



**FACULTY OF
PUBLIC HEALTH**

Faculty of Public Health Annual Lecture

Presented by

**Mr Justin McCracken, Chief Executive,
Health Protection Agency
Tuesday 16 December 2008**

Good evening ladies and gentlemen. It is a great honour to be asked to give this lecture and I have to say it is somewhat daunting for someone who frequently describes himself as a lapsed physicist to be addressing such an august group as yourselves. What I want to do is to use the opportunity to give a personal perspective on the health protection system and so the views are very much mine rather than those of the Health Protection Agency. I cannot hope in 35 minutes to give a comprehensive view but what I will try to do is illustrate a few areas of progress and raise a couple of issues and I hope in that way generate a bit of debate. I intend to start with an example from my own past and show how it illustrates current health protection issues and then discuss a few examples of health protection at work and finally set out some thoughts about what is needed to take health protection forward in the 21st century.

The example I want to start with is not from the UK. It concerns a small boy called Harish whom I met in 1973 when I was doing drought relief work in Rajasthan. He was clearly seriously malnourished and very ill. He looked about 18 months old although it subsequently transpired he was over 3. He'd been born into a poor family, one of several siblings in an area suffering from prolonged drought. He'd been neglected from birth and we found him very sick indeed with endemic cholera and amoebic dysentery - the outlook for Harish was very poor yet we felt unable to do anything for him and I believe Harish's predicament illustrates the following generic issues all of which are relevant to health protection in UK now: social inequalities, environmental hazards, infectious diseases and societal values. It's pretty clear how his predicament illustrates all of them except for the last. His family neglected him from birth because he was born under the wrong star sign. They believed he was doomed whatever they did and so they focussed on looking after their other children. I intend to say a little bit about each of these generic issues except for social inequality. This is a massive area in its own right and I will simply confine myself to saying that it's clearly going to be around for as long as any of us so we better accept that as professionals need to cater for it while not in any

way stopping trying to reduce it or even eliminate it. So let's look at the 21st century issues.

Given my background in the environment agency and health and safety executive it probably will not surprise you to hear that I believe the biggest challenges for health protection this century lie in the field of environmental hazards. Naturally occurring ones such as radon still kill between 1000 and 2000 people each year in the UK. There are also many hazards that we now face as a result of our industrial activities past and present. The scale of health issues is often slow to be recognised for a number of reasons. Long latency can make the connections difficult to detect and difficult to accept for many people for whom the daily struggle of life is quite enough.

Asbestos is a case in point. It illustrates the problem well. It was known in the times of the ancient Greeks to be a killer and yet currently it is killing about 4000 people each year in this country and this is set to go on rising for the next few years because of previous exposures. So how did we let this happen? Was the health threat forgotten? This may possibly explain the lack of controls in the early days of the industrial revolution. But in 1899 just down the road from here at Charing Cross Hospital, Montague Murray discovered that 10 people who'd all worked together spinning asbestos had died of asbestosis in their 30s. A study in 1928 showed that 80% of those who had been in the industry for more than 20 years had asbestosis. That year the Chief Inspector of Factories declared that the industry would be safe within 10 years. Let's look at asbestos related deaths since then and the projections for the future. The chart demonstrates the issue clearly – it shows an unmistakable correlation between exposure to asbestos which is the curve on the left and deaths from mesothelioma the dots and curve on the right. The dots are the observed figures and the curve is predicted value. Of course asbestos exposure is a factor in other cancer deaths than mesothelioma actually mesothelioma only accounts for about half of asbestos related deaths and there currently, as I said 4000 asbestos related deaths per year in the UK. We are still on the upward part of the graph and deaths are expected to peak at about 5000 per year around 2015 and then decline gradually. This is pretty sobering stuff for a threat that was known about over 2000 years ago and with a cause and link clearly identified over a 100 years ago here in London.

Returning to the wider theme of environmental hazards the benefits of technology make us all reluctant to recognise possible adverse consequences. Marie Curie would not admit that her beloved radiation could cause cancer. In addition there is not the same shock value in illness as in injury or violent death who knew that the London smog in 1952 was implicated in more deaths in three weeks than the bombing throughout the whole war. The smog did at least lead to the Clean Air Act of 1956 from which we as a generation are all benefiting. But this is typical of progress in health protection and many other fields, we wait for a real disaster and then act. Piper Alpha at the bottom of the slide there that was a fire on an offshore oil rig in which 167 people lost their lives 20 years ago this year. It led to a radical overhaul of that industry and to the introduction of truly independent regulation. The trick for us as public health professionals is to spot the impending disasters before they occur and ensure that steps are taken to prevent them. That of course inherently unglamorous.

Having discussed environmental hazards I now move onto infectious diseases. The traditional childhood diseases are more or less under control now. As is so often the case this has been brought about by a combination of factors, good sanitation and immunisation strategies probably being the biggest contributors. Almost exactly 100 years before the great smog London of course suffered the big stink which led to a public health act and so to the comprehensive sewage system that still serves us pretty well. And it's worth acknowledging here of course that the biggest improvements in public health have not, by and large, been brought about directly by public health professionals themselves the sewage engineers, the combustion engineers and of course politicians have all been key but usually stimulated into action by committed public health professionals. The need for joined up government is not new. Of course whether or not diseases such as measles remain under control does depend on the personal choices of many parents. Are their decisions motivated by the public good or their perception of the balance of benefit and risk for their own children and how do we best influence them in a post-Wakefield and post-BSE society.

Sexually transmitted infections are of course also very much determined by the choices people make about their own behaviour and we probably should not be too hopeful of major changes to behaviours which are so closely related to the survival of the species. Actually the developing position on HIV aids is in many ways an example of how good public health work can address even major challenges. From the original epidemiological work in the US which identified the disease in the 80s through to today's international efforts has been a long journey with many players involved but the combined efforts are making real in-roads into the impact of this new disease. And of course this century's big stink or great smog may instead turn out to be a new flu pandemic. As I am sure you know estimates of the number of possible deaths from such a pandemic in this country range from between 50,000 and 75,0000.

In a few minutes I'd like to have a look at what's being achieved on HIV and what's being done on pandemic flu to illustrate how the public health system can work really well together. Before that I want to say a few words about the last of the issues illustrated by poor Harish's predicament. Societal values. Now I am absolutely not an expert in this area but I do find it fascinating. It seems to me that there is a deep seated paradox between what I see as a developing dependency society or dependency culture in our society and a lot of trust in authorities generally. On the one hand, people now expect to be protected from all sorts of risks they not only expect their food and water to be safe, they expect the state to protect their savings even when they choose high-risk/high-return options and on the other they no longer offer unquestioning trust to authorities, be they politicians, healthcare professionals, or any other of the myriad groups who help us with our daily lives, and there is a failure to recognise the slow-burn but large threats that society faces. There is an over-riding attitude of 'it can't happen to me'. Perhaps this is because our every day experiences are of consistently good outcomes. Most members of the public have not even seen a dead body. There is a lack of sense of urgency about climate change in particular, compare this with the response to the recent financial crisis. We are just like the archetypal frogs in the slowing heating pan of water except that we are busy stoking the fire underneath us.

Having said a few words about each of these generic issues lets now look at some current health protection issues and what's being done about them.

My first example is of a disease which only emerged in the second half of the twentieth century and looks set to be with us in a big way throughout this one. HIV provides an interesting example of a global health protection issue where action has followed evidence. On all my examples I will look at how evidence helps to identify the threat, creating the right environment for effective action, to prepare for and respond to it and how more evidence helps to set standards for improved health protection. On HIV, surveillance in the USA by CDC in the eighties provided early understanding of its epidemiology in the groups which were affected first, men who have sex with men, intravenous drug users and recipients of blood products. There is now continued production of high quality data to better understand the transmission pattern and so forth. Keeping track of the international picture provides invaluable information for identifying high risk groups. In terms of preparation, sensitive specific laboratory tests came in the mid-nineteen eighties and an unlinked anonymous testing programme came in in 1990. Of course the development of anti-retrovirals has been key and this demonstrates the crucial role of the drug companies. Whatever their motivations may be, they are important partners for us too. And there are far too many actions involved in the response for me to list them but the work to target high risk groups is essential and worth singling out. This involves many voluntary and professional groupings as well as clinicians and statutory agencies such as HPA.

On standards, outcomes of performance management are already being built into world class commissioning and again the agencies working with strategic health authorities, primary care trusts and specialised commissioners on that. Time to diagnosis has been a particular issue with enormous benefits flowing from early diagnosis and again there are many players involved in making that happen. A recurring theme through all my examples is the need for good communication and collaboration. On HIV it's crucial that young people and other hard to reach groups are exposed to appropriate and accurate messages about safe sex and how to seek advice, testing and treatment. We at HPA produce regular reports and advice on HIV and STIs for different audiences. For example, advice for high risk groups such as gay men on having an HIV test at least annually and avoiding over-lapping sexual relationships. Collaboration needs to and does involve the NHS, local authorities, voluntary sectors and of course the Department of Health and agencies such as HPA. This global problem necessitates global solutions and a really coordinated effort.

So let's look at what the effort is actually resulting in. This is European data. It demonstrates that substantial gains and improvements are being made over the years. The slide shows the number of new aids diagnoses every year on the top line and the number of deaths per year on the lower line. The reduction since the late 1990s is a fantastic result even though much more needs to be done and in the UK last year the improvement in survival of those living with HIV following the introduction of effective anti-retroviral therapy has been sustained. During 2007 only 540 deaths occurred in the estimated 73,000 HIV infected persons. That's about 7 per thousand.

Another welcome health outcome is that ante-natal screening in HIV diagnosis has almost eliminated mother to child transmission. This chart shows that as the proportion of HIV positive women who are diagnosed before birth has increased that's the rising line at the top with rates now sustained in the mid to high 90s the proportion of exposed infants becoming HIV positive has fallen to about 3 percent. While there is undoubtedly much more to be done on HIV, for instance there has been no fall in UK HIV transmission in gay men with over 2,600 new diagnoses annually and heterosexual HIV transmission in the UK is steadily rising although it still relatively low with just 700 new diagnoses annually. These two charts show that important steps forward have been achieved by a combination of interventions by many different organisations and of course committed individuals.

Turning now to environmental hazards, I mentioned that there are between 1,000 and 2,000 deaths per year associated with radon. Radon is a good example of how work can be done to define and take action on an environmental hazard. As I am sure you will know naturally occurring radon gas represents the largest exposure to radiation for most people and gives mean population radiation doses about 1,000 times higher than those due to disposals of radio active waste. The agency has used surveillance of lung cancer deaths and radon levels to improve our understanding of the problem which is now pretty good. In partnership with the British Geological Survey we've produced a detailed map of radon in England and Wales. We've taken measurements of radon levels in over half a million homes using a purpose-built meter and remediation is recommended for all homes above the action level which is currently set at ten times the median level. The evidence obtained by this measurement programme is also a primary input into research on the health effects of radon and provides the basis for setting standards for managing the risks. These include designating certain areas as radon affected which leads to advice to all households to have levels measured or high radon areas where radon protective measures are now required by the building regulations.

New research has recently led the HPA to recommend to the Department for Communities and Local Government further changes to the building regulations to extend the use of radon protective measures. I will shortly be publishing a report which uses cost effective calculations similar to those used by NICE to determine what actions are justified and I think that this consideration of cost effectiveness is a development which I expect to be more and more common in the future. Looking at the communication aspects we have set up a website together with the BGS so that people can obtain radon levels on a postcode basis. We will soon be consulting over a number of proposed changes including the question of whether or not the domestic action level should be applied in schools. I think many parents will be surprised to find that this is not already happening. Collaboration has been important in dealing with radon. We are working with DCLG and with BGS and local authorities to ensure that building regulations reflect the appropriate control measures in radon affected areas. The HPA has also collaborated with HSE on providing advice on reducing radon levels in the workplace as levels there are of course just the same as in homes.

Moving on to chemical threats, these cover a wide spectrum of issues from localised contaminated land through to widespread air pollution. They are never far from the

headlines one way or another and there is still much uncertainty about the health risks associated with many chemicals. One of the critical contributions the HPA makes in this area is in evidence gathering. We have established a joint medical toxicology research centre at the University of Newcastle. This aims to improve population and individual health protection by focused research on monitoring exposure to environmental chemicals, identifying the toxic mechanisms involved and developing evidence based clinical management options and preventative measures.

The HPA's research programme aims to address 3 priority areas in toxicology research, bio markers and uptake, susceptibility factors and long term toxicological effects. We've also recently set up a new National Nano Toxicology Research Centre. We will be collaborating with the Universities of Birmingham, Cardiff, Edinburgh, Imperial College and King's College London and the MRC Toxicology Unit in Leicester in this venture. On preparation, training and specialised equipment are now provided for NHS and emergency response staff. Many exercises are conducted each year to improve preparedness and of course the Health Protection Agency organises and delivers much of that. There is also a very active programme of research into decontamination of people exposed to high levels of toxic chemicals involving the Home Office and the Ministry of Defence as well as ourselves and the Department of Health and that uses EU and actually US funding and of course there is an enormous amount of response work up and down the country involving many players dealing with the legacy of past industrial contamination. A good example of this is St Anthony's Coultard factory site in Newcastle. Chemicals including benzene and naphthalene were leaking into the river Tyne, Newcastle city council, Newcastle Primary Care Trust and Newcastle University were all working together. Agency scientists helped to assess the health risks and communicated these to the public.

We concluded that the levels could be hazardous with long term exposure and that direct contact with chemicals on the site could cause skin irritation. Residents were advised to avoid the fore shore until the clean-up was completed. And finally acute exposure guideline levels for short term exposure to a range of chemicals have been developed in the USA. HPA set up an expert group and is now recommending that these are adopted as standard in the UK and this is, actually, years ahead of European work that is going on in this area. This is a great example of one of my favourite themes which I call pinching with pride. Adopting other people's ideas and applying them rather than going through the effort of reinventing the wheel.

Reflecting both the known health risks and the uncertainties chemical hazards can cause considerable anxieties among the public. We need to be careful neither to dismiss concerns simply because there is an absence of evidence rather than evidence of a lack of effect nor to stoke the sensationalism that suits some sections of the media and preys on anxious ordinary people. With the St Anthony's riverside work communication was synchronised and involved on-site messages and letters to community centre schools and GPs and this approach ensured that coverage was balanced, the threat was addressed and there was no panic. Incidentally, the picture on the right of the slide shows part of that problem.

Given the range of issues it is essential that we engage at all levels from the very local one, as in the St Anthony's example, through to the national and international one. For example, to influence the longer term improvements in the control of

chemical hazards that the new European reach directive on the registration, evaluation and authorisation of chemicals offers.

Global warming is going to pose a significant challenge to the nation's health during the rest of this century. The Agency and the Department of Health produced a key report earlier this year; it's actually an update of a report that had been produced 5 years previously. It's unique in that it is quantitative about possible impacts. For instance, temperature rises mean that by 2012 there is a one in forty per year chance of the UK suffering a heat wave that will claim 3,000 lives immediately. The report identified the key risks to health associated with climate change as heat waves, flooding, infectious vector borne diseases, UV radiation and ozone. It was written to advise the decision making processes of the UK government and it also formed the basis of our submission to the Royal College on Environmental Pollution to help scope their study on adapting in the UK to climate change. Just focussing on one of the five risks, the increased frequency of heat waves, we now have a national heat wave plan that was launched by the Department of Health in 2004. That's led to the establishment of a heat health watch system which operates in England throughout the summer months and during a heat wave support from many organisations in all sectors is available for vulnerable groups. Key areas for the NHS in adapting to climate change, including adapting the health and social care infrastructure, hospitals and nursing homes and so on to be more resilient to the effects of heat waves. New building standards are being developed to cover that. We need to help and advise people to look after themselves and their families.

We need to raise awareness of the risk without scaremongering and yet help to create a sense of urgency which is a tricky balance to strike and requires evidence and communications expertise. But climate change is a unique challenge for the 21st Century which will undoubtedly require unique collaborations and approaches. It's a massive challenge for humanity and one where international collaboration is absolutely essential if an effective and comprehensive strategy is to be put in place. But its slow long term development makes it politically much harder to address than the current financial crisis.

My final example strikes a more positive note. The preparations for the expected flu pandemic are, I believe, far better than anything that's previously been achieved for an impending threat. Since the next pandemic, is thankfully, very unlikely to originate in the UK, a global approach to surveillance and alerting is key. We do not know where or when the next pandemic will begin but it's clear that there will be a real benefit in being prepared and being prepared across all sectors not just public health and the health sector, but with appropriate actions and interventions to mitigate the effects on critical services, education, food supplies, businesses and so on and this really does seem to be happening. The capability to produce vaccine strains quickly and for manufacturers to supply will also be important even though they will not be available for at least 3 months after a new strain appears they should help with the second and third waves of the pandemic. For the first time part of the response is to use anti-virals within 48 hours of onset to mitigate the effects of flu and a stock-pile sufficient for 50% of the population is being built up. All of this represents an unprecedented level of preparation and has knock-on benefits in terms of the generic capabilities being developed. Let's hope we never need to put

our plans into action but if we do the business continuity plans and the arrangements to facilitate rapid distribution of anti-viral drugs are key.

Meanwhile the by now well rehearsed arrangements for responding to avian flu incidents swing into action as and when needed and its worth noting that there's still been no single case of human H5N1 in the UK. For the response everyone needs to know the basic facts about flu and how to minimise the impact on themselves, their families and their workplaces. International work on policy development has been a new facilitating mechanism and has allowed discussion of a scientific evidence base which is pretty much the same wherever you are and its different interpretations according to culture, politics and societal values. We in the UK are making massive investment in preparing to deal with the flu pandemic and this is establishing capabilities which will be useful against a range of other threats.

So what are the themes emerging from these examples. First is the re-emergence of the theme of getting public health onto everyone's agenda not just the NHS one. There is the developing recognition of the local authority role again. Examples of this are the local area agreements and the joint appointments of many directors of public health; an acceptance of the real con-activity from local to global and vice versa. Then there is a real focus on preparedness, establishment of the local resilience fora, cobra and so on, the work on pandemic flu and chemical incident preparedness are creating a strong generic capability. This is a big step forward for UK plc. Local authorities, NHS, agencies such as ours, the Department of Health, DEFRA all are intimately involved and developing real competence and this is an enormous comparison with the foot and mouth learning, the very painful foot and mouth learning that some of us went through 7 years ago.

But there are some points of concern in terms of the whole horizon we need to be sure we don't forget the lessons of history such as asbestos and air pollution. We need to pay sufficient attention to opportunities to learn from around the world. For instance, if China can set up 4,500 mobile phones surveillance data entry points into their web based public health surveillance system within 20 days of the Sechuan earthquake, and I can assure you they did, what opportunities does such technology offer to us. This rather strange parent-child relationship between the authorities and the population needs much more careful management than it frequently gets. A 'we know best' attitude, which still frequently manifests itself, means insufficient is done to win hearts and minds. This is a delicate issue in a sophisticated society like ours but I believe we need to do more to empower people to take informed decisions about their own health protection issues and we need to listen and to be seen to do so. I'd like to share another personal example with you on this point.

This is from my early time in the Environment agency 10 years ago and it has left an enduring impression on me. I was responsible for regulating the emissions from Castle Cement factory in Clitheroe. This site was a focus for a national debate about the health effects of burning substitute liquid fuels which were mainly solvent wastes or where then anyway. I inherited a very difficult situation with very active campaigning groups and general low levels of trust especially from local residents. I went to meet a certain one of them in his home. A man who was worried about his daughter whose asthma seemed to be affected by plume grounding. Some of the activists were accusing the environmental agency staff at the time of being corrupt.

He said your staff are not corrupt but they do drink coffee with the management at Castle Cement and they don't drink coffee with me and that affects their perception of the situation. I thought then and I still think now that that was a very insightful observation and one that we would all do well to keep in mind as we do our work. There is of course a whole spectrum from being corrupt to being recognised as being on our side and too often those in authority seem to be at best distant and at worst dismissive of ordinary peoples concerns. We need to listen to all the views and to be seen to keep an open mind until we have clear and conclusive evidence. We should not just rely on established experts or confuse an absence of evidence with evidence of no effect. We ought to explore the need to look for and assess new evidence and be very careful about the communication of risk putting it into an every day context which means something to ordinary people, being honest about uncertainties and giving balanced advice and so empowering people to make their own choices. We also need to demonstrate the business case for action and so influence the policy agenda maybe even build the case for the next big public health act.

In the Health Protection Agency, we recognise that we have a particular responsibility, of course, for health protection. We absolutely are just one cog in a large and complex public health system but as a national expert body, we represent a substantial investment in developing the generic capability I have spoken about. Our responsibilities encompass the whole spectrum of evidence gathering to action, research to response as some people put it or as I have put it in my examples earlier, threat identification, preparation, response and standard setting. We're a young organisation and we have still got a lot to learn possibly particularly in the being seen to be responsive area but we are determined to develop, building on our strengths and confident in the support of fellow professionals around the country and indeed around the world. We have been working on a vision for HPA which embodies all the aspects I have been talking about and we believe will make us a more effective partner within the public health system. If you are interested please pick up a copy outside.

So what are my conclusions; I think the current direction of the public health system is encouraging after a very difficult and confused period. We're seeing the joining up of all parts of government under local to an international approach but we do need to maintain the momentum here. Most encouraging is the real energy being put into generic preparedness. This is a new development in the UK and will stand us in good stead for the unknown and unpredictable threats of the 21st Century. But the threats are very real; climate change, growth in the volume and speed of international travel, terrorism, new technology to name but a few. Looking at how progress has been made in the past and how society is developing now, we need to avoid the trap of being too inward looking as professionals. We must combine our voices to influence both public and policy makers, providing real leadership to stimulate the behavioural and the policy changes we know are necessary to protect the health of our children. I am confident that we will do that and in so doing we will see more and more faces like the one's on this slide and fewer and fewer like that of Harish.

It just remains for me thank those who have helped me prepare this talk particularly Professor Ruth Hall who is here, and Phil Hemmings and of course to thank you for your attention.

Thank you