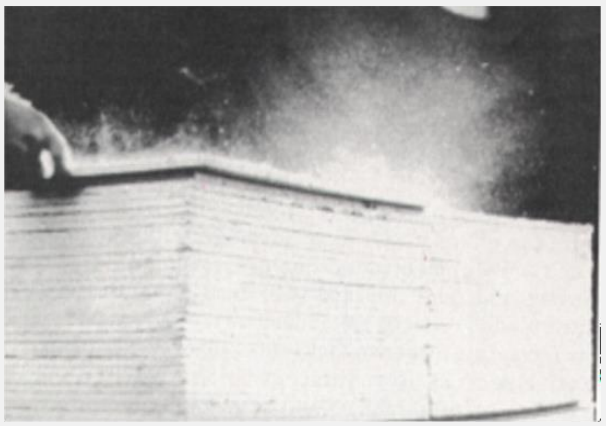


FIGURE 8: Tyndall beam photography reveals clouds of airborne fibres of asbestos fibres when knocked

Pupils in a classroom with unremediated columns may potentially be exposed to airborne asbestos above the Control level and so will have an elevated risk of developing mesothelioma,[7]

An asbestos contractor would be required to check asbestos levels and wear protective gear. See Figure 9.

The children have no such gearand no asbestos air level checks are made.

Table 7 (page 28), **Figures 6A and 6B** (page 31) and **Figures 7A and 7B** (page 32) indicate that most of the 60 CLASP schools investigated still have many different sources of unsafe levels of asbestos exposure throughout.

This is not surprising because CLASP-type schools have substantial asbestos incorporated into the building structure as standard according to Scape (see page 26) and the HSE advise that asbestos should be presumed throughout unless there is clear evidence to the contrary.

See also page 61 APPENDIX C: ASBESTOS LEVELS FOUND IN SCHOOLS

HOW CAN ASBESTOS LEVELS IN CLASP-TYPE SCHOOLS BE REDUCED?

The evidence outlined in **Table 8** page 36 SOURCES OF ASBESTOS EXPOSURE IN CLASP-TYPE SCHOOLS indicates that pupils and staff are potentially at risk from exposure to disturbed asbestos from a variety of sources in a high proportion of the CLASP schools investigated.

COLUMN REMEDIATION: The HSE recommended remediation of columns did reduce the asbestos levels many times in over 20 Clasp Mark 4/4b schools investigated but even after remediation, levels were 10 times higher on average than the levels found in schools with asbestos in a good condition.[41] Their occupants are therefore likely to have an elevated risk of developing mesothelioma in future according to the Courts.[6]

The HSE has advised that the causes of column casing damage include:

- refurbishment/installation works that disturb the column casings and the internal lining to the external wall.
- cables or wires that have been threaded inside the column casings possibly disturbing the ACM.
- items that have been fixed to the column casings e.g., fire extinguishers hanging brackets.

The ITN investigation of columns in a Brent CLASP Mark 4/4b school building also indicates that building deterioration due to weathering may also have disturbed the asbestos in some columns. Their G & L Consultancy Ltd Report on the disturbance testing of an unremediated column in a Brent CLASP Mk4/4b school stated:

> *"I noticed that the casings of the columns in the corridor on the first floor away from walls were in sound condition, so I suspect that there is a weather effect on those columns attached to external walls. I suggestthis be investigated further."* [42]

The above findings suggest that ineffective renovation work and building deterioration have increased the risk of exposure to asbestos from columns and ceiling voids so adequate funds, support and appropriate training is clearly vital for all Duty Holders, appointed responsible persons and staff in schools that have one or more CLASP-type buildings. Pupil and staff mesothelioma related deaths will inevitably increase without all the necessary resources and support regarding the identification and removal of unsafe asbestos.

FUNDING, TRAINING AND ASBESTOS AWARENESS: The failure of 38 (63%) of the 60 CLASP schools investigated to provide evidence of compliance with HSE column remediation guidance suggests that underlying causes such as inadequate funding, training and asbestos awareness should be urgently addressed as their occupants potentially have a particularly high risk of developing mesothelioma in future. See **TABLE 4A** page 21 SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

IMPROVED ASBESTOS REGULATIONS: The HSL 2007 reports state that the average levels after column remediation were *typical school background levels* and the HSE did not require schools in their later 2008 Guidance to carry out their earlier (2006) more costly 'long term solution' to minimise asbestos levels in the CLASP school buildings or take further action to identify other sources of asbestos exposure.[10 41] In view of the known risk from levels higher than that found in schools with asbestos in a good condition,[6 12] the current asbestos regulations should be updated in order to prevent continued exposure to these unsafe, '*typical school background levels.'*

IMPROVED REMEDIATION: The HSE long term solution included the removal of asbestos from ceiling voids, the sealing of wall voids and the tops of columns with foam or sealant and routine air monitoring to check their effectiveness. Such measures may potentially have reduced the airborne asbestos levels further in remediated schools. However, only a few of the 60 CLASP schools investigated for this report provided evidence of carrying out the HSE 'long term remediation solution.'

ASBESTOS REMOVAL: Removal of asbestos from within the structure of CLASP Type buildings is not considered cost effective by Nottinghamshire County Council in view of the difficulty of removing asbestos from within the structure and restrictions of the current structure on the modern learning environment.29

In view of the increasing evidence regarding the known harm from long term exposure to low levels of asbestos, it is inexplicable that the Government has not required further investigation of asbestos levels during normal occupation in all CLASP-type schools. Less than 0.5% have been investigated so far although there are 6,000 such schools in England alone and thousands more in Wales and Scotland. Different makes of system buildings may have different sources of asbestos exposure. See page 40 EVIDENCE FOR HARM FROM ASBESTOS EXPOSURE IN BUILDINGS SINCE 1960; page 57 APPENDIX A: TYPES OF SYSTEM BUILDINGS

Main Findings: Airborne asbestos levels

"All that matters is whether or not kids are breathing in asbestos and, until you find that out, everything else is hot air." (Peto 2013)[5] (page 11/20 para 3)

Published airborne asbestos levels in CLASP schools indicate that:

- Average asbestos levels in CLASP schools (2007) with remediated columns were UNSAFE as 10 times higher than schools with asbestos in a good condition.[41]
- CLASP schools with unremediated columns (2007) have average asbestos levels that are about 200 times higher than schools with asbestos in a good condition.[41]

This investigation of 60 CLASP (Mark 4/4b) schools found:

- only 22 schools provided evidence of column and ceiling tile remediation and
- 38 schools provided no evidence for column and ceiling tile remediation. See page 22
- many other sources of accessible and inaccessible asbestos, that could be easily disturbed by everyday activities, throughout most of these schools. See page 35 TABLE 8

Robin Howie has estimated that former teacher mesothelioma victims at school in 1960-1980 had a significantly higher cumulative asbestos exposure over 30 years than teachers in schools with asbestos in a good condition.[39]

The above findings suggest that pupils and staff in CLASP-type schools today are not safer than their counterparts in 1960-1980. Indeed, the occupants of unremediated CLASP-type schools have a potentially much higher risk of developing mesothelioma. See page 42-3 RETROSPECTIVE RISK ANALYSIS; page 53 RECOMMENDATIONS FOR GOVERNMENT

E. THE ASBESTOS REGULATIONS

The Asbestos Regulations

This section investigates if the current asbestos regulations are effective at preventing unsafe asbestos exposure in CLASP-type school buildings

Context: The Control of Asbestos Regulations 2012 [27]

The Regulations give minimum standards for protecting employees from risks associated with exposure to asbestos.

Regulation 4 requires dutyholders to identify the location and condition of asbestos in non-domestic premises and to manage the risk to prevent harm to anyone who works on the building orto building occupants. The regulation is designed to make sure anyone who carries out any work innon-domestic premises and any occupants of the premises are not exposed to asbestos from ACMs that may be present……

The Regulations stipulate that Regulation 6 should be read with regulation 11(1), which places a duty on employers to entirely prevent the exposure of their employees to asbestos so far as is reasonably practicable and this should be the first consideration. If this is not possible, the exposure must be reduced to the lowest level reasonably practicable. The risk assessment must identify how to achieve this and if there are any other risks in complying with this duty

The 2012 Asbestos Regulations place a duty on employers to reduce asbestos exposure to the lowest reasonably practicable level possible. The main function of the recommended surveys and risk assessments is to enable school Duty Holders to identify asbestos that is being disturbed or likely to be disturbed and then take appropriate safe action in order to prevent asbestos exposure. However, there is no effective guidance on identifying the actual risk from disturbed hidden asbestos. See also page 13 OUTLINE OF HSE SCHOOL ASBESTOS

his is because **the Asbestos Regulations wrongly imply that levels of asbestos exposure in buildings below the Clearance level (0.01f/ml; 10,000f/m^3) are safe for long term occupation.**
In addition they do not take account of the evidence that asbestos fibres accumulate in the body over time.[40] They also do not take adequately allow for the age at first exposure,[4] relative potency of the different forms of asbestos and their dustiness, clinically active atypical fibre lengths, duration of exposure or require Duty Holders to measure the actual asbestos levels in all areas of schools that contain substantial asbestos.[43] [44] [45] [46]

Robin Howie has developed a risk algorithm which gives an "absolute" indication of the risk associated with a given situation and should also allow prioritisation of risk of a number of situations so that the available resources are used to achieve the greatest possible reduction in risk for the population(s) of interest. However, there has been no evident attempt by the Government to require a risk assessment that measures the actual risk to occupants from long term exposure to low asbestos levels. [47]

EVIDENCE FOR HARM FROM ASBESTOS EXPOSURE IN BUILDINGS SINCE 1960

The asbestos regulations are designed to minimise asbestos exposure but as outlined above they do not measure the actual risk of developing mesothelioma in schools. Moreover, the increasing number of deaths from mesothelioma due to exposure in schools (1960-1980s) and the known relatively high background levels in CLASP-type system buildings indicate that the risk in many schools has been and probably still is unacceptably high.
In particular:

A. **Research by Professor Peto et al (2009) included detailed occupational histories of mesothelioma victims. The findings indicated that 14% of men and 62% of women (over 500 deaths each year) die from mesothelioma each year presumably because they were exposed to low amosite asbestos levels in buildings like schools**.[1]

B. **The Courts accepted in 2009 that the levels above 0.0005f/ml; 500f/m^3 (such as found in schools with asbestos in a good condition) can materially increase the risk of mesothelioma developing.[6]**

C. **In 2011, the Department for Education (DfE) sought advice from the Committee on Carcinogenicity (COC) on the relative vulnerability of children to asbestos. The Committee concluded that '*exposure of children to asbestos is likely to render them more vulnerable to developing mesothelioma than exposure of adults to an equivalent asbestos dose.*' [4]**

D. **Regulation 17 Approved Code of Practice [21] regarding Clearance levels in buildings after work involving asbestos states*: "The threshold of less than 0.01 f/ml [10,000f/m3] should be taken only as a transient indication of site cleanliness … and it is not an acceptable permanent level."* However, in practice, pupils and staff are often required to reoccupy a school at asbestos levels just below the Clearance / Reassurance level of 10,000f/m^3.[12 Regulation 17 para 453] This level is twenty times higher than the average level (500f/m^3) found in schools with asbestos in a good condition and is not a safe level according to the Courts.[48]**

E. **In 2013 Professor Peto informed the Education Select Committee that an estimated 200-300 formerpupils (1960-1980) probably die from mesothelioma each year because they were exposed to amosite asbestos in their former schools in 1960-1980**.[5] This report estimates on that basis, there were 3,890-5,835 former pupil mesothelioma deaths (1980-2017)**.**

F. **An estimation using the United States Environmental Protection Agency EPA findings suggests there were 9,000 former pupil mesothelioma deaths (1980-2017). See pages 8-10**

G. **This report on pages 8-10** also outlines how an estimate 312 teachers (aged 75 and over) plus 380 teachers aged < 75 have died from mesothelioma since 1980. That is **an estimated total of 692 teachers who have died from mesothelioma since 1980 because they were exposed to asbestos in schools.**

H. Robin Howie (2017) has estimated that teachers and nurses had about 5 and 3 times respectively

more mesothelioma deaths than expected in populations not exposed to asbestos. [39]

I. **Robin Howie (2017) has also estimated, using the Hodgson and Darnton 2000 findings, that the 125 teacher (aged <75 years) mesothelioma victims in schools (1960-1980) over 30 years who died between 2002 and 2010, were likely to have exceeded the equivalent cumulative exposure of about 0.15 fibres/ml.years of amosite asbestos. This suggests that the average level of airborne asbestos between 1960-1980 exceeded 0.005f/ml (5,000f/m^3) and is 10 times greater than the average level of asbestos found in schools with asbestos in a good condition (0.0005f/ml; 500f/m^3). The Courts accept that such raised levels materially elevate the risk of mesothelioma developing.** [6]

J. **Preliminary research (2018) by Professor Peto et al has additionally found that some young pneumothorax patients have unexpectedly high levels of amosite asbestos in their lungs and that the most likely cause of exposure is asbestos in buildings like homes and schools. This potential evidence of asbestos inhalation by young people from buildings is being studied further.**[20]

The current 2012 asbestos regulations imply that the low levels of asbestos exposure in buildings with levels below the Clearance level are safe but they do not take account of the fact that low levels of asbestos accumulate in the body and so the risk from low-level asbestos exposure increases over time. The implications for pupils and staff in schools today is considered in the following two sections – Cumulative Asbestos Exposure and Risk and Retrospective Risk Analysis.

CUMULATIVE ASBESTOS EXPOSURE AND RISK

In 1997 the Medical Research Council estimated that "*Children attending schools built prior to 1975 are likely to inhale around 3,000,000 respirable asbestos fibres (roughly 10% of the higher estimate of the burden from ambient lifetime exposure or 1000% of the lower estimate). Exposure to asbestos in school may therefore constitute a significant part of total exposure*." [19]

More recently, **Asbestos expert Robin Howie** estimated that as the average child and adult inhales about 5-10m^3 of air per school day they will inhale about 2,500-5,000 fibres per school day if exposed to about 500 asbestos fibres/m^3 from asbestos which is in a good condition. This means they will inhale and accumulate about 0.5-1million fibres per school year of 190 days. i.e., 2.5 -5 million in 5 years. [39]

The risk of developing mesothelioma after cumulative asbestos exposure from various historical data was reviewed and investigated by Hodgson and Darnton 2000. Their findings suggest there is no safe level of exposure and that the risk depends on the type of asbestos fibre; cumulative exposure to airborne asbestos and the exposed person's age when exposed.[40] **Once fibres were inhaled, they were presumed to stay in the body and so fibres and the risk accumulate over time.** ***The units of cumulative exposure are f/ml.years***

This proportionality regarding cumulative exposure is widely supported by the evidence, but according to WATCH* there is some uncertainty regarding the reliability of the exposure assessments for the worker cohorts studied as well as the validity of the assumption that cumulative exposure is the relevant dose metric, regardless of the duration of exposure and the pattern of fluctuating airborne concentrations within the overall period of exposure. **However, despite these caveats the scientific judgement of WATCH in 2011, in an extension of its 2008 position, is that there are risks of asbestos-induced cancer arising from work-related cumulative exposures* below 0.1 fibres/ml.years.**

*WATCH is a Government Science Advisory Safety Committee and is the scientific and technical subcommittee of HSC's Advisory Committee on Toxic Substances (ACTS).

In 2011 WATCH stated:

'The risk will be lower, the lower the exposure, but "safe" thresholds are not identifiable. Where potential exposures to amphiboles, particularly crocidolite, are below 0.1 fibres/ml.years (for example, 0.01 fibres/ml.years), the available scientific evidence suggests no basis for complacency, but rather a basis for active risk management.[49]

**The units of cumulative asbestos exposure are fibres/ml.years*

Howie's estimate (see paragraph H above) **that the former teacher mesothelioma victims had a cumulative asbestos exposure for 30 years (1960-1980) of 0.15f/ml.years, indicates that they were exposed to levels significantly higher than would be found in schools with asbestos in a good condition**.

The estimated deaths from mesothelioma of 692 former teachers and up to 9,000 former pupils also indicates that the risk of developing mesothelioma is unacceptably high. **See** pages 8-10 MESOTHELIOMA DEATHS: SCHOOL STAFF AND PUPILS (1980-2017). If the Hodgson and Darnton asbestos levels used by Howie are presumed similar to asbestos levels as measured using current techniques today, then the average level of exposure in remediated CLASP-type buildings today is similar to the estimated level in schools occupied by former teacher mesothelioma victims between 1960-1980.

RETROSPECTIVE RISK ANALYSIS

While the current asbestos regulations restrict the duration of exposure to asbestos during high-risk work involving asbestos, they do not restrict long term exposure to the lower levels found in schools. Yet the cumulative exposure in both situations could be similar.

However, the HSE has recently developed a Retrospective Risk Analysis (RRA) which shows the probability of harm from long latency diseases like mesothelioma and which can be used to aid sentencing where the offence is increating a risk of harm.[50] It is based on cumulative asbestos exposure derived from risk models like Hodgson and Darnton. The HSE Table 1 below shows the link between cumulative asbestos exposure to different types of asbestos and life time risk.

The RRA is apparently intended for people working with asbestos but it also could be used for showing the probability of harm to occupants from buildings like schools. In view of the Watch Committee comments a key issue is how the asbestos levels in the RRA and the Hodgson and Darnton research relate to current methods of asbestos measurement.[49] The comments made below presume they are similar.

Thus, Howie has estimated using the Hodgson and Darnton 2000 findings that **the average cumulative amosite asbestos exposure (1960-1980) of the 125 former teacher mesothelioma victims, who were exposed for 30 years in their schools (1960-1980) and died between 2002 and 2010, was 0.15f/ml.years.**

According to the HSE RRA (see HSE Table below) they would be in the **Medium-risk asbestos cumulative exposure band.** This is a significant finding as the 2007 HSL report indicated remediated CLASP school columns in enclosures had an average background level of about 0.005f/ml; 5,000f/m^3 during disturbance.[41] Teachers in remediated CLASP schools therefore potentially also have a **Medium-risk asbestos cumulative exposure** over 30 years of about 0.005f/m^3 x 30 years = 0.15f/ml.years, especially if other asbestos sources are also disturbed. See pages 35-36 HOW ASBESTOS MAY BE DISTURBED TODAY

This cumulative exposure level - 0.15f/m^3.years – is estimated in this investigation to have caused between 1980 and 2017 the death from mesothelioma of 1,000 staff and up to 9,000 former pupils. See pages 8-10 MESOTHELIOMA DEATHS: SCHOOL STAFF AND PUPILS (1980-2017)

According to the HSE RRA, occupants of the 38 CLASP schools who provided no evidence for remediation may potentially have an average background level of 0.094f/ml; 94,000f/m^3 and after exposure over 30 years could have a cumulative amosite asbestos exposure of 2.82f/ml.years. If so, these occupants **would be in the High-Risk cumulative exposure band** and have a **High**-risk of developing mesothelioma.

Application of the HSE risk model to schools, therefore suggests that the risk from cumulative amosite asbestos exposure in CLASP type schools is probably higher on average today than in 1960-1980. Indeed, it is likely that potentially many tens of thousands of pupils and staff in these schools (1980 until 2021) may die from mesothelioma. Moreover, the specific risk from disturbance of inaccessible asbestos

in other makes of system buildings have not yet been investigated. See page 57 APPENDIX A: TYPES OF SYSTEM BUILDINGS

Application of the boundaries using risk model exposure cumulative dose data*

Table 1: Cumulative exposure bands for which lifetime risks are High (H), Medium (M) or Low (L) by fibre type

Cumulative exposure (f/ml.yrs)	Crocidolite	Amosite	Chrysotile
10 or more	**H**	**H**	**H**
0.5 to <10	**H**	**H**	**M**
0.2 to <0.5	**H**	**H**	**L**
0.02 to <0.2	**H**	**M**	**L**
0.01 to <0.02	**M**	**M**	**L**
0.001 to <0.01	**M**	**L**	**L**
<0.001	**L**	**L**	**L**

**Table from HSE Asbestos Compliance and Retrospective Risk Analysis*

Application of Retrospective Risk Analysis to buildings like schools, could usefully provide Duty Holders with an evaluation of the actual risk of children developing mesothelioma over time and so could inform asbestos management risk assessments and criteria for Duty Holder / Government funding bids for asbestos removal. Crucially the risk for children is much higher than the risk for school staff and so any Retrospective Risk Analysis for schools should be based on the risk to the most vulnerable occupants - the pupils.

However, presumably there needs to be some agreement about the relationship between the estimated asbestos levels in the Hodgson and Darnton data and the RRA and this should include the precautionary principle and so aim to reduce risk rather than costs. See page 52 Environmental Regulations.

THE NATIONAL OCCUPATIONAL MESOTHELIOMA STATISTICS

The National Occupational Mesothelioma Statistics aim to inform Government policy regarding the level of harm from asbestos exposure including the asbestos regulations. However, they do not include victims aged under 75 or the occupations and buildings occupied during the most vulnerable ages for asbestos exposure i.e., childhood and early adulthood. See pages 9-12 pages 8-10 Mesothelioma deaths: School staff and pupils (1980-2015). **Consequently, they have not been able to identify the significant proportion of mesothelioma deaths that appear to be due to asbestos exposure in buildings.**

Furthermore, the number of teacher mesothelioma deaths each year is compared to the *expected* number although this is actually the average number for the whole population including the people who work with asbestos.

Expert Asbestos Hygienist, Robin Howie has compared the number of mesothelioma deaths between 2002 and 2010 for teachers and nurses (exposed in schools and hospitals during 1960-1980, respectively) with a hypothetical population not exposed to asbestos. **Howie found that these teachers and nurses had about 5 and 3 times respectively more mesothelioma deaths than expected in populations not exposed to asbestos**. The higher risk for teachers is likely to be due to the increased use of *amosite* asbestos [a] in the construction of school system buildings during 1960-1980. **Howie's comparator is more effective because it indicates that teachers and nurses have *unexpectedly* been exposed to unsafe levels of asbestos in their work building environment and that exposure in their asbestos riddled buildings is likely to be the cause.**

WHAT IS THE SOCIALLY ACCEPTABLE LEVEL OF RISK?

This report estimates that 5-7,000 former staff and pupils have died from mesothelioma (1980-2017) due toasbestos exposure in their schools (1960-1980). Clearly this is not acceptable for school occupants.

The HSE believes that an individual risk of death of one in a million per annum for both workers and the publiccorrespond to a very low level of risk and should be used as a guideline for the boundary between the broadlyacceptable and tolerable regions. This risk as defined by the HSE is an excess death risk of one death/million people /year. As such it appears comparable to the socially acceptable number of deaths described by Howie.

Howie has estimated, using the Hodgson and Darnton (2000) reference text, the risk due to cumulative amosite asbestos exposure. For a child in a school for 5 years the socially acceptable number of deaths would be 5 deaths /million children / 5 years. **Howie found that the 'socially acceptable' ambient amosite asbestos concentration which should not be exceeded for children in schools for 5 years is 0.0001f/ml (100f/m3).**

There were about 8 million children in schools between 1960-1980 so the socially acceptable number of deaths of former pupils is 40 deaths/8 million pupils/5 years. The estimated number of pupil mesothelioma deaths (1980-1917) due to asbestos exposure between 1960-1980s is 3,890-5,835. This is far higher than the socially acceptable level of risk. See page 10 ESTIMATED FORMER PUPIL MESOTHELIOMA DEATHS

Howie has also estimated a mesothelioma risk for teachers of about 60 mesothelioma deaths per million up toage 80 from amosite in asbestos-containing materials in good condition in buildings. The socially acceptable level of risk would be 30 deaths/million teacher/30 years. That would be 15 mesothelioma deaths in the 0.5 million teachers in 1960-1980. The actual number of teacher mesothelioma deaths was 125 according to occupational statistics and clearly exceeded the socially acceptable level. [39]

Main findings: The Asbestos Regulations

The current asbestos regulations provide a helpful framework for asbestos management. However, the Risk Assessments do not inform Duty Holders about the actual risk of pupils and staff developing mesothelioma:

- after long term cumulative exposure to asbestos in buildings.
- after exposure to amosite and crocidolite asbestos
- from disturbed hidden asbestos passing from within the structure into occupied areas.

Moreover, asbestos measurements do not include all clinically active fibres and there is no requirement to check the effectiveness of sealants used to reduce asbestos exposure in system buildings.

Consequently, Duty Holders cannot identify unsafe exposure to asbestos from within the building structure and so fail to take action and bid for funds necessary to prevent further exposure. See pages 51-52 IMPLICATIONS FOR GOVERNMENT; page 53 RECOMMENDATIONS

F. ASBESTOS MANAGEMENT AND FUNDING

Asbestos management and funding
This section investigates how the availability of funding impacts on asbestos

This asbestos management investigation found that most of the 60 CLASP schools still had substantial asbestos throughout. In some cases, it appeared that funding and resources for asbestos management and removal was not available. For example, 89% of the 60 schools had not removed easily accessible asbestos from classrooms. 72% of the 60 schools placed limitations on the survey remits that restricted their effectiveness and 63% of the staff in the 60 schools had not received appropriate training as required under the regulations. Moreover, the available evidence indicates that inadequate funding also has an impact on the risk assessment criteria that underpin the asbestos regulations and current guidance as indicated in the sections below.

FUNDING AND ASBESTOS REGULATIONS

Since 1967, successive UK governments, like the US governments, have been aware that low levels of asbestos exposure could cause mesothelioma and that children are particularly vulnerable. They were advised to take measures that prevent the escape of asbestos fibres.[51] [59]
However, it appears that in the UK appropriate action was not taken to ascertain and reduce the risk to school occupants because of concerns about the consequent cost and disruption. In so doing they ignored the warnings about the particular risk to children,[59] the precautionary principle[53] and a third wave of mesothelioma arising from exposure of children to asbestos in buildings like schools.[52] [53] Thus, a Ministerial Briefing Document obtained under FOI in 1997 gave the Department for Education's reasons for not assessing the risk to teachers and pupils stated:

> *"A central government initiative to assess the risk to teachers and pupils would not only be inappropriate, given where the statutory duty lies, but would also lead to pressure for centrally funded initiatives to remove all asbestos and for other aspects of building work. That would be extremely expensive, as well as disruptive for the schools concerned."* [54]

Indeed, the DfE subsequently did not provide detailed guidance for school Duty Holders on asbestos risk assessment until 2015.[15]

Cost reduction also may explain why the HSE 2008 guidance regarding system school buildings focused only on the less effective, but cheaper short-term solution (sealing columns with bathroom sealant and checkingintegrity of ceiling tiles) although it had previously also recommended in 2006 a further more costly '*long term solution'.* The latter included the removal of asbestos from ceiling voids, the sealing of wall voids and the tops of columns with foam or sealant and routine air monitoring to check their effectiveness.[10] [55]

IMPACT OF CAPITAL FUNDING CUTS SINCE 2010

Capital funding has experienced significant and damaging cuts over the last decade and is estimated by theInstitute for Fiscal Studies (IFS) to be over 40% less in real terms between 2010-11 and 2019-20. Schools have suffered a cumulative cut of £26.5 billion to the Education capital budget since 2009-10.

Even in 2017 the National Audit Office (NAO) calculated that it would cost £6.7 billion to return all schools inEngland to satisfactory or better condition, and a further £7.1 billion to bring parts of school buildings from satisfactory to good condition. These costs will only have increased since then – and they do not account forthe cost of managing or removing asbestos. Exposure to asbestos can increase dramatically after water ingress due to building deterioration within the building of CLASP-type schools.[56]

The Joint Union Asbestos Committee (JUAC) has called on the Treasury to prioritise the funding of the school estate, and in particular the phased removal of asbestos from schools in its Budget (11 March 2020.

John McClean (Chair of JUAC) said:

"Any real-term decrease in capital funding for schools in this Budget will raise the risk from asbestos for children and staff. School budgets are already at breaking point after more than a decade's funding freeze, and many school buildings are literally crumbling as repairs become unaffordable. This means asbestos could become more accessible in classrooms or be accidentally disturbed. To continue to put the school estate under such pressure by reducing or freezing capital funding again would be irresponsible. We urge the Chancellor to make the health of everyone in schools a priority a to provide adequate capital funding to safely tackle asbestos in his Budget tomorrow." [57]

FUNDING BIDS AND RISK OF DEVELOPING MESOTHELIOMA

A key problem is that funding bids for removal of unsafe asbestos are based on the management asbestos surveys, risk assessments and the demolition/renovation surveys. None of these provide a measure of the actual risk to children from asbestos exposure in CLASP-type buildings. See page 41 CUMULATIVE ASBESTOS EXPOSURE AND RISK and page 42 RETROSPECTIVE RISK ANALYSIS

The Public Accounts Committee in 2017 criticised the DfE's lack of knowledge about the school estate and recommended that it *'needs to understand the prevalence, condition and management of asbestos.' 32* **Error! Bookmark not defined.** Subsequently the DfE developed the Asbestos Management Assurance Process AMAP in order to enhance itsunderstanding of the management of asbestos in schools. However, this is based on the current asbestos regulations which do not provide a measure of the actual risk from asbestos exposure in schools.[16]

Cynically, the Government has given Duty Holders the ultimate responsibility for asbestos management in their schools but has failed to ensure that they can measure the real risk from cumulative asbestos exposure to school staff and children and access the necessary funds for the removal of unsafe asbestos and buildings with asbestos that cannot be made safe. The underlying reason appears to be purely economic.

Significantly, the HSE 2010 Report[58] has estimated that the economic cost to society of new cases of mesothelioma cancer in Great Britain, arising from past working conditions was £3.0 billion. Individuals bear the vast majority of the human costs of mesothelioma around £2.8 billion and most of the total costs to society. The report states that there are little *financial incentives* for employers or indeed the government to reduce exposure to asbestos because *'employers do not bear the vast majority of the costs associated withthe consequences of exposure to some of the risk factors they control'*.

Two decades ago, the Government should have been aware that cumulative exposure of even low levels of asbestos elevated the risk of developing mesothelioma.[40] **They already knew that children were particularlyvulnerable.[53] Shockingly, they chose to cut asbestos management costs, and failed to develop effective measures of the risk – particularly to children - from cumulative asbestos exposure in buildings.**

Two decades later, the mesothelioma death toll due to asbestos exposure in school buildings (1960-1980s) is now evident. See pages 8-10 MESOTHELIOMA DEATHS: SCHOOLS (1980-2017). **Shockingly the available evidence suggests that asbestos levels are likely to be higher in CLASP-type schools today due to asbestos deterioration and building damage and so many tens of thousands of their former occupants between 1980 and 2021 may die. Urgent Government funded action is needed to identify and prevent further asbestos exposure in all CLASP-type schools found to be unsafe for long term occupation.** **See page 52 IMPLICATIONS OF FINDINGS FOR GOVERNMENT**

DISCUSSION

The findings in this report indicate an estimated 5-10,000 GB school pupils and staff may have already died from mesothelioma because they were exposed to amosite asbestos in their former schools between 1960-1980s. It is likely that they attended the schools with the most asbestos and that is why asbestos management was investigated in CLASP Mark4/4b schools which are known to have substantial asbestos throughout.

Shockingly the available evidence suggests that current asbestos levels in the 60 English CLASP-type schoolsinvestigated are likely to be higher, on average, today than in 1960-1980. Consequently, potentially tens of thousands of pupils and staff in CLASP-type schools (1980 until 2021) may in future die from mesothelioma.

Reasons for their potentially unsafe asbestos levels include the substantial amosite asbestos presumed to be located throughout these schools and the apparent failure of most of the 60 schools to comply with the detailed HSE school asbestos management guidance. However, the main underlying cause is the failure of successive governments to develop asbestos regulations and funding criteria that include measurement of the actual risk of developing mesothelioma and necessary resources to remove all identified unsafe asbestos.

This investigation of asbestos management in schools includes a number of lines of enquiry because the long latency period between exposure and diagnosis of mesothelioma and the absence of effective national mesothelioma statistics and research into the impact of long-term low-level asbestos exposure means that there are many unknowns about where and how unsafe exposure took place.

This discussion therefore outlines the significance, implications and limitations of these findings and proposesGovernment action that would remove the risk from exposure to unsafe asbestos in CLASP-type schools.

SIGNIFICANCE OF MAIN FINDINGS

THE ESTIMATED GB FORMER PUPIL AND STAFF MESOTHELIOMA DEATHS in this report **indicate that up to 10,000 former school pupil and staff have died from mesothelioma because they were exposed to asbestos in their former schools between 1960 – 1980s. This suggests their former schools had unsafe levels of disturbed asbestos and supports the many concerns raised in the UK[59] and the prediction by United States scientists in 1991 of a third waves of asbestos related diseases in former school children, teachers and maintenance staff arising from exposure to asbestos in school buildings due to uncontrolled, low level exposure to asbestos**.[52] See page 3 INTRODUCTION; pages 8-10 MESOTHELIOMA DEATHS: SCHOOL STAFF AND PUPILS (1980-2017)

ESTIMATED EXPOSURE OF GB TEACHER MESOTHELIOMA VICTIMS (1960-1980).
Howie's estimate of teacher exposure is based on the Hodgson and Darnton findings and indicates their likely cumulative exposures over 30 years would need to have exceeded the equivalent of about 0.15f/ml.years of amosite asbestos. This is 10 times higher than the cumulative exposure expected from schools with asbestos in a good condition and significantly the HSE Retrospective Risk Assessment (page 42), which is also based on Hodgson andDarnton findings, cites this level as a medium risk for developing mesothelioma.

Howie's estimate has implications for all CLASP-type schools because it is similar to the estimated average cumulative exposure over 30 years of teachers in remediated CLASP-type schools today (0.005f/ml x 30years = 0.15f/ml.years) and the Courts have recognised that such levels materially increase the likelihood of developing mesothelioma. See pages 33 AIRBORNE ASBESTOS LEVELS and page 52 IMPLICATIONS OF FINDINGS FOR GOVERNMENT

CLASP MARK 4/4B SCHOOLS were investigated because they represent a common GB school building type that usually contains substantial amosite asbestos throughout and consequently was more likely to have been attended by the former pupils and teachers in 1960-1980 who developed mesothelioma 30-50 years later.

The similarity between the estimated amosite asbestos level in schools attended by mesothelioma victims in 1960-1980 and the average levels found in over 20 CLASP schools (2007), that were reviewed by the HSL after remediation, suggests that CLASP-type schools are indeed likely to have been attended by former teacher and pupil mesothelioma victims. See page 34 ASBESTOS LEVELS TODAY

CLASP-TYPE SCHOOLS EXPOSURE TODAY: The potential for asbestos exposure is likely to be higher in CLASP buildings today than in 1960-1980 because the column damage found by the HSE in 2006 is largely caused by renovation, maintenance and building deterioration and it is likely that this was less of a problem in1960-1980 when the buildings were newly constructed. See page 37 HOW CAN ASBESTOS EXPOSURE IN CLASP-TYPE SCHOOLS BE REDUCED? **The failure of 38 of the 60 CLASP schools to provide evidence for this required remediation also suggests that the third wave could become a tidal wave or even a tsunami for post-1980 school occupants.**

In addition, while there is evidence that some of the asbestos has been removed from the more accessible areas, almost all the 60 schools still had substantial and presumed accessible and inaccessible amosite asbestos throughout in locations where it could be disturbed by everyday activities. The failure of such a high proportionof Duty Holders to comply with the detailed HSE guidance on school asbestos management also indicates that many of the 60 schools will not have identified and prevented exposure to asbestos as required. See page 30 LOCATION OF ASBESTOS IN EACH SCHOOL; pages 34-36 SOURCES OF ASBESTOS EXPOSURE IN CLASP-TYPE SCHOOLS

According to Professor Peto,[5] recent lung burden research indicates average asbestos lung burdens are much lower today than in 1960-1980 and the average mesothelioma deaths across the population are therefore likely to become lower. However, **this report provides specific evidence that the current asbestos regulations and guidance regarding CLASP-type schools appear ineffective at preventing exposure of pupils to unsafe asbestos. As most children go to schools and there are 6,000 of these schools in England plus thousands more in Scotland and Wales there is an urgent need to identify the actual level of long-term cumulative exposure and risk of pupils and staff developing mesothelioma. Less than 0.5% of these schools have been investigated so far.** See page 6 METHOD.

THE OBSERVED RISE IN TEACHER MESOTHELIOMA DEATHS aged under 75 since 1980 has been attributed to amosite asbestos exposure in system buildings constructed with substantial asbestos during the 1950-1980s. Schools are known to have a higher proportion of buildings containing amosite than other sectors and amosite exposure is thought to be a major cause of the high incidence of mesothelioma in the UK. This amosite asbestos exposure may partly explain why former teachers, and presumably other school staff, in schools between 1960-1980 have been estimated to have about five times more mesothelioma deaths than expected in populations not exposed to asbestos.[1 39]

Unfortunately, the Great Britain Occupational Mesothelioma Statistics compare the observed levels with the average level for all the population and this has obscured the significant rise in deaths from mesothelioma due to long term exposure to low levels of asbestos in buildings like schools. This is a major concern because almost everyone goes to school and Local Authority responses to the HSE questionnaire on system buildings indicates that there are over 6,000 CLASP-type schools in England alone.[22]

The estimated 692 teachers who have died from mesothelioma because they were exposed in 1960-1980 in their schools may have been exposed in 692 different schools or a smaller number of buildings. Similarly, the estimated 5,000 - 9,000 pupil mesothelioma victims may have been exposed in up to 9,000 buildings or a smaller number. Urgent Government action is clearly needed to identify all unsafe schools. See pages 8-10

ASBESTOS MANAGEMENT FAILURES: The finding that the Duty Holders of the 60 CLASP-type schools, on average, only complied with half of the HSE asbestos management requirements suggests that many of the Duty Holders, responsible persons and staff have not received, as required by the regulations, the necessary information, instruction and training for working in areas containing asbestos.

Thus, while most of the 60 CLASP schools could produce surveys, asbestos registers and asbestos managementplans, a high proportion did not carry out the detailed asbestos management arrangements required to identify and prevent asbestos exposure. Further investigation of the underlying reasons is clearly necessary.

See PAGES 24-25 SECTION 6B: COMPLIANCE OF EACH SCHOOL WITH ASBESTOS MANAGEMENT CRITERIA

ASBESTOS REGULATION FAILURES: Investigation of the effectiveness of the current asbestos regulations found that they are not designed to identify the risk from long-term cumulative asbestos exposure to the relatively low asbestos levels found in remediated CLASP schools today. This is a major concern because **current average cumulative exposure levels in the small number of CLASP schools investigated so far by the HSL appear similar to the estimated level of asbestos in former schools attended by mesothelioma victims in 1960- 1980. Duty Holders, pupils, parents and staff need to know if their schools are safe and that the Government will take action to remove the risk, where necessary**.

See page 42 RETROSPECTIVE RISK ANALYSIS

In view of the potentially high risk from long-term cumulative asbestos exposure in these CLASP schools and current asbestos management failures there is an urgent need for improved asbestos regulations, support for CLASP-type school Duty Holders and appropriate staff mandatory training, information and communication regarding asbestos in their work location. See page 52-53 IMPLICATIONS OF FINDINGS FOR GOVERNMENT

FUNDING FAILURE: This report has outlined how Duty Holder responsibility for school asbestos management has not been supported by asbestos regulations and financial support that enable them to identify and prevent unsafe asbestos exposure. **Shockingly, successive governments have failed to act despite the increasing evidence of the actual risk from cumulative exposure to low levels of asbestos. Their failure to investigate and provide the necessary funding for asbestos removal / demolition and replacementof asbestos riddled schools has been and is likely to be a death sentence for tens of thousands of former pupils and staff in schools after 1980.** See page 45 ASBESTOS MANAGEMENT AND FUNDING.

COMPARISON WITH OTHER ASBESTOS MANAGEMENT STUDIES.

HSE INVESTIGATION OF CLASP-TYPE SCHOOLS: There has been no other specific study of asbestos management in CLASP-type schools, apart from the HSE investigation of column remediation in 2006-2008 and their follow-up HSE 2009 questionnaire to Duty Holders regarding this. In the latter investigation all Duty Holders with inadequate questionnaire responses regarding compliance with column remediations were followed up with HSE guidance, inspections or improvement notices as appropriate 2009. [10] [35] [36]

The HSE inspection findings indicate that it was eventually satisfied with Duty Holder questionnaire responses,including Duty Holders of the 60 CLASP schools investigated.[35] However, about a decade later, two thirds of the 60 CLASP-type schools investigated provided no evidence of the required ongoing column and ceiling tile monitoring and remediation and two thirds of staff had apparently not been made aware, as required, of the location and risk from asbestos in work areas.

Between 2009/10 and 2018/9 period half of the 60 schools investigated had left local authority control and itwas noted that compliance with column sealing guidance was higher in more local authority schools than Academy / other schools. Nevertheless, more than half of all types of school Duty Holders failed to provide evidence of ongoing compliance with the HSE 2008 guidance for system buildings. See page 21 Table 4A

HSE INSPECTION OF ASBESTOS MANAGEMENT IN 153 SCHOOLS OUTSIDE LOCAL AUTHORITY CONTROL: Asbestos Management in the 60 CLASP schools investigated was compared with asbestos management in the 153 schools outside local authority control that were inspected by the HSE in 2013/2014.[60] The HSE inspections, aimed to determine the levels of compliance with the Control of Asbestos Regulations 2012 (CAR 2012) in a targeted sample of schools. 44 schools of the 153 schools were given advicefollowing the visits and enforcement action was taken against 20 of the 44 in the form of an improvement notice. It did not include compliance with the 2008 guidance for system buildings and it is not known how many of the 153 schools included CLASP-type system buildings.

In general, the CLASP school asbestos management findings were similar to the HSE findings for specific information like up-to-date surveys and UKAS accreditation. However, there were significant differences. Twothirds of schools in the HSE investigation identified all asbestos compared to just one third in this investigationof 60 CLASP schools. The reason for this disparity is not known but it may be in part due to the failure of a third of the CLASP schools to presume asbestos in all areas not accessed by the survey.

Compliance with the HSE guidance on Material and Priority assessments was apparently higher in the CLASP school investigation than in the HSE investigation of schools outside local authority control. However, this is likely to be because the CLASP investigation was unable to check, from the written FOI information provided,the actual level of compliance. For example, although the evidence provided by CLASP school Duty Holders indicated they had carried out Priority assessments no evidence was provided that staff were aware of the location of asbestos in their work areas and had informed the Duty Holder about the potential level of asbestos disturbance. See page 16 SECTION 2: RISK ASSESSMENTS; page 21 Table 4A SECTION 6A: COMPLIANCE OF SCHOOLS WITH ASBESTOS MANAGEMENT CRITERIA

LIMITATIONS OF THE CLASP SCHOOL INVESTIGATION

THE ESTIMATION OF THE NUMBER OF FORMER PUPIL MESOTHELIOMA DEATHS SINCE 1980 due to asbestos exposure in their schools between 1960-1980 is problematical because of the long latency period between exposure and diagnosis and inadequate GB Occupational Mesothelioma statistics.
See page 52 OCCUPATIONAL STATISTICS. See also page 10 ESTIMATED FORMER PUPIL MESOTHELIOMA DEATHS; page 62 APPENDIX D ESTIMATED GB FORMER PUPIL MESOTHELIOMA DEATHS (1980-2017)

The estimated number of former pupil deaths (up to 5,835) from mesothelioma was based on Professor Peto's research findings and presume that about 200-300 former pupils die each year from mesothelioma because they were exposed to asbestos in their former schools between 1980 and 2017.[5] The estimation in this investigation presumed that the number of pupil mesothelioma deaths increased at the same rate as the teacher mesothelioma deaths. This is because currently the Committee of Carcinogenicity has advised that more pupils die from mesothelioma only because they live longer after exposure.
Estimation of former pupil mesothelioma deaths based on the United States EPA evidence that there are 9 former pupil mesothelioma deaths for every staff member found there were about 9,000 former pupil mesothelioma deaths, indicating that the risk from asbestos in buildings is higher than that presumed by Professor Peto in 2013. [5]
See page 10 ESTIMATED FORMER PUPIL MESOTHELIOMA DEATHS.

THE ESTIMATION OF FORMER TEACHER MESOTHELIOMA DEATHS aged 75 years and over between 1980 and 2017 is necessary because since 2011 more people die from mesothelioma aged over75 than under 75. Therefore, the GB occupational statistics are likely to be a considerable underestimation of the actual number of deaths. See page 10.

ASBESTOS MANAGEMENT FINDINGS in the 60 CLASP schools investigated only included the information provided by the Duty Holders in response to the FOI request. Fortunately, the asbestos regulations do require all schools to have written surveys, risk assessments and asbestos management plans and so there is no reason why all the required information was not provided. However, follow up enquiries and on-site investigation are needed to verify the actual level of compliance.

COMPARISON WITH THE HSE FINDINGS FROM THEIR 2014 INSPECTION OF SCHOOLS suggests that some, but not all, of the CLASP school asbestos management findings are broadly similar. See page 49. The exact HSE criteria used are not precisely known and the HSE inspections include access to buildings and all the available documents together with the opportunity to check if all data has been provided. The HSE findings additionally include graded responses and advice. However, their school inspections did not ascertain compliance with the HSE 2008 guidance for system-built schools despite the potentially high risk from exposure to asbestos passing into occupied areas from within the structure of the building.[10]

In contrast to the HSE inspection, this investigation of 60 CLASP-type schools only looked for evidence of compliance with the asbestos management criteria in the surveys and AMPs that were provided by the Duty Holders. Failure to provide evidence of compliance with each criterion was deemed to be noncompliance.

A particular problem in the CLASP investigation was that it was not possible to ascertain if an unexpectedly low priority assessment score, for an easily accessible location such as a low-level classroom wall, was because staff were unaware of potential asbestos disturbance in their areas or because the areas was not being used. However, the asbestos management plans indicated **that nearly two thirds of staff had not been informed as required about asbestos location or received asbestos awareness training and so it was clearly unlikely that those staff could reliably inform the Duty Holder about the potential level of disturbance in their work areas.** Such a failure potentially means unsafe asbestos is left in place and unsealed or perhaps sealed with just a bridging sealant that is only suitable for low disturbance levels.[26] **No information about the type of sealant (bridging sealant for low disturbance areas or penetrating encapsulant for areas likely to be disturbed) was provided in any of the 60 school surveys although this would appear to be essential asbestos management information.**

Significantly, 75% of respondents to the NEU 2019 Asbestos Survey, who reported asbestos in their schools, also said that the asbestos was in locations accessible to children and staff, such as floors, ceilings, window frames and more than a quarter (27%) were aware of incidents or potential asbestos exposure in their school. Numerous incidents in system buildings have also been reported by Michael Lees[61] and indicated in responses to Lucie Stephen's FOI request to local authorities. [62]

The HSL investigation into the effectiveness of remediation of ceiling tiles wrongly presumes that ceiling tiles and high-level walls are unlikely to be disturbed in schools.[10] [41] This is probably because Duty Holders have often underestimated the likely risk of disturbance in such areas. In fact, two former pupil mesothelioma victims (Diane Willmore and Sarah Jane Bowman) were exposed to asbestos when ceiling tiles were lifted bypupils and the pupils at Hetton school had to be decontaminated several times after winds lifted ceiling tiles and asbestos from the ceiling voids covered the pupils and staff below.[6] [7] [32]

THE AVERAGE ASBESTOS LEVEL IN THE FORMER SCHOOLS OF TEACHER MESOTHELIOMA VICTIMS (1960 - 80) was estimated by Howie[39] and is based on the findings from the Hodgson & Darnton (2000) work showing the proportionality between cumulative asbestos exposure levels and the risk. Despite the uncertainty over the absolute measurements of asbestos in the Hodgson and Darnton study the scientific judgement of WATCH in 2011, is that there are risks of asbestos-induced cancer arising from work-related cumulative exposures below 0.1 fibres/ml.years.[40] [49] Consequently, a precautionary approach is necessary and Howie's estimate of 1960-1980 asbestos levels potentially confirms the risk from low levels of asbestos exposure in schools between 1960 and 1980 as well as from 1980-2021. See page 41 CUMULATIVE ASBESTOS EXPOSURE

THE AVERAGE ASBESTOS LEVEL IN CLASP SCHOOLS BEFORE/AFTER REMEDIATION was investigated by HSL in 2007. Fewer than <30 (0.5%) of CLASP-type schools were investigated so it is not known if their findings are representative of all such schools. The asbestos levels suggest that teacher cumulative asbestos exposure over 30 years in remediated CLASP schools is Medium while their risk is High in unremediated schools. See page 42 RRA. The risk of pupils developing mesothelioma would be High in both remediated and unremediated schools. However, the HSL findings are based on a relatively small number of such schools (<0.5% 0f CLASP-type school. Government should urgently ascertain the scale of the asbestos problem and ensure all CLASP-type schools are investigated. See page 55 RECOMMENDATIONS

IMPLICATIONS FOR GOVERNMENT

OCCUPATIONAL STATISTICS.

Mesothelioma Occupational Statistics are necessary to inform governments about the actual level of risk from asbestos in various occupations and locations. However, the current statistics are ineffective because:

- **They considerably underestimate the number of mesothelioma deaths as they do not include the increasingly high proportion of deaths in people aged 75 and over**. See page 8-9 ESTIMATED FORMER TEACHER (AGED 75 AND OVER) MESOTHELIOMA DEATHS
- **The current practice of only recording the last occupation of the mesothelioma victims ignores the fact that the risk of developing mesothelioma decreases with age. This is because mesothelioma has a long average latency period of 30-50 years and so young adults are more likely to live that long after exposure.**
- **The current practice of comparing occupational mesothelioma deaths with the population average wrongly discounts teacher mesothelioma deaths as 'expected.'** Howie's comparison of the number of mesothelioma deaths for a given occupation with a hypothetical population not exposed to asbestos appears to be a more meaningful comparison in view of the current concerns about asbestos exposure in buildings. Howie found that teachers at school in 1960-1980 were 5 times more likely to die from mesothelioma than a population not exposed to asbestos.
- **The failure of the Occupational Mesothelioma Statistics to identify the mesothelioma deaths due to exposure in buildings was demonstrated clearly in the research published in 2009. That research found 62% of female mesothelioma deaths were apparently due to exposure in buildings. Moreover, this report estimates that up to 10,000 former pupils and staff have died from mesothelioma since 1980 due to exposure in their former school buildings between 1960-1980s.** See page 4 ASBESTOS MANAGEMENT IN 1960-1980; pages 8-11 MESOTHELIOMA DEATHS: SCHOOL STAFF AND PUPILS (1980-2017); page 55 RECOMMENDATIONS FOR GOVERNMENT

THE CONSEQUENCE OF GOVERNMENT FAILURE: THE THIRD WAVE

Successive Governments allowed the construction of buildings with the carcinogen – asbestos - and failed to heed concerns that occupants of buildings, particularly children would be at risk.[52] [59] They have also ensured that the cost and trauma of developing mesothelioma is largely borne by the individual mesothelioma victims and their families while the Asbestos Industry and Government appear to have evaded any responsibility or cost.[58]

Consequently, an estimated 5-10,000 former GB pupils and staff have already died from mesothelioma because they were exposed in their former schools between 1960-1980s. Their deaths may now account for 10 -20% of UK mesothelioma deaths each year and up to 9,000 were former pupils. See pages 8-11 MESOTHELIOMA DEATHS

Today most of the schools with substantial amosite asbestos are still in use and this investigation of 60 CLASP schools suggests that almost all may still have substantial asbestos throughout. See pages 26-33 ASBESTOS LOCATION. Indeed, the available evidence outlined in this report suggests the risk of developing mesothelioma is now potentially much higher due to inadequate asbestos management, the vulnerability of CLASP-type buildings to asbestos damage arising from renovation, everyday activities and building deterioration and the fact that it is not considered cost effective to remove asbestos from within the CLASP-type building structure.[29] See page 37-38 HOW CAN ASBESTOS LEVELS IN CLASP-TYPE SCHOOLS BE REDUCED?

Consequently, the predicted third mesothelioma wave is likely to become a tidal wave for school occupants post-1980. See pages 34 ASBESTOS LEVELS TODAY; page 42 RRA; page 47 SIGNIFICANCE OF MAIN FINDINGS

Despite the increasing evidence of harm from cumulative asbestos exposure in schools, no action has been taken by governments to measure the actual risk of developing mesothelioma from cumulative asbestos exposure in all CLASP-type schools. See page 40-41 EVIDENCE FOR HARM; page 42 RRA. Indeed, they appear to have covered up their failures with ineffective GB Mesothelioma statistics (see above) and argued secretly against more effective risk assessments for building occupants on grounds of cost and disruption.

Consequently, occupants of CLASP-type buildings with substantial asbestos are still potentially exposed, unknowingly, to any asbestos disturbed by everyday activities as it passes unseen from within the building structure into classrooms and corridors. Moreover, their Duty Holders cannot identify the actual risk, and so cannot seek funding with bids that are informed by the actual risk from asbestos exposure. See page 42 RRA; page 37.

Will the Government now act to prevent further unnecessary deaths from asbestos exposure in buildings?

ENVIRONMENTAL ASBESTOS REGULATIONS.

In 2015 the Joint Union Asbestos Committee and the Asbestos in Schools Group requested that the HSE develop Environmental Asbestos Regulations for buildings like schools.[63] The HSE response in 2015 indicated that:

> '*The purpose and consequences of any environmental level will need careful consideration by all stakeholders and discussions must involve a number of Government Departments. Establishing an environmental level, as opposed to a workplace control level/limit, is outside HSE's vires, and certainly outside the remit of DfE's Asbestos in Schools Steering Group. HSE would suggest that other Government Departments and Agencies, such as the DEFRA, Public Health England, the EA and DH at least would have a significant interest and would need to be consulted on any proposal for an environmental level at a very early stage.'* [64]

The HSE also advised that:

> *'…. environmental levels will first need to be established by gathering data on the current airborne asbestos fibre exposures across a range of exposure scenarios, including, but not restricted to, those involving pupils and teachers in schools.'*

JUAC therefore requests that the Government carefully considers, develops and implements environmental airborne asbestos levels for long term occupation of buildings and ensure that they comply with the European Convention on Human Rights Act when they do. In particular the Government should demonstrate that a fair balance has been struck between the risk to pupils and staff from asbestos and the measures taken to counteract it according to Article 8 of the European Convention on Human Rights.[65]

However, JUAC also cautions that Robin Howie[48] has estimated that pupils are unsafe when cumulative asbestos exposure over 5 years exceeds 0.0001f/ml.years; 100f/m^3.years and recent research[20] indicates that in buildings *'the resulting mesothelioma risks are not known, as current occupational and environmental airborne concentrations are too low and variable for lifetime exposures to be estimated reliably.'* Consequently, if low asbestos levels cannot be measured reliably then the precautionary principle should prevail and the removal of unsafe asbestos and the demolition / replacement of buildings which cannot be made safe for young children should be urgently prioritised.

CONCLUSIONS

There is increasing evidence that thousands of former GB school pupils and staff are developing mesothelioma because they were exposed in their former schools (1960-1980). A third mesothelioma wave in schools was predicted by some U.S. scientists in 1991. This report outlines an investigation to find out if pupils and staff are safer today.

This report outlines how GB mesothelioma statistics and research data suggest that up to 10,000 former staff and pupils died from mesothelioma between 1980-2017 because they were exposed to asbestos in their former schools between 1960-1980s. It is likely they attended schools with substantial asbestos and so the location of asbestos and the effectiveness of asbestos management was investigated in 60 CLASP-type schools.

Shockingly, the available evidence outlined in this report indicates that the airborne asbestos levels in CLASP-type schools since 1980 are likely to be much higher, on average, than in 1960-1980. Consequently, potentially tens of thousands of pupils and staff in CLASP-type schools since 1980 may in future die from mesothelioma.

Reasons for these high levels included the failure of most Duty Holders to provide evidence of full compliance with all asbestos regulations and guidance and the presence of substantial amosite asbestos in most of the 60 schools. However, **the main, underlying cause is the failure of successive Governments to develop asbestos regulations that enable Duty Holders to identify the actual risk of developing mesothelioma from long term cumulative asbestos exposure and use that estimated risk as a basis in bids for funding asbestos removal.**

Governments appear to have been more concerned about the cost and disruption arising from more effective risk measures than the unnecessary deaths of tens of thousands of children and adults occupying asbestos-riddled schools buildings. Similarly, the Fire Brigade Union has argued that *'the terrible loss of life at Grenfell Tower was ultimately caused by political decisions made at the highest level. For at least 40 years, policies relating to housing, local government, the fire and rescue service, research and other areas have been driven by the agenda of cuts, deregulation and privatisation.'*

The findings suggest that the third mesothelioma wave could become a mesothelioma tidal wave for occupants in schools after 1980. The Government should now act urgently to ensure all unsafe asbestos is identified in CLASP-type schools and funding made available for removal of unsafe asbestos and buildings that cannot be made safe. See pages 55,56 RECOMMENDATIONS.

"Unless stringent asbestos fibre limits of less than 100 fibres per cubic meter are introduced and enforced in our schools and public buildings then our children will continue to be exposed to an unacceptable level of risk. The threat cannot be overstated."

Robin Howie. (Expert Industrial Hygienist, Robin Howie Associates) [47]

RECOMMENDATIONS FOR GOVERNMENT

1. To uphold the commitments made by the Government in the 2015 Asbestos Policy Reviewand, in particular, to prioritise the development of children specific asbestos risk assessments and asbestos environmental levels.

2. To fund the development of an age-specific Retrospective Risk Analysis, based on cumulative asbestos exposure and type of asbestos, that shows the likelihood of developing mesothelioma after long term exposure to the type of asbestos found in each school building or specific areas of a school building.

3. To fund the implementation of the age specific Retrospective Risk Assessment and collect and share data centrally on the extent, type and condition of all asbestos in schools including the data obtained from the Retrospective Risk Analysis process.

4. To use the data (see 3 above) to inform a national programme for the phased removal of allasbestos in educational establishments, starting with the most dangerous and with completion by no later than 2028.

5. To provide adequate funding for this national programme, for the removal of all asbestos and the demolition/replacement of schools (e.g., CLASP-type system schools) where asbestos removal / encapsulation is not possible or cost effective.

6. To support duty holders and ensure all Duty Holders, Responsible persons and staff have mandatory, appropriate training and ongoing support for asbestos management in CLASP-type system buildings.

7. To support duty holders in providing information to stakeholders, staff and parents about the location and condition of asbestos in their school(s) and the actions needed to manage it.

8. To develop National Mesothelioma Occupational Statistics which are based on lifetime occupations and the buildings occupied.

9. To ensure asbestos regulations and criteria for funding asbestos management in buildings like schools are compatible with the European Convention on Human Rights Article 8 (2000).

10. To carefully consider, develop and implement environmental airborne asbestos levels for long term occupation of buildings and ensure that they comply with the European Convention on Human Rights Act. In particular the Government should demonstrate that a fair balance has been struck between the risk to pupils and staff from asbestos and the measures taken to counteract it according to Article 8 of the European Convention on Human Rights.

How safe is my school?

What can we do?

You can help ensure that schools and colleges are safe for children and staff. The most important thing – ask questions. A culture of openness is essential.

01.

Does the building contain asbestos?

02.

If so, where is it located?

It is a legal requirement for duty holders to determine the location of any asbestos in a building for which they are responsible. Ask for details to be displayed prominently.

03.

How is it being managed?

Ask to see a copy of the asbestos management plan. Again, it is a legal requirement for duty holders to prepare a plan setting out how risk will be managed

APPENDIX A: TYPES OF SYSTEM BUILDINGS

Types of system building[10]

CLASP SEAC ORLIT SCOLA HILLS

SPOONER MACE LAINGSPAN SIMMS SON AND COOK

ONWARD VIC HALLAM PRATTEN METHOD CLAW BRISTOL

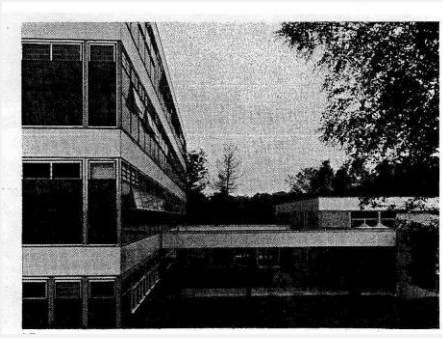
ASC AUSTIN-HALL BOULTON&PAUL TIMBER LESSER BS STONERE SB

SWIFTPLAN LTD TERRAPIN LTD TRANSLINK LTD WARNICK & SONS

YOUNGMAN SB

This list is not exhaustive.

'System buildings are particularly widespread throughout the public sector, the majority of them are school buildings. See box below for some of the different types of system buildings. There is a likelihood that such buildings contain asbestos materials. The issues arise predominantly in system buildings but you should be aware that steel-clad columns with asbestos insulation may also have been incorporated into traditional buildings of the time.' [10]



TYPICAL EXAMPLES OF CLASP-TYPE SYSTEM BUILDINGS. SOME OF THE DIFFERENT TYPES ARE SHOWN IN THE BOXES ABOVE.

APPENDIX B: SARAH JANE BOWMAN

This Appendix includes extracts from the Joint Union Brent Report which investigated how Sarah Jane was exposed to asbestos in her Brent Primary and Secondary schools. [7]

> 'This [*The Brent Joint Union Report*] is a shocking story of a Brent child being needlessly exposed to asbestos whilst a pupil at school. It shows the highly negligent and unlawful practice in schools for which Brent Council had a duty of care and responsibility.
>
> Their negligence led to the exposure of Brent children to the deadly killer dust ASBESTOS.
>
> This report details the seriously disturbing events and provides evidence of what happened in five Brent schools.
>
> Despite Brent taking more actions than many Councils to improve this situation, our pupils are still being exposed to potential death sentences.
>
> At the end is our conclusion. We describe how the situation in Brent is being replicated across the country and giving our children premature death sentences.
>
> We have outlined what positive steps the Council and Government can and should urgently take to make our children safe.'

SARAH JANE BOWMAN: A BRENT SCHOOL MESOTHELIOMA VICTIM

A former Brent pupil, Sarah Bowman, was diagnosed with mesothelioma in August 2009. She was just 40 years old with two young boys.

Sarah said in a Press release:

"To be told that I had a terminal illness and had less than a year to live was simply too much to comprehend and my family and I have struggled to overcome this."

She underwent surgery on her abdominal wall to remove the cancerous tumour. Her prognosis was described as guarded and her family were living with the knowledge that this painful death sentence could return at any time.

The investigation by Sarah's solicitors of how and where she was exposed included the two schools she attended in Brent:

- Braintcroft School (1973 to 1979) and
- William Gladstone School (1979 to 1984).

Initially in March 2011 Brent Council informed her solicitors that they had no documents showing that asbestos was present in William Gladstone School5.

Fortunately, substantial evidence and information regarding asbestos in William Gladstone School was found in 2011 by the Brent unions. Following the submission to court in 2012 by Sarah Bowman's solicitors of all the evidence regarding asbestos at William Gladstone School a settlement was agreed between Brent Council and Sarah Bowman.

Brent local Trinity Mirror newspapers reported that Brent Council denied liability but her solicitors refuted this in an email to the newspaper. Sarah's solicitors said:

> *"We have a copy of the Defence filed at Court on 5 December 2012 on behalf of the London Borough of Brent. In the Defence, they say: "The Defendants do not require the Claimant to prove breach of duty", i.e. they admitted negligently exposing Sarah Bowman to asbestos*."

Sarah said in September 2014 that:

"I am relieved that the London Borough of Brent has finally admitted liability for my exposure to asbestos at school and I am grateful for the help of my legal team at Irwin Mitchell to help me secure justice for my horrific ordeal."

Sarah and her lawyers at Irwin Mitchell are renewing previous calls for the Government to introduce a schedule of work to identify and remove asbestos from school buildings.

HOW WAS ASBESTOS DISTURBED IN SARAH'S SCHOOL?

The HSE states that: *"As long as the asbestos is in good condition and it is located somewhere where it can't be easily damaged then it shouldn't be a risk to you."*

However, Sarah and other contemporary witnesses remember that ceiling tiles were regularly disturbed when contractors removed the ceiling tiles in order to access the ceiling voids for routine maintenance and repair of services e.g., electrical, plumbing. These witnesses also recall that pupils regularly pushed ceiling tiles and moved them when they were left stacked on the floor. The ceiling voids were known to have substantial amounts of asbestos in the fire breaks and asbestos debris often rests on the hidden surface of the ceiling tiles. Any disturbed asbestos could potentially have entered the classrooms when contractors accessed the ceiling voids.

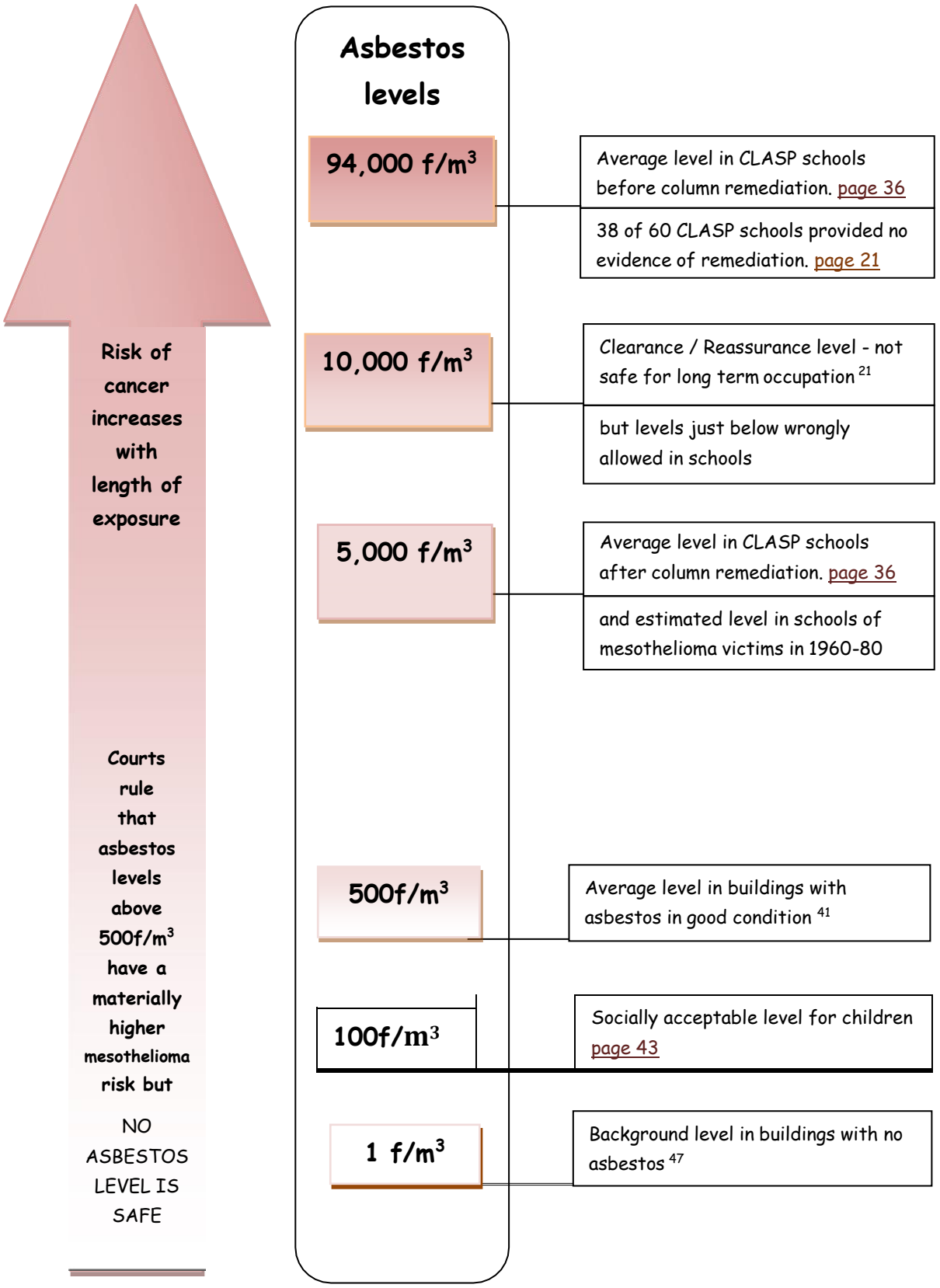
Sarah has recalled a chair thrown by a pupil breaking a classroom wall. She and other contemporary witnesses stated that classroom walls were soft and work surfaces were often covered in dust. It is considered probable that the wall was made of asbestos insulation board (AIB) in common with other such MACE schools. If it was then the exposure to asbestos fibres would have been high as AIB is friable. It was also probable that asbestos materials, debris and fibres entered the wall cavity from the ceiling void and the fibres could from there enter the room through any gap or crack. The tops of the columns were typically unsealed so it is considered likely that asbestos fibres would be spread over time through the wall and ceiling voids into classrooms. This is because the evidence shows that the activities of maintenance contractors and everyday classroom activities like the banging of columns, doors and windows and even draughts can make asbestos airborne.

The union evidence also indicated that Sarah Bowman was probably exposed to crocidolite fibres in a double classroom in the mid-1970s when she was aged eight or nine. it is likely that Sarah was exposed regularly to crocidolite asbestos fibres as she pinned work into the soft walls and when classroom activities and hut movement disturbed asbestos. According to a 2004 survey it contained significant areas of millboard panels containing crocidolite in the walls of the two classrooms and the lobby.

It was erected as a new build against the 1967 DES guidance in 1971.

Shockingly, over a decade later it was also her eldest son's classroom but now visibly deteriorating. It was deemed unsafe during a union inspection in 2007 and a subsequent local authority inspection in 2008. Demolition took place in the summer holidays (2008).

APPENDIX C: ASBESTOS LEVELS FOUND IN SCHOOLS



APPENDIX D: ESTIMATED FORMER PUPIL MESOTHELIOMA DEATHS IN GREAT BRITAIN (1980-2017)

Professor Peto has estimated in 2013 that 200-300 former pupils die each year from mesothelioma because they were exposed to asbestos in their former schools during 1960-1980.[1] [2] It is, however, increasingly likely that some of the deaths now reported will also include exposure in the 1980s. For example, Sarah Bowman and Diane Willmore were found to have developed mesothelioma due to exposure in the 1980s. [7] [6]

Table 9 below shows estimates of the total number of former pupils who have died from mesothelioma from 1980 until 2017. The estimate presumes that between 2011-2015 the average number of pupil deaths per year was a minimum of 1000 (column 3) and a maximum of 1500 (column 4).

The estimate also presumes that the number of pupil mesothelioma deaths since 1980 increases at the same rate as the estimated teacher mesothelioma deaths (all ages) as they were exposed to the same building asbestos levels. This is a reasonable presumption because the Committee on Carcinogenicity has stated that pupils are more likely to develop mesothelioma than adults after exposure to a given amount of asbestos only because they live longer after exposure.[5]

Consequently, the ratio (Rt) of teacher mesothelioma deaths for each year range compared to teacher deaths in 2011-2015 (see column 5) equals the ratio (Rp) of pupil mesothelioma deaths for each year range compared to pupil mesothelioma deaths in 2015. The number of pupil mesothelioma deaths in a given year range can therefore be calculated.
For example, in 1980-1985 if minimum number of pupil mesothelioma deaths is called n

- Rt (1980-1985) = 0.11 = Rp (1980-1985) = n/1000 then n = 0.11 x 1000 = 110

Similarly, in 1991-1995 if maximum number of pupil mesothelioma death is called x

- Rt (1991-95) = 0.24 = Rp (1991-95) = x/1500 = 0.24 x 1500 = 360

Table 9 below shows the estimated number of former pupil mesothelioma deaths for each year range

TABLE 9: ESTIMATED FORMER PUPIL AND TEACHER MESOTHELIOMA DEATHS FOR ALL AGE GROUPS (1980-2017)

Year range	Teachers (all ages) page 10 table 2	Pupil mesothelioma deaths (based on Peto research minimum estimation)[5]	Pupil mesothelioma deaths based on Peto research (maximum estimation)[5]	**Rt -** Teacher deaths(each year range)/ Teacher deaths 2011-2015	GB pupil mesothelioma deaths based on United States Environmental Protection Agency research (EPA)
1980-85	19	110	165	19/178 = 0.11	
1986-90	34	190	285	34/178 = 0.19	
1991-95	42	240	360	42/178 = 0.24	
1996-00	71	400	600	71/178 = 0.40	
2001-05	113	630	945	113/178 = 0.63	
2006-10	134	750	1125	134/178 = 0.75	
2011-15	178	1000	1500	178/178 = 1.00	
2016-17	101	570	855	101/178 = 0.57	
1980-2017	**692**	**3890**	**5835**		**9,000**

The total number of estimated former pupil mesothelioma deaths ranges from 3,890 to 9,000. **See also pages 9-11 Mesothelioma deaths: School staff and pupils (1980-2017)**

REFERENCES

[1] C Rake, C Gilham, J Hatch1, A Darnton, J Hodgson and J Peto, British Journal of Cancer (2009) 100, 1175 – 1183 & 2009 Cancer Research UK

[2] JUAC. Mesothelioma deaths among school staff 1980-2017. Teacher deaths

[3] Table MESO02 www.hse.gov.uk/statistics/tables/meso02.xlsx shows the number of mesothelioma deaths ineach year in 5-year age groups for males and Table MESO03 www.hse.gov.uk/statistics/tables/meso03.xlsx shows the equivalent information for females.

[4] Committee on Carcinogenicity of chemicals in food, consumer products and the environment CC/13/S1:Statement on the relative vulnerability of children to asbestos compared to adults

[5] Professor Julian Peto at Education Select Committee hearing on Asbestos in Schools on 13th March 2013

[6] High Court QBD Liverpool District [2009] EWHC 1831 (QB). Before the Hon Mr Justice Nicol. Dianne Willmorev Knowsley Metropolitan Borough Council 24 July 2009 Para 8, 57b

[7] Asbestos Management in Brent Schools: local and national implications 2016, A Brent Joint Union Report

[8] Assessment of Asbestos Management in Schools. Asbestos Testing and Consultancy Association ATaC January24th 2010

[9] Scape School building overview www.scapebuild.co.uk;

[10] HSE Asbestos in system buildings Control of Asbestos Regulations 2006 Guidance for duty holders Updated18 September 2008

[11] Property Data Survey Programme. Summary Report. January 2015

[12] Managing and working with asbestos. Control of Asbestos Regulations ACOP 2012

[13] HSE. Asbestos Management: Checklist for schools. See http://www.hse.gov.uk/ pubns/indg223.pdf

[14] DfE Policy review: The management of asbestos in schools. A review of DfE policy. March 2015

[15] DfE Managing asbestos in your school or college (October 2020); DfE Managing asbestos in your school. March 2015; EFA Managing asbestos in your schools February 2017.

[16] DfE Asbestos Management Assurance Process (AMAP) report. July 2019

[17] Lord Young review "Common Sense Common Safety 2010; Asbestos in Schools response to HSE's simplified classroom risk assessment February 2011

[18] Managing asbestos in schools outside local authority control. Inspection findings. 2013/14

[19] Fibrous Materials in the Environment Institute for Environment and Health. P72 and p75. 1997

[20] Gilham et al Past and current asbestos exposure and future mesothelioma risks in Britain: The Inhaled Particles Study (TIPS) International Journal of Epidemiology 2018 1–12 doi: 10.1093/ije/dyx276; Gilham,Rake, Burdett et al Occupational Environmental Medicine 2016; 73: 290-299.

[21] JUAC Why unsafe asbestos may still be in our schools in 2050. October 11th 2017

[22] HSE. Questionnaire survey on asbestos management in local authority system-built schools – Alphabetical list of responses – July 2010

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

[24] EPA Support document for the proposed rule on friable asbestos – containing materials in school buildings. EPA report 560/12-80-003 page 92. American Academy of Pediatrics. Asbestos Exposure in schools. Pediatrics vol 79, No 3 Feb1987 p301-5. Reaffirmed May 1994.

[25] Ministerial brief: Meeting with Doug McAvoy. DfEE premises team/Minister for Schools R Squire MP 12th Dec 1994.

[26] HSE HSG227 A Comprehensive Guidance to managing asbestos in premises. 2002

[27] Managing and working with asbestos. Control of Asbestos Regulations ACOP 2012.

[28] HSE. The Duty to manage asbestos. http://www.hse.gov.uk/Asbestos/duty.htm

[29] Issues of Using CLASP to transform learning – Nottinghamshire County Council. 2008

[30] HSE HSG227 A Comprehensive Guidance to managing asbestos in premises. 2002

[31] ILEA report LSS/AP/52 (1987) Investigation into fibre release from low level asbestos panels - Ernest Bevin school May 1987

[32] House of Commons Committee of Public Accounts. Capital Funding for Schools Report April 24th 2017

[33] House of Commons. Capital Funding for Schools. (paras.19-22) 24th April 2017

[34] FOI to Duty Holders of schools in England requesting list of CLASP schools and other information via Whatdotheyknow website [CLASP school FOI] JUAC 2017/2018

[35] HSE. Inspection Findings: Asbestos management in Local Authority school system buildings 2009/10

[36] HSE. Questionnaire survey on asbestos management in local authority system-built schools – Alphabeticallist of responses – July 2010

[37] Response to Freedom of information request to Scape for list of pre 2000 CLASP schools. 07/02/2018.

[38] Email response from Scape regarding FOI request 23/02/2018

[39] Robin Howie, Robin Howie Associates, Edinburgh. Mesothelioma deaths in teachers and nurses in GreatBritain. Environmental Health Scotland, Volume 29 No 4 2017 pages 35-37.

[40] Hodgson and Darnton Ann. Occup. Hyg., Vol. 44, No. 8, pp. 565–601, 2000. The quantitative risks ofmesothelioma and lung cancer in relation to asbestos exposure.

[41] HSL Summary of fibre concentrations in CLASP construction schools containing asbestos. HSL/2007/22; HSLFurther measurements of fibre concentration in CLASP construction buildings AS/2007/14.

[42] G&L Consultancy Ltd Report on Asbestos Investigation at Hay Lane School, Kingsbury, London on 15th/16thDec.2007

[43] 2003/18/EC amending to EU asbestos worker protection directive (83/477/EEC) article 7.6. (Powerpointpresentation G. Burdett HSL

[44]The 2nd Asbestos Disease Awareness Organisation (ADAO) conference Apr 2006. Dr Lemen, the Deputy Director of National Institute for Occupational Safety and Health (NIOSH) and the former US Assistant Surgeon General. p58. Kazan –Allen American Journal of Industrial Medicine 50:52- 62 (2007)

[45] The 2nd Asbestos Disease Awareness Organisation (ADAO) conference Apr 2006. Jonathan Bennett of the New York Committee on Occupational Safety and Health (NYCOSH). P57. Kazan –Allen American Journal ofIndustrial Medicine 50:52- 62 (2007)

[46] Short, thin asbestos fibers contribute to the development of human malignant mesothelioma: pathological evidence. Suzuki Y, Yuen SR, Ashley R. Int J Hyg Environ Health. 2005;208(3):201-10.

[47] Robin Howie. Recommended Risk Algorithm for MDHS 100

[48] Robin Howie. Robin Howie Associates. Asbestos exposure in buildings-the risks. August 2005 https://www.healthandsafetyatwork.com/content/asbestos-buildings-risk ; Consequences of childhood exposure to asbestos.https://www.whitelung.org/pubs/childexp.htm.

[49] Final WATCH position on asbestos risk assessment: February 2011

[50] Asbestos Compliance and Retrospective Risk Analysis. BOHS Regional Meeting London June 2018. Dr MartinGibson HSE. Agenda. Projected mesotheliomas. Factors reducing exposure. Factors which could inhibit future reduction. Retrospective Risk Analysis. Sentencing Guidelines.

[51] Letter to Dr Lloyd Davies head Medical Officer Factories Inspectorate Ministry of Labour / Department of Education 1967. 1966 Annual Report of HM Chief Inspector of Factories on Industrial Health. Ministry of Labour P60 August 1967.

[52] Landrigan. A population of Children at Risk of Exposure to Asbestos in Place. Annals of New York Academy of Sciences 1991 p283 – 286; Landrigan and Kazemi (eds), The third wave of asbestos disease: Exposure to asbestos in place. Public Health Control. ANYAS 643 (19091) p. 1-628; M. Huncharek, Changing risk groups for malignant melanoma Cancer 69 (1 June 1992, pp. 2704-11.

[53] Michael Lees. Increased vulnerability of children to asbestos. The Precautionary Principle. August 2011.

[54] Secretary of State for Education and Employment written reply to Mr Michael Clapham / June 1997.

[55] SCAPE Formal notice. Release of asbestos fibres in CLASP buildings 12 October 2006;

[56] National Audit Office. Capital Funding for Schools 2017.

[57] JUAC Press Release March 9th 2020. Unions warn Treasury that capital spending cuts could increase asbestos risk in schools.

[58] HSE. RR1074. Costs to Britain of work-related cancer Michael Zand, Clark Rushbrook, Ian Spencer, KyranDonald and Anna Barnes

[59] Michael Lees MBE, Founder member of the Asbestos in Schools Group. Asbestos in Schools – a Fifty Year Scandal. British Asbestos Newsletter. Spring 2016. 100th Issue Commemorative Edition.

[60] HSE Asbestos Compliance in non-LA Managed Schools HSE Statistics and Epidemiology Unit June 2014.

[61] Michael Lees. Asbestos incidents and failures of asbestos management in schools 2009. Updated 2014.

[62] FOIs to Duty Holders: https://www.whatdotheyknow.com/user/lucie_stephens/requests

[63] Michael Lees JUAC AiS. 14th June 2013. Case for an environmental level for the occupants of schools.

[64] Proposal for an environmental level for asbestos exposure in schools. HSE comments. February 2015.

[65] https://www.equalityhumanrights.com/en/human-rights-act/article-8-respect-your-private-and-family-life