

ACP OPEN MEETING 10 JULY 2002

TEMPEST ANDERSON HALL, YORK

2.00 – 3.30

Members were invited to introduce themselves.

David Coggon

I'm Professor David Coggon and my professional expertise is in occupational medicine, I'm a physician and I have expertise in epidemiology. I work for the Medical Research Council at Southampton University.

Gareth Edwards-Jones

Good afternoon my name is Gareth Edwards-Jones. I'm Professor of Agriculture in the University at Bangor and my specialism on the committee relates to economics.

Sylvia Owen

My name is Sylvia Owen – I was nominated by the National Council of Women, where I chair the science and technology committee. I am the consumer representative. My working life was spent in education.

Elaine Brown

Hello my name is Elaine Brown, I am another of the lay members of the ACP. My professional life was teaching biology. I am meant to represent the environment on this committee which is a bit more nebulous than representing the consumer. I have five

children and seven grandchildren and I am interested in the environment in which they are developing – thank you.

Christopher Stopes

Hello I'm Christopher Stopes, I'm a freelance consultant in organic food and farming and I serve on the advisory committee on pesticides as an expert in organic farming.

Jim Orson

Jim Orson director of Morley Research centre in Norfolk. I'm an Agronomist and my specialism on the committee is efficacy and trials methodology.

David Coggon

Peter Calow isn't here yet, we'll let him introduce himself when he arrives – if he arrives.

Alan Boobis

Afternoon, I'm Alan Boobis deputy chairman of the Advisory Committee. And I also chair something called the Medical and Toxicology panel which provides expertise to the committee. I am a Professor of Pharmacology at Imperial College in London and my particular area of expertise is toxicology and pharmacology.

Cliff Elcombe

I'm Cliff Elcombe, I'm a senior lecturer at the University of Dundee. My particular expertise is in mechanisms of toxicity and carcinogenicity.

Nick Bateman

Good afternoon I'm Nick Bateman. I am a physician. I work in Edinburgh in the

hospital there, the Royal Infirmary. I also am a director of one of the UK National Poisons Information Services centres – of Scotland. My particular interest is in human toxicology and the effects of drugs and poisons in humans.

Pat McElhatton

Hello I'm Pat McElhattan, I'm the head of the National Teratology Information Service which is funded by the Department Of Health to provide risk assessment on drugs and chemicals in pregnancy. I have a background in pharmacology and toxicology and I lecture in reproductive toxicology.

Graham Matthews

Good afternoon I'm Graham Matthews. I'm based at Imperial College as Professor of Pest Management, I'm an entomologist by training and have a particular interest in pesticide application technology.

Robert Smith

Hello I'm Robert Smith, I'm Professor of Biology at the University of Leicester. I work on pest management and the environment, so my expertise is on the environmental effects of pest management.

David Coggon

Thank you very much for that. We have three main items on the agenda this afternoon. And the first one is really putting the risk assessment that we carry out for pesticides in the context of what is done in relation to other chemicals in other circumstances and also what is done in other countries. The paper that's been

circulated in advance of the meeting is currently in draft form. It has already been before the ACP and the medical and toxicology panel, but we thought it would be helpful to take it to a more general audience at this stage. Partly so that you can just see where we fit into the more general picture but also to get comments from you that can actually feed into the final drafting of this document.

Professor Ian Purchase is going to introduce the paper. We need to move down to the front benches so that we can see the overheads so if you just bear with us...

Background talk

Ian Purchase

Well thank you Mr Chairman. I welcome the opportunity to talk to you about this group. It's got rather a complicated name but I think I'll explain to you why we have a group of this sort and what type of work we're doing. But I think after consultation with the chairman we thought it would be a good idea just to reconfirm what it is that we mean by risk assessment.

Because it's important to distinguish between risk assessment, exposure assessment and hazard assessment. And this is a diagram which sets out the process that we're involved in. Here are the people who might be exposed to the risk. They can

be exposed through various routes in various ways to a chemical or a group of chemicals. Next there is the information we have on the toxicity of the chemical. The hazard assessment is frequently based on animal studies but may be based on epidemiological studies or other information from *in vitro* studies, the chemistry of the chemical and so on.

But it's only when we bring together the information about the hazard, (about whether the chemical is toxic and in what way it's toxic,) it's only when we bring that together with the exposure, (the route of exposure, the frequency of the exposure, the amount of exposure and the duration of exposure) that we can hope to assess what the risk to the health of the individual is. And what I'm talking about, what this group IGHRC has been involved in is having a look at the whole process of integrating the information from hazard assessment and exposure assessment to make a judgement on the magnitude and acceptability of risk.

We are an interdepartmental group and all the different departments are represented by their working scientists. I chair the executive committee - there's a steering committee that does the political work in Whitehall to make sure that everything ties up, but I am chairing the executive committee - which also has members from all of these Departments – Department of

Health, Trade and Industry, Home Office, Food Standards Agency and so on.

I have been working with those people in order to try and analyse (as you'll see) the processes used in risk assessment and what can be done to actually improve those processes.

You'll see in the paper that's been circulated, that a report was produced in 1995 suggesting that it was important for government to try and produce greater consistency and coherence in its processes including those of risk assessment. And so, soon after 1995 a risk assessment and toxicology steering committee was set up. That produced (through workshops, through questionnaires and so on) six reports. And these reports had vast numbers of recommendations represented by all these arrows at the end here, some of which were 'motherhood' statements like – wouldn't it be nice if everything was perfect. Others were more pragmatic and practical.

Just to give you a feel - these are rather technical titles - but these are the six reports – here's three of them. You can see that there was a mapping exercise about how different the government departments did this work. And then there was more technical information.

So our job was to take the recommendations from these reports and try and convert them into something practical. And so the aims of our group were a) to promote the development of methods and techniques that'll improve information and risk assessment, b) to promote improved approaches, c) to promote coherence and consistency amongst government departments. And then d) to act and disseminate advice on best practice.

So what we did was to take all these recommendations and try and convert them into actions. And looking back on the work I can now see that the actions that we identified can be classified into three groups, three types of actions. Those that affected people, related to training and improved knowledge of these processes. Those related to the scientific knowledge, which there is in risk assessment. And those related to the overall process, which is followed in carrying out a risk assessment. And I've colour coded these so that you can actually follow them through on the different slides that follow.

So first we considered the circumstances of people working with risk assessment; what we've been trying to do is to stimulate what we've called specific issue working groups. Where scientists working in government departments felt uncertain about an emerging area of science. We've tried to

stimulate a forum where they can learn and keep on top of that science as it emerges. And *sharing experience* is where the experience in some departments is stronger in one aspect than in another department. And so by putting together workshops and courses we can actually share that experience between all departments so that they can actually come to a common understanding of the issues.

Scientific knowledge: we have a research programme which I'll come onto later. When I started this work I was against the idea of relying on research to change this overall process of risk assessment. Research by its nature is long term, the output of research and translating it into what might change the way we work takes decades. And we were working to a three year programme. But still there are some things we can do in research which might help to start up some changes which ultimately will have some effect. Finally we had a look at the overall processes in risk assessment. We are developing some guidelines which would provide information for people working in government departments about what an idealised system would be so that they can actually emulate that idealised system in their daily work.

So now we come to some slightly more technical material but we're going back to

the first of those specific issue working groups. The first of these is what the experts call PBPK modelling. Essentially what this does is to model the way in which chemicals are handled by experimental animals and model the way in which they're handled by humans and thereby provide better information about how you can use experimental animal information to predict what will happen in humans. So that's PBPK modelling. For example, if a chemical is absorbed from the food in animals and causes toxic effect but in humans it's not absorbed from the food at all, then the toxic effects are likely to be much less or non-existent in humans, although you might see them in animals and vice versa.

So understanding how the chemical is actually distributed around the body and how it has its toxic effects is vitally important. It has been known for some time the methods of PBPK modelling are a challenge even to scientists in toxicology and risk assessment because it uses big computer power, lots of assumptions and so on. And so what we've done is that we held a scientific meeting on PBPK modelling in conjunction with the British Toxicology Society. And we are now encouraging the British Toxicology Society to actually set up a working group or a sub-group. If people join into that activity they can actually learn about the subject as it develops over time.

Another example is probabilistic modelling. When I was talking about exposure just now I spoke about the amount of exposure, the frequency of the exposure, the duration of exposure, the route of exposure. Now if I look at this group of people here and I ask you were you exposed to – should we say a food additive. Say it occurs in sausages – well those of you who've eaten sausages in the last week will be exposed to it, and those of you who haven't eaten sausages won't be exposed to it. Those who ate ten sausages will be exposed to more than those who had one sausage and so on. When you're dealing with the risks of that how do you get a handle on it? The way we do it is by probabilistic modelling; we can calculate the frequency or measure the frequency of these events. For example we can say well you know the average British person eats say fifteen sausages a year. And they eat them all in one week or they eat them spread over the year. Some eat lots and some eat few – and on the basis of that information you can get a distribution of the way in which the exposure takes place. And then when we're doing our risk assessment we can use that distribution to try and understand who in that population would be most at risk and who would be least at risk and what steps need to be taken to deal with that issue.

Now that's a simple example of probabilistic modelling but it can also be applied to the

toxicity information and all sorts of other information. It then becomes very complicated computer-based technology about how you bring all of this information together and express it in a way that for example the Advisory Committee on Pesticides or anyone else can actually deal with it and make decisions on it. So probabilistic modelling has been developed in this field, in the past decade or so and is going ahead very rapidly in the United States – not so rapidly in this country. People are having to deal with that information – people in government departments are having to deal with that information – we want to give them the tools where they know how to interrogate that information and interpret it. So we've held a workshop in conjunction with the British Toxicology Society – that gives you some idea of the sort of issues that were dealt with in the workshop. And we're now trying to encourage the British Toxicology Society to actually have a sub-group or a special interest group which would take the subject forward. So that people in government departments when they move into a job or change jobs or new people are recruited can actually continue to learn about this rapidly advancing and important and powerful tool for risk assessment.

So those are the two areas where we've looked at very technical problems under the heading of sharing experience and initiating

change. We've set up two courses – one you'll see the title of it is there - It's how you present and publish risk assessments in a transparent and understandable way. And we held a course where we had both senior policy makers within government departments and the practical people who did this work on a day to day basis present to share their experience and examples. And as you'll see everybody who attended – every single person who attended - said it was a very useful experience for them to actually be able to learn about how the other parties in this process worked and it would help them in their work in the future.

We're planning another such workshop training course on the interface of risk assessment with risk management. That's yet to be designed, we haven't done the work on it yet.

So that covers those first issues about people carrying out risk assessment, about providing an environment where people can learn – I have to say it's been very selective, we scanned the whole field and we've just selected the areas which those scientists working in IGHRC felt were most important – there are lots of other things we could have done, we focussed on the most important.

The next thing we did was to have a look at research. We accessed all the departmental

data bases on research related to the subject of risk assessment and mapped it. Arising out of that we discovered that there were five areas which are listed here which really are inter-departmental in nature – they're generic in nature and therefore no single department was putting large amounts of money into research in those areas. We felt that that was something as an inter-departmental group that we could actually try and encourage. So we've identified those research areas – all of that information is available on a database so you can access it through the internet if you wish. There's even a hardcopy report of it if you don't like the internet.

So we identified these five areas which we felt needed investment. And we have shared this with the Medical Research Council and the Biotechnology and Biological Sciences Research Council,. They have a policy of not ring-fencing money, not saying before they start out – we will definitely spend money in this area. But what we can do is to provide bait and this is bait that we've provided to the MRC and the BBSRC to say – would you encourage people to apply their minds to these problems, putting grant applications and then the council will assess the grant applications using their usual method and only the best applications will get support. So we feel we've encouraged people to invest time, intellect and money in these

areas which we saw as deficient in the platform of research funding within the UK.

We've identified two research areas where we felt that we could actually do something practical. The first one was toxicodynamics. Now for those of you who are not familiar with the jargon in this field, when we're talking about differences between the susceptibility of experimental animals and humans we know that there are two major things that contribute to differences in susceptibility. The first one is the way in which the chemicals are handled – the example I gave you earlier that's called pharmacokinetics – the kinetics, the way the chemical is metabolised and distributed.

But there remains that possibility that human cells are sufficiently different from animal cells in their basic susceptibility to toxicity and that that is the basis for the difference in the responses you get amongst different animal species and humans. That's called toxicodynamics. When we look through the literature and through the work sponsored by government departments there was very little being sponsored in that area. And so what we've done is to identify an expert at Southampton University and we've given him some funding. We do not have a large research budget but we have a small amount of money so he can do a literature based study; he's looked through all of the

literature and he has made an assessment of that literature and recommendations for how the situation might be improved by investing further in research.

Our summary of that is that not much has been done in this area and not enough is known. And this is an area which we really need to put some effort into if we're going to improve our ability to carry out risk assessment.

The other ongoing research project is about exposure models. I've explained to you the type of probabilistic modelling that might be required using the example of sausages to understand what the distribution of exposure even of a small group such as we have in this room. – Imagine how much more difficult it is to understand exposure of the whole of the UK population to pesticides and food additives or household chemicals or drugs or whatever it is.

What we know is that individual departments in government have good methods of carrying out exposure assessment. But the methods are not always contiguous with those used when other chemicals or other departments are involved. What we're trying to do is to find whether there are computer models that can be used to collate this information which would act as a commonality between departments. So we have a research

project, again a literature based research project, and its aim is to try and identify the most appropriate models which might be used in the UK to assist in this half of the risk assessment process. And that's only just been started and we'll be another year or so before it's finished. Again it's a paper based exercise with the idea being that certain models might be recommended but also where there are data gaps that those might be filled.

We've had a look at terminology in risk assessment – all these words we use like hazard and risk and there are tons of them and I sense no enthusiasm for writing a thesaurus of words in risk assessment so we're hoping that somebody else will do it for us. It's a difficult job.

And then the other area is about chemical mixtures and I'm sure that part of the debate today is about chemical mixtures – how do you deal with chemical mixtures and the (COT) have set up a working group looking at this and rather than duplicating that what we are planning to do is to have a look at their report and then decide whether there is something additional which can be done to assist all departments to view mixtures in a common way.

Well then we get to processes – this is the third of the categories if you remember One of the first areas we looked at was the way

in which information about chemicals causing cancer is looked at. And clearly it's important – I mean there's a joke going around amongst toxicologists that dioxins are much more toxic in America than they are in this country. And the reason is 'cause they use a different method of assessing them not because they're actually more toxic. And the same might occur here and so we have produced a very short document referring to ...other reports prepared by government departments saying – well this is the way we do it in the UK and this is the basis on which that is done. And that is already published and available to you.

The next area as you might imagine after my comments on exposure assessment, is in regard to exposure assessment. And we are currently drafting a guidance document and I have to be careful in talking about a guidance document. It's not a document that will force people to comply with a certain rigid set of rules. Rather, it sets out a pretty good way of doing it and people should try and use that good way unless there are good reasons why not to.

And we held a workshop to work out what needed to be included in the exposure assessment and the documents are currently being drafted.

And finally the subject of today's discussion – uncertainty factors. When we're carrying out risk assessment we have to take account of the fact that there are differences in susceptibility between animals and humans and differences in susceptibility between individual humans. We use uncertainty factors or safety factors to take account of this when we have no other information. And the way in which those uncertainty factors are used in different settings, for example the occupational setting or the setting of households or of children or older people or whatever it is can be different for very good reasons. And our document sets out where those differences are and why there are differences. And Julian Delic will take you through that document in a minute.

Finally we have produced a report on the work that we've done so far up until the end of last year - and of course this one about chemical carcinogens. Those are also available and accessible if you want them and we can let you have them. And there is a website address and a research data base where you can access all of this information if you are interested in taking it further.

So I hope that gives you a background to how this inter-departmental group has worked. We're due to complete our work by the middle of next year when all of these

different strands will then be completed. By consulting with you – with this guidance document we can actually incorporate any comments where we have missed – missed things out or got things slightly wrong we can incorporate into the document before it's finalised. And we will also need to consult with our exposure guidance document maybe later this year or next year. Julian will take you through the consultation document.

Background talk

Julian Delic

I'll start by putting this overhead back up that I've used earlier and just to remind you that what this document that we are considering today does, is concentrate on this process and aspects of it that I'll talk about to do with this side of the process to do with the risk assessment and the uncertainty factors. But it is an integrated process of both the need to know the hazard and the exposure to come to the end risk.

In undertaking that process we have to have a starting point, I've used the word risk characterisation there it means the same it's just another term, (it's why we don't want to try and get into producing a thesaurus of them!).

And from the point of view of hazard assessment the reference points that are

normally used and this is not just by committees like the ACP, but worldwide. As well as what of course will be in the UK are the no effect levels or the [dose?]dose response relationship and this can be from animal studies or from human data. Clearly when you start to move away to – it's because of interest to humans then it becomes more uncertain. And in making those considerations about the starting point you've got a whole range of things to consider such as the quality of the data the species et cetera.

Just as a reminder exposure assessment itself is uncertain. We didn't want people to think that the uncertainties just lie with this side.

Before I go onto say a little bit more about the uncertainties themselves and what we've tried to address. I wanted to be a bit clear about the kind of hazards we're talking about when we talk about uncertainties in this context in this document. Broadly toxicologists and risk assessers will think of the hazards produced by chemicals in some two broad categories. One is where however low the dose might be, you feel that you cannot dismiss an effect of a chemical. I've used the example there of genotoxicity by which I mean damage to the genetic material. And by and large it's – that's the way it's used. Other end points for example here I've talked about liver toxicity,

the view generally is you need to get above a certain dose before you start to actually express any form of that toxicity. And really when I talk about the uncertainties in the risk assessment I'm talking about this side here this type of response. The way we handle this is quite evident in the sense of it being too late to consider even.

I think it's probably worth putting this slide up – sorry if it's a bit faint what I really wanted to show here though is that there's two – there's two processes by which we undertake risk assessment for chemicals. Not only in the UK but really worldwide. They've both actually come out – they've both had the same uncertainties, they'll need to start with different end points but from the point of view of pesticides – agricultural pesticides in the UK as I understand it, you follow this pathway you end up by taking the uncertainties into account here and developing some sort of standard against which we could consider exposure.

The other form of risk assessment that we use which has generally got the same uncertainties is you combine the exposure and the hazard first and then consider the uncertainties and make the judgement on the comparison of the two. I believe that's the way non-agricultural pesticides are considered in the UK. The key message

though is they both had the same problems in terms of uncertainty.

What the document tries to do is to lay out the types of uncertainties that have been seen and these really are from the experience of 50 years-ish of trying to do this kind of thing worldwide. And seeing as the main areas of uncertainty they're probably not the only ones but they're the ones that have been most studied and most people are most concerned about. And probably the two biggest that Ian's mentioned are moving from one species into the human – from another species to the human. And also what do we know about variation of the human population's response to an exposure.

There are other uncertainties that I mentioned and I'll now show you how we try and deal with these. If you have no information whatsoever in making comparisons across species and within species then you have to have – you have the possibility of uncertainty – uncertainty can be a number of ways. You can actually have a situation where take the animal to human extrapolation – the actual test species is more sensitive than the human. In which case you wouldn't need an uncertainty factor, it could be exactly the same. In many cases and the position that we adopt routinely because it's the most prudent one is to assume the worst case

that the animal species is less sensitive than the human so you have to allow for that.

Now on this graph here what we've got is a series of experimental data where we have dose there and the response here. What I've tried to show is as you go from say the short term study to a longer term you may have a movement in that which you have to take into account – particularly if you don't have these data. You may be moving from an effect level and you have no effect level, you have to take that into account perhaps by introducing a factor. And then here you have to move perhaps between species – within the species the human population isn't all the same so even if we're all in this room have the same dose of a chemical delivered to a tissue we wouldn't all respond the same to that.

And then on top of that you may have other uncertainties – for example you may have a data gap you may want to take into account to know reproductive toxicity. Not so much a problem for pesticides because the data bases tend to be full. But certainly in other areas of chemical regulation and that document is broad it doesn't just deal with pesticides you do have that problem.

By and large these uncertainty factors are standardised and the document does indicate how that arose and the very both

historical and geographic nature of the establishment of the same values pretty much worldwide. Just focussed on that a little bit more in terms of the pesticide side specifically. Where what we show here is from an experimental no effect level say in an animal species, factors are introduced to allow for the difference between species. And then to allow for variation in the human population assuming that you've actually here gone from average animal to an average human and then to allow for those humans in the population more sensitive to derive a fixed point in ABI which are routinely used in pesticide appraisals.

Without being presumptuous...looking at what we'd written in the document for pesticides this is the sort of standard and safety factor that's used for that extrapolation. With no better information the assumption the default position is that you allow factor of ten to move away from the no effect level and the other factor of ten to allow for variability.

The other document hopefully lays out how – or shows how the work that ACP does very much mirrors what happens across the UK in other areas. And also worldwide in similar areas so it's pretty much does the same kind of thing which most of the people do. But as Ian's indicated there was lots of efforts to try and change things and the document ends up with a draft attempt at

suggestions for some areas for hopefully improvement in this. Ian's touched on one or two. His first one the concept is that to try to improve better science getting people to generate information specific for the chemical which will inform on these uncertainties so you're not just left with the default position. But [for this] you have to understand a lot more about the interactions.

Computer modelling is the current thing that Ian's talked about PBPK – there's also the other areas such as where you try and move away from animal models to computer models. The problems of validation of them (inevitably) and how you fit that into this paradigm – probably one of the most promising is this toxico genomics the new technologies where we can start to get tissues out and see how at the genetic level they respond to them [the chemicals] in culture, in tissues and probably long term that provides some real hope of ways of improving the process of actually working on human tissues and understanding what's going on, particularly under specified conditions of exposure so we understand the whole process together.

Last thing was – Ian's already mentioned is probabilistic approach is – the thing that is not on there probably is also transparency. The picture I've laid out here in the document is what has been done for many

years. I think it's sometimes hard to see how that's applied in documents which lay down positions for chemicals. I will end by putting that up I think which is the questions we're inviting.

Background talk David Coggon Right, I think we'd better move back round to the front now.

David Coggon Can I thank you Ian and Julian for those very clear presentations. As I said at the beginning the document that's been circulated is a draft and it's a draft that we on the committee have seen before. But we would very much welcome input from the audience here today in relation to this issue, particularly the way in which the ACP approach to risk assessment fits in the context of what's done elsewhere. There are some differences between risk assessment for pesticides and many of the other chemicals that have to be dealt with particularly because in general we have more information for pesticides we require more information on pesticides so there is less uncertainty to be dealt with in managing risk from pesticides than there is for many other chemicals. But please if you would like to ask questions or make points, could I remind you to indicate who you are and where you're coming from when you ask your question. We have two roving microphones so we should be able to keep up with you.

While you're thinking about it I wonder Alan whether – one of the issues that's raised in the paper which you've discussed since we've fed back to you on this is this question of whether you can reduce uncertainty factors in some circumstances if you have more information. And we discussed this recently on the medical and toxicology panel, and one of the issues we identified was that when we say that we have a hundredfold uncertainty factor and that comprises a nominal factor of ten for between species and a factor of ten within species and you can split those down even further to differences in toxico-kinetics and toxico-dynamics as you've said, those are only an average way of splitting it and it may be that for a particular chemical the variation in toxico-kinetics is more than threefold but the variation in toxico-dynamics is less. And when you use an overall factor of a hundred you give yourself a margin of safety because if one is too high it will tend to be cancelled out by another that will often be lower. If you start removing some components of this uncertainty on the basis of data do you lay yourself open to more problems if you happen to be unlucky and the remaining component shows more variability than normal.

It's a bit difficult to explain is that – do you want to have a go at putting it more clearly Alan?

Alan Boobis

No I think that's as clear as one can put it. I think really the issue is – what is the confidence that we would have in moving down from the default of a hundred-fold based on a number which is based on information. There's a sort of intrinsic feeling that because we don't know what's happening to the other three quarters of the uncertainty factor, the other three components, we would feel that we're not comfortable with that position. And I think that the other issue's what would the motivation be for anybody to ever try and do an experiment that would move the safety factor upwards. So the likelihood is that will only ever be done to move it downwards so it's not an...

End of side A so there is this barrier, I think and it's difficult to see how (unclear) pesticides. Perhaps one route would be to get experience with other chemicals first and then see how well (unclear).

Side B

Background talk David Coggon and Julian Delic but unclear

Julian Delic

Two or three things I think – one is I agree with the last comment I think the information can work both ways. And the tendency I have to confess would be for people to try and drive the numbers down...

Background talk

Julian Delic

I think having said that, it depends on the scheme you're working in. If you're in a position to actually request the information then the output is the output and people have to live with it so there's that side of the coin. As regards altering just one factor say the knowledge of kinetics you could deal with that through for example PBPK modelling if you have the information the strength there is you can actually move from one route to another for example or lots of things you can do. But also as I understand the scheme there are safeguards in there so you always iterate back to where your starting point is. And if you have another toxic concern which would kick in, that might actually become the default position anyway. But as Ian said, I mean we know very little about human toxico-dynamics in general never mind for any specific substance or chemical. So I think it's a useful tool to lay down your thought processes to understand the uncertainties as much as being beneficial in moving uncertainty factors one way or the other. It makes you think about the uncertainties which is something that I think is very useful.

Alan Boobis

~And I think it's also important to make the point that as you say Julian, it's a framework. And one of the driving forces I believe in the early development of this subdivision of the default on uncertainty factors was to think of – is – what could we do with

actual knowledge— on variation between and within species because we have a hundredfold safety factor default and that is divided ten by ten. There was no mechanism to apply specific knowledge on the extent of variation and so this was an effort to devise a framework which would allow you to feed specific knowledge into the system if you were comfortable with it. So I do applaud the efforts to do that because I think it will provide us with a mechanism to use a rational approach where it is appropriate.

David Buffin

David Buffin from Pesticide Action Network. I just have a question about the process guidelines that were briefly referred to in relation to carcinogens but I just wondered whether there were similar guidelines for example endocrine disrupters or other areas. You've just mentioned carcinogens. And also maybe you could say a little bit more about why or how precise the guidelines could be and how much interpretation there could be. I think from an outside perspective it's I think useful to know what sort of reference points are being used and how the justification of safety is given – given the uncertainties that you've obviously just explained.

Ian Purchase

Seemed you had two questions there. The first one was – are there guidelines other than those related to carcinogens. My

understanding is that the usual threshold phenomenon risk assessment paradigm is used for reproductive toxicants in general. And therefore – is thought to be effective in assessing risk from exposure to those chemicals on an international basis. So we felt no need to start writing a guidance document on there.

The situation with carcinogens is somewhat different. There is a basic distinction in philosophy between what the UK does for dealing with carcinogens and what is done for example in the United States of America. In the United States of America they have mathematical formulae which they apply to the information from animal studies. And on the basis of those mathematical formulae they calculate what the risk is. So you know your risk of exposure to this is one in ten million or one in a hundred thousand or whatever it is.

The scientific community in the UK by and large thinks that you might just as well guess the number as stick it into this mathematical formula. And particularly for genotoxic carcinogens where it's not known what happens at very low doses, the philosophy is much more – (and it's expressed in this guidance document) let us assess all of the information about this chemical – everything from experimental studies – what is known about how it's distributed and exposure and so on and so

forth. Let's assess all of that and come to a view about the likely risk at exposures which are currently experienced. And if we feel that that risk is measurable and too high then we will recommend a reduction in that exposure. If we feel that the exposure is very low in comparison to the carcinogenicity of the chemical we may not need to make the recommendation. So it's a much more fluid and flexible system than the American one and that's why these guidance documents are so important in the UK context because these mathematical formulae methods are believed to be more misleading than informative by many scientists working in the UK in this field.

David Coggon

Just before I come to you if I can just clarify that when you were talking about carcinogens then you were talking about genotoxic carcinogens and I should point out that in relation to pesticides we would not currently allow a genotoxic carcinogen to be used as a pesticide because of the uncertainties in the risk assessment. And as far as non-genotoxic carcinogens go we adopt the same approach as we would for an endocrine disrupter or for another sort of thresholded toxic action - that we look for a no adverse effect level in an animal study for the most sensitive end point in the most sensitive species, and then apply an uncertainty of factor or assessment factor to that in the way that's being described earlier today. Yes you had a question please?

Enfys Chapman

My name is Enfys Chapman. I wondered whether this particular work will have access to the sheep dip study that has been undertaken and is going to be published soon by the London school of hygiene and tropical medicine. Because at least two thousand very different individuals took part in that.

David Coggon

I think that the work that's being described is more generic than that. But clearly information, that is research that's carried out in relation to the health risks of organo-phosphates, is relevant to the risk management for pesticides. And while sheep dip is not regulated as a pesticide (it's regulated as a veterinary medicine so it doesn't come within the remit of this committee) other organo-phosphates do come under the remit of this committee and clearly there are messages to be learnt from studies of organo-phosphates in other situations. So when the results of that study become known and there are other studies on sheep dip that are coming out all the time, there was Nicola Cherry's study that was reported in the Lancet – they come through to this committee and they're looked at and I can promise you that they are taken into account in the work that we do.

Do we have one last question on this before we move onto the next item? We've got one there and one up there so if we go here first

and then we'll go up there and then we'll finish on this topic.

Sandra Bell

It's Sandra Bell from Friends of the Earth. You touched briefly on the issue of exposure uncertainty and I just wanted to ask a bit more detail about how that's going to be dealt with. For example the Wigramp report concluded that the existing data that we have on exposure to pesticide residues is statistically invalid basically. And also the sort of modelling we do at the moment looks at one route of exposure only so you look at the exposure for example to chlorpyrifos in the diet through residues but actually in reality somebody could be being exposed to exactly the same chemical through a household insecticide – garden insecticide and that's not taken into account at the moment. And also you don't take into account for example the existing body burden of chemicals that the population has. So I'd like to know a bit more about how you're going to tackle those issues of exposure uncertainty.

Alan Boobis

I was on the working group that was dealing with the issue. As far as the statistical unreliability of the data is concerned, I'd just like to put it in to context that this is not an issue with respect to consumer exposure because the concern with respect to the statistical nature of those surveys was that they were biased to be over-representative of high residue levels. They're targeted to

detect residues where there's a problem, the normal risk assessment of residues in food is over conservative anyway and the issue about the PRC's reports was that they couldn't be used to get an accurate estimate of true exposure because as I say they're targeting problem areas and that was the nature of that discussion.

There is a real issue though on exposure by other routes as you correctly say and the bodies that are concerned about that are going to take that up following the publication of the Wigramp Report to see what they can do about a more coherent totality of exposure assessment for those chemicals where there will be multiple routes of exposure. So we will be looking at ways in which we might approach that in the coming months.

David Coggon

Right it might just help also I think to put this in context of how much difference do you think it will make to the risk assessment and the risk management decision when you do start to take account of other routes of exposure. And you know people and I suspect people here- are asking, well if there's this gap why haven't people been doing it years ago, it's such an obvious thing. And I think the reason why people haven't been doing more about it earlier is because we don't suspect that there are major problems going to arise from this. We don't expect that suddenly all sorts of things

are going to turn out to be unacceptable that previously have been considered acceptable. But having said that there may be some circumstances where we decide that margins of safety are eroded and and that further restrictions will be necessary. But we don't anticipate that suddenly there's going to be a dramatic change as a consequence of attempting to do these multiple risk assessments and I think that's been the experience in the United States so far.

Alan Boobis

I was going to say that the US EPA has just conducted its first assessment of that type and I think it's still finalising it over the summer months. They've kindly offered (and we've taken them up on the offer) to send a senior representative of that group to the UK to discuss with the members of the advisory committee as to the findings and methodology they used. So first of all what can we learn about the methodology and second is as Professor Coggon has said to look and see how much difference they actually make to the risk assessments. Because they've done a very detailed analysis of all routes of exposure.

I think it's fair to say that so far it hasn't made a huge difference to the risk assessments. The preliminary estimates are that it doesn't make a huge difference for the compounds they looked at.

David Coggon

Okay we have one last question up there and then we will move onto the next item.

John Clarke

John Clarke Small farms Association. If we're talking about risk assessment and uncertainties in measurement why are we not measuring pesticides on humans. In other words if we're going to – at present if I understand it correctly we authorise the use of a pesticide and we then test it on the whole human population in one go. If we took our authorisation procedures and the logic that we've got in the papers and what we've heard today and took that up to the present approval position. And then said – right it is going to be tried on this grain, in this field or on this product, in this storage bin and then put into these sausages, you could then have people who would be more than willing to eat those sausages, live near that field et cetera. So that you would be able to measure the effect of that pesticide on people direct rather than animals and then a very complex and hopefully accurate calculation between, thank you.

David Coggon

Who'll have a go at that. Nick do you want to have a go?

Nick Bateman

There are a number of steps you have raised there that create major ethical problems in studies. The idea that – there is no evidence on man before things are licensed isn't actually correct in the first place. We often do have information on

exposure in workers in the factories making the product which we can look at. The idea of more surveillance in man is an important one and we may come back to that later this afternoon. There is a later question that addresses this and I think this is an important area. And you're quite right that it is necessary when looking at potential adverse effects of agents of like pesticides to have a better idea of what people have been exposed to.

How you get that is quite difficult because if you were to want to study, for example, if you were to treat some of your grain in your farm with a pesticide, I would need to take some blood and urine from you before you do that, and at intervals during the exposure. And I would need to think about how I might want to monitor your health and there would be other things that could happen to you in the process while I'm doing that. You might get the 'flu, you might have other things happen which could be confounding in the analysis of the effect. So looking at the kinetics the way the blood levels go up and down is potentially relatively simpler than looking at any health effects in that model. But that could be done, I'm not sure that people would be so keen as you suggest to want to do it. I actually chair an ethics committee - its one of the other things I do. My ethics committee would have serious concerns about the ways proposed to study being

done without very clear consent from the individuals involved. But I mean there are potential aspects of what you say that could be put in place, for some chemicals I suspect and that hasn't been done in the way you've suggested. It is a complex process ...it's not easy.

I'm not sure if that fully answers your question but perhaps other can then have thought about what you said and fill in afterwards like Professor Coggon.

David Coggon

I think that is an excellent answer to really a very challenging question. I mean we're running into issues of ethics here as well as science and the general principle that is applied with pesticides is that we would not like to expose people until we are sufficiently confident from studies in animals that adverse effects will not occur. It's a bit different with a medicine where you may not be able to get that sort of confidence from an animal study, so you have to do experiments in people before you allow a medicine to be used on patients in general. But in that case the benefits to people are regarded as, the potential benefits are regarded as, greater and therefore it may be considered ethical to carry out that sort of experiment in human subjects and eventually in human patients. But for pesticides the feeling is that really you – it wouldn't be justified to use human guinea pigs if you like in that way, and so rather

than do that we look for a much higher level of reassurance from the animal studies than we might do in other circumstances.

And we can carry out observations in humans after a pesticide has gone on the market and that's only right and proper that we should do because we have to recognise that no matter how rigorous a risk assessment process is there's always a possibility that something will slip through the net so you can't be complacent, you do have to look. But the general feeling is that it's not ethical to use humans as experimental subjects in looking for possible adverse effects from pesticides and that's not something that we would do either in this country or in any other country that I know of.

John Clarke

With due respect, Chair, I think I must have been misunderstood. I was asking that instead of now using the whole population as guinea pigs when it gets approval, that we only use a small portion of the population.

David Coggon

Well...well it does work that way because the approval is progressive, initially a compound is given experimental approval to be used on a limited scale. And so in effect it does work that way.

Okay I – if people having – David you want to make a quick point. You need a microphone.

David's from the FSA so we allow him special licence!

David Atkins

Thank you chairman. Just briefly just to make a statement if I may about the work of Wigramp on the cocktail effect. I know a lot of people are interested in the work that the FSA commissioned with the COT. And the draft report has been welcomed by the FSA board. We plann to publish the final report – as many people know the interim report went out for consultation earlier on this year so the advice is out there now. The final report will be published in September – officials like myself have been asked to put together an action plan so I'm working with – with colleagues from PSD and VMD and also from the IGHRC as well to put together an action plan for dealing with the recommendations, so that will come out in mid September. Thank you.

David Coggon

Thank you. Now if anybody has any further thoughts on the paper for this first item after the meeting and they want to write into the ACP secretariat we'd be very pleased to receive comments in writing and we can pass them on to the authors of the report as well.

We'd now like to move onto the second item on the agenda which is bystander risk. And those of you who were at the meeting last year may remember that a very penetrating question was asked about how would members of the committee like to stand in a garden next to a field that was being sprayed. And we thought that this was a very good point and that it was something that really deserved to be discussed at greater length. And Georgina Downs who asked the question last year has very kindly agreed to produce a paper which is being circulated to you and also to give a presentation and to show you a video of what it's like in her garden when the farmer is spraying. And I thought - I've seen part of this video before - and I thought it would actually help to bring home to us just what it's like in real life and it would be a good starting point for discussion. Then we've got a couple of other papers to follow on from that.

Can I just say Georgina's not a professional civil servant, she's not a report writer but I think she's done a really excellent job in the report that she's produced. And I do very much appreciate that you've done this for the meeting, so thank you.

Can we move round this side.

First of all I'd like to thank the chairman for inviting me to present today as I do see this as hopefully a positive step forward. I presume everyone's read my paper so I'm going to go straight into showing you a video that I think will clearly illustrate many of the issues I've raised.

So if you could turn the lights down and press play that would be great – thanks.

All the shots in this film are taken from inside our house and are edited from over 15 hours of filming. These first few shots provide clear evidence that the chemicals do not stay confined within the target area and drift off all over the place, even when it's not particularly windy.

Now the main point to highlight here is that exposure does not only come from immediate visible spray drift, as once pesticides have been dispersed, the droplets/particles remain in the atmosphere for some time after spraying has been applied, but which are not necessarily seen.

This next shot shows a man walking his dogs on the public right of way through the field, during a spraying application – something he may do every day- with no warning signs to inform him of the dangers.

This is the sprayer on the boundary with our garden and again you can see the spray going up into the air.

As the tractor turns round you will see the dripping boom almost pass right over our wheelbarrow.

So I decided to set up a little experiment to illustrate to you today what happens if you substitute that wheelbarrow for people and the high level repeated unprotected exposures they receive over just a one month period.

Now clearly these are not real people as there isn't anyone I know who'd be willing to do this,. but I think this is a very effective alternative. We have a woman who is about five months pregnant with some food laid out, five year old girl, six month old baby and in a second you'll see another lady with a two week old newborn baby. Now I'd like you to imagine that this is your garden and these are the members of your own family enjoying the sunshine. This was filmed on the fifteenth of May 2002.

The sprayer passes within inches of the family and according to the existing regulations this is acceptable although I'm still not quite sure who it's supposed to be acceptable to!.

These next few shots show multiple passes of the sprayer at various distances over a period of three to four hours, continually dispersing mixtures of pesticides and other chemicals into the surrounding air. These people could be exposed for twenty-four hours a day from living in the sprayed area and the routes of exposure will include oral, dermal and inhalation. They are unprotected, have not been informed of the dangers, as there is no law requiring anyone to tell them and therefore they have no idea that their health is being put at significant risk.

Now we move on to the thirty-first of May 2002.

The sprayer is out again dispersing more untested combinations of poisons into the air and again repeated exposures for the woman and the two developing babies through the inhalation of the droplets, particles and possible vapours.

This is now the nineteenth of June 2002.

If you look very closely in a second you will see another person in the background walking along the public footpath, again probably uninformed of any danger. You can see him just through there. ...

So still the same day, further multiple passes of the sprayer. There are actually

twenty-five fields within the surrounding area and each field will be sprayed on average nine times over a period of five months, with a number of different chemical mixes per application. Four and five way mixes are obviously commonly used. Now this obviously results in almost constant sequential spraying with innumerable mixtures of hazardous chemicals.

Even at this distance of about one hundred and fifty metres away from the woman and the two babies, no one can say this is acceptable and without risk to human health, as it is not known how far particles travel or where they end up once airborne, and studies have shown pesticide particles ending up miles away from where they were originally applied.

So after the continual spraying of the growing season it's now harvest time. These next few shots show harvesting dust containing residues of mixtures of pesticides and other chemicals pouring over our property and so once again the windows have to remain tightly closed in extremely hot weather.

You can see all the dust pouring over – completely enveloping our property and our land.

In fact the visibility is so low at times that you can't really see anything, through what looks like a thick fog.

The year these shots were taken the harvesting went on for about three to four days and again this harvesting dust can travel very considerable distances.

This is just a shot taken a bit further back so you can see a bit better.

These next shots illustrate the disruption caused to my family from living under these conditions.

The temperatures experienced while imprisoned inside the house during spraying and harvesting are extremely unbearable and suffocating. All the doors and windows have to be kept as tightly sealed as possible and this results in absolutely no ventilation and this is just one of the fans we had to buy to try and help the situation.

This is what my dad has to wear if he has to venture outside during spraying and for the days after because of the effects these chemicals have on his health. He has to wear overalls, gloves...goggles and a respirator.

So this is what my dad has to wear on his own property and on his own land.

So just to remind you, this was the fifteenth of May 2002.

The thirty-first of May 2002.

And the nineteenth of June 2002.

One field, three spraying applications in just a four week period. This is the reality for those living in agricultural areas where people are subjected to high level, repeated exposures, to mixtures of pesticides and other chemicals, uninformed, unprotected, with no escaping the effects, as it's in the air, it permeates your house and ventilation systems and almost constantly contaminates both your indoor and outdoor environment.

If we can have the lights up it will be great thanks.

Okay before I I come to my final few comments I just want to have a very quick show of hands. Who thinks that this is the protection of human health and is acceptable?

Come on – no. okay.

Background talk

Georgina Downs

No, no, no I asked a specific question – who thinks this is the protection of human health and is acceptable? Can it be noted that

nobody actually raised their hand in response to that question today?

Background talk

Georgina Downs

No I asked a specific – that's all I wanted to ask now we can talk afterwards 'cause I want to get onto the – that's the specific question that I asked and I think nobody responded there.

I think I've highlighted both in my paper and today that there are serious fundamental flaws within the – throughout the existing regulations and certain sources of exposure to pesticides have not been considered within the current registration system. Therefore the authorised use of pesticides is posing unacceptable risks to human health for those living in agricultural areas and is a breach of articles 2, 5, 8 and part 2 the first protocol article 1 of the human rights act. And articles 2, 6, 7, 7, 17 and 37 of the charter of the fundamental rights of the European Union.

Incidentally I personally do not believe that this can be excused as being unforeseen at the time of the approval, as crop spraying has been a predominant fixture within agriculture for over fifty years and people have always lived around these fields. Countless numbers of people have regularly suffered and reported ill health effects following exposures, even if these cases

have not always been investigated. Now this is a serious public health hazard and therefore the only responsible course of action to take is an immediate ban on crop spraying within a certain mileage of human habitation, as a small buffer zone is not going to be adequate or any way acceptable to protect those – protect people from the high level of risk associated with the spraying of poisonous chemicals.

The only overall solution to this problem is through the widespread adoption of non-chemical management practices. Therefore the government and their advisors need to recognise and admit the effects pesticides have on human health as prevention of pesticide poisoning is the only way to protect people from pesticide related ill-health. And I very much look forward to hearing the responses to all the questions I have raised today and throughout my paper – thank you.

Applause

Background talk

David Coggon

I don't want to have a discussion now, but does anybody have any questions of fact for Georgina, just related to her presentation.

Tom Bals

Tom Bals from Micron Sprayers. I was just interested Georgina you said the sprayer was applying mixtures. Do you know exactly which chemicals were applied.

Georgina Downs

Obviously not off the top of my head but I've got everything and I have to say he regularly uses five way mixes very, very rarely are you getting just one chemical.

David Coggon

Thank you very much for that and I have to say the video came out much better than the original one, even better, they were very good. Now, Alison Craig is going to give the next presentation from the Pesticides Action Network and she's produced a paper of examples (unclear). I think one of the things that will be particularly helpful for us today, will be some idea of the level of concern that PAN hears about from members of the public. I know that you have put notices haven't you in (unclear) asking people to write in if they are concerned about this and it would be helpful for us to know what sort of level of concern you're getting.

Background talk

Alison Craig

Can you hear me after all that palaver sorry about that delay yes I'm Alison Craig from Pesticide Action Network. It's quite hard to follow that video but I'd like to focus this talk on approved use of pesticides. Though I think it would be good to start with an image produced by a member of ours. This is the village of Newchurch in the Isle of Wight. And the local farmer there was using the combination – a mixture of both approved pesticides and illegally used pesticides. And

the hatched areas show that the village itself is pretty much surrounded or certainly half surrounded by these fields of sweetcorn and garlic that he was growing there.

So you can see that quite a few homes in the village here I don't know if you can clearly see that – you can see Winford at the bottom – Newchurch is further up in the image and most of the homes on the west side of the village are surrounded by these sprayed fields. And this is a typical village scene, the rights of way are marked very faintly in green. And you can see they run through the sprayed areas.

The rights of way to the north. No one really knows how long the farmer was doing this for, it may have been for several years. He was eventually prosecuted as we know, not initially through the actions of the health and safety executive but because ex-employees who had a grudge eventually shopped him to the authorities. I would also point out that the health and safety executive have not carried out any follow up epidemiological studies of this area. They found that it's not possible – we have to ask ourselves why? Why there's been no follow up and will be no follow up epidemiology on this area.

Well we have here today someone who's case goes some of the way to answering that question. Mr Alex McBain is present here, he lives in Newchurch. I think it's no

exaggeration to say that Alex's life, his later years, have been ruined by the approval of highly toxic, organo phosphates when there is no mandatory notification of usage.

Alex McBain was working in his garden in 1997. He was building – he was doing some carpentry, he bashed his head, he'd taken a layer of skin off his head. He heard a funny noise at the end of his garden, he stuck his head through the hedge at the top of his garden, he was oversprayed with organo phosphates.

His medical care was led by a rheumatologist who doesn't know about chemical exposures. Nobody realised in time how hazardous such an exposure could be. When the Guy's poison centre were eventually consulted several weeks later they observed that although an expected symptom to demeton-s-methyl exposure would be local skin irritation and this was what Alex's rash looked like at the time. It was in fact both legs, both arms, he was wearing a t-shirt, shorts and this is what his legs and arms looked like a couple of days later.

But Guy's poison centre concluded that his illness was not related to the chemical exposure. It's not clearly known what the OP was but 'metaphor' was being used on that farm and that was an OP that has not been banned.

This is Mrs Marion Ernsall she lives near Boston in Lincolnshire. She has systemic lupus and (as you see her garden is just behind her in this picture) fields come right up to the dividing ditch. And every time they spray, they were overspraying into her garden, she could smell the chemical, she could taste the chemical in her garden. The farmer was prosecuted earlier this year. He was fined four thousand pounds. In fact he was fined for damage to aquatic higher plants because the fact is it's much, much easier to prove that there's pesticide contamination of that ditch water than it is for Mrs Ernsall or her doctors to prove that her illness was being made worse by the chemical exposure. It's more difficult therefore it's easier to prosecute for effects on higher plants.

What a difference it would make to the life of Mrs Ernstall and the thousands like her who live right next to those fields. If they were not sprayed – either through organic agricultural management or if she had the right to a buffer safety zone next to her home.

This is Nigel Ford. He suffered severe symptoms after exposure to sulphuric acid which was being used on or near a right of way in a national park. In fact the sprayer farmer was complying with all the regulations but nonetheless Mr Ford and his

daughter did suffer severe illness. We are very concerned that rights of way are being oversprayed, we know in fact that they are. We contacted a prizewinning farmer in the Syngenta best practice event, which occurred recently. We asked him if he does overspray rights of way. In fact he does. He was unaware of the regulations, he was unaware you're supposed to leave one metre clear which is clearly completely inadequate. So if even this paragon of good practice is overspraying rights of way then it is almost certainly common practice.

This is Mr Steven Leach in Suffolk. He and his family have been drinking water from their private well which is contaminated over the limit with these three pesticides. I'm citing this case as an example of another form of bystander. And we suggest that the experience of water contamination is a parallel to a bystander where you're getting continual low doses and the water act stipulations are very strict, they should be stricter still but the local environmental health office suspects that the Leaches have been drinking the contaminated water for perhaps over twelve years. It may have occurred that long ago.

This is Mr and Mrs Lawton in their case they suffered pesticide related symptoms when there was local spraying. And their GP was very concerned and when she went to her GP he said that that there were a number of

similar cases locally that he was concerned about. She contacted the health and safety executive and pursued them several times to contact Dr Johnson. They failed to do so until he'd moved to live abroad. So none of those cases have been recorded or investigated. And this is a quote from what the health and safety executive their EMAS doctor had said.

It is not possible to establish a link between ill health symptoms which you and your son are suffering from and any pesticide exposure.

So to try and scope the number of people who have been affected this way - as I mentioned the England and Wales figure of over five million people living in rural areas-about going from the Newchurch example and estimate of villages like that around 5% (and that's a very conservative estimate) that's a quarter of a million people in England and Wales are living right next to these sprayed arable fields. But we suggest as a matter of some urgency we should find out how many people could be affected. And this is one source of data, this is from the centre of ecology and hydrology. This isn't at all clear but it's a sample to show that the satellite maps (which are backed up with field survey) do show which crops are being grown where. And therefore you could work out how many people are being affected.

So moving onto post approval surveillance system. I'd like to first start by asking if I may whether when the ACP are re-evaluating a pesticide you receive perhaps I could ask Professor Coggon as he is to hand. Do you receive information data on it from all six of the regional poison centres.

David Coggon

We will receive information on reports of human poisoning. We look at PIAP reports, we will look for other reports (unclear)

Alison Craig

But do you receive from all six regional poison centres throughout (unclear)

End of recording

Nick Bateman

(unclear – 15 seconds) poisoning of this type. We try and do where possible and where this information is available to us (unclear). The problem is that often it is difficult to trace patients who have been exposed because of confidentiality issues and these are very serious in the health service ... (continues in 2nd transcript)