Minutes of public meeting of the PFAS Scientific Advisory Panel on Teams

10:45am on 9 October 2024

Panel Members present:	Dr Steve Hajioff – Independent Chair
	Dr Tony Fletcher – PFAS and Health member
	Professor Ian Cousins – PFAS and Environment member
In attendance:	Julia Head – Senior Public Health Officer
	Grace Norman – Deputy Director of Public Health
Subject Matter Experts:	Ann Christine Lyngberg – University Hospital of Holbæk

Welcome:

The Chair welcomed everyone to the Panel meeting, and reminded people the meeting was being recorded.

Introductions

The Chair and Panel members introduced themselves.

Dr Steve Hajioff, Independent Panel Chair: A background as a GP for 25 years and a retired Director of Public Health from an area of London with two major international airports and a variety of other environmental hazards and challenges. Not a PFAS expert but has done lots of work with National Institute of Care Excellence and other groups about translating science into policy. Dr Hajioff has also worked a lot in the pharmaceutical industry.

Dr Tony Fletcher, PFAS and Health Panel Member: Environmental Epidemiologist at the London School of Hygiene and Tropical Medicine, working on PFAS since 2006 and member of the panel with experience of epidemiological studies on the health effects of PFAS in contaminated communities in West Virginia in the United States, in the Veneto region, in Italy, and in Ronneby, and is the health expert on the panel.

Professor Ian Cousins, PFAS and Environment Panel Member: A Professor in Environmental Chemistry at Stockholm University, an expert on PFAS, appointed as the environmental expert on this Panel and whose expertise on PFAS is on the sources, transport, fate, and exposure of PFAS.

Support staff for programme management and administration were also in attendance.

The Chair noted that the meeting had 1 Subject Matter Expert in attendance who introduced themself before speaking.

The chair thanked the Islanders for their input into Report 2. The panel are collating the comments and Report 2 will be revised in the light of the comments. All anonymised comments and the panel's responses will be included in the Appendix to Report 2. The comments will be displayed in sections by topic rather than by commenter. The report will be finalised and sent to Government for them to respond.

Declarations of Interest

No additional declarations.

Minutes of last meeting and matters arising

There were no minutes from the previous meeting to discuss due to the August and September meetings containing inputs from Experts by Experience and Subject Matter Experts. This requires additional review prior to minutes being discussed in the meeting.

Additional findings since the last meeting

Dr Fletcher spoke about a talk he recently attended where it was discussed about how AFFF contamination in the ground is very closely related to the locations of military air bases. Prof Cousins was aware of work in this area also but mentioned that there are also lots of countries who aren't doing anything. Dr Hajioff reminded the panel that it is important to remember that Jersey is one of the first to look into this issue properly, and that there are many countries which are not investigating. The issue is global and other countries will need to replicate the work in Sweden, Australia and Jersey.

Agenda item 5 – Assessment approach – Dr Steve Hajioff

Dr Hajioff presented the factors which the panel have agreed to take into account when looking at the ways to reduce the body burden of PFAS so that judgements have be made on their merits and detriments to enable a balanced view for recommendations.

1. Clinical effectiveness
    a. Considering how effective each intervention is to reduce the body burden of PFAS
2. Cost effectiveness
    a. Important to understand that the recommendations ensure that the most people get the most benefit. The measures of cost and effectiveness will be balanced. The panel pointed out that we cannot quantify the reduction of body burden in terms of diseases avoided. Cost per unit reduction for different options.
    b. The panel could potentially consider disability-adjusted life years (DALYs) – this will be discussed in a future meeting
3. Risks and side effects
    a. All interventions have the potential to cause side effects. The panel must be aware of these side effects during the deliberations as they may reduce the net benefit to the patient.
4. Tolerability
    a. How likely people are to feel comfortable with continuing with the intervention or how likely they are to stop the intervention due to side effects or practicalities for intervention options, e.g. necessity to go into hospital every week and the associated disruption
5. Equality of access
    a. Interventions should be available on the basis of need, not on other characteristics in the population
6. Costs

    a. Consideration must be taken on the practical implementation of interventions, and the upfront and ongoing costs of the enabling processes for each intervention
7. Speed of deployment
    a. Existing interventions may be deployed quickly, however other options may take longer to get in place due to equipment requirements or training.

Dr Fletcher asked about attempting to quantify the benefits of each intervention in terms of Disability Adjusted Life Years (DALYs) or Quality Adjusted Life Years (QUALYs), and indicated it would be difficult in this context. Dr Hajioff replied to suggest the panel investigate cost per unit reduction in PFAS for each of the options, and that this analysis could be performed during the preparation of this report. He agreed that the panel will not be able to look at the improvement in quality of life however. Dr Hajioff proposed looking at mapping the body burden of PFAS to the health outcomes as this will provide useful information about which intervention may be most cost effective.

Agenda item 6 – Dr Tony Fletcher

Dr Fletcher presented slides on possible interventions to reduce PFAS levels.

There is no further literature on phlebotomy since the review in Report 1 so phlebotomy will not be discussed further in this meeting.

There are three types of studies which are useful in helping to determine the impact of interventions on PFAS levels:

1. Observational studies
2. Interventional studies without a control group
3. Intervention studies with a control group

<u>Observational studies</u>

- Dietary fibre
- Drugs – probenecid, statins, bile acid sequestrants
- Blood donations

Diet is complicated as it is both a source of PFAS and also could be a way to detoxify as well. If there is ongoing exposure to PFAS from diet in a study population, then the benefit cannot be extrapolated to a population where exposure has largely stopped. The exposure scenarios are different. There are several food stuffs which seem to be associated with lower serum levels of PFAS. This has prompted several studies investigating dietary components which could reduce levels. High fibre diets compared to low fibre diets appear to have a benefit.

There are also observational studies looking at drugs such as statins and probenecid which affect reabsorption of chemicals in the kidney. Neither of these studies showed an effect. Studies have shown that Cholestyramine (a bile acid sequestrant drug) is associated with significantly lower PFAS levels including in the C8 studies. All PFAS were reduced, but the biggest drop is for PFOS.

There is a study which indicated that voluntary blood donors have a lower level of PFAS on average.

Overall, observational studies suggest that blood donations and bile acid sequestrants are likely to reduce PFAS levels, and high fibre diets have a quite a weak effect.

<u>Interventional studies without control group</u>

Interventional studies have confirmed the findings from the observational studies, showing that use of phlebotomy and bile acid sequestrants resulted in reductions of PFAS body burden. A reduction

was seen from the use of cholestyramine in a highly exposed population in Canada. The same research group also conducted a dietary intervention study with chlorella pyrenoidosa, an extract from water weeds after the use of cholestyramine. This did not further reduce body burden in those exposed, there was no additional impact.

Intervention studies with control group

Several intervention studies were summarised in Report 1 summarised the findings of intervention studies investigating the impact of extracting plasma or whole blood removal, both of which interventions led to a reduction of body burden of PFAS.

Report 1 summarised the evidence for phlebotomy, and found that studies show that removal of a pint of blood results in a 1%-7% reduction of PFAS levels. As this is a wide range which is affected by a number of factors including imprecision in measurements and individual differences, the Panel assumed that the average reduction per pint would be 4%. In order to compare different interventions, the table below shows the PFAS reductions assumed over a three-month period.

For example, the reduction from 1 phlebotomy session is similar to 1 plasma reduction session, however, it is only advisable to give whole blood once every 3 months, but possible to have plasma removal once a month.

Dr Fletcher presented a spreadsheet where he estimates the percentage reduction of PFAS in blood for 4 situations:

- Natural half-life (HL) reduction through excretion i.e. the baseline rate of reduction without intervention
- Bile acid sequestrant intervention
- Phlebotomy intervention
- Plasma donation

	% reductions over 12 to 13 weeks					
	pfos	pfhxs	pfoa	pfna		
HL approx	4	5	3	3		
% red 12 wks	3.1	2.5	4.2	4.2		
moller ref	3.3	3.5	2.4	-1.3		
moller 12 wks	63	19	22	40		
from report 1:						
1 phlebot	4	4	4	4		average
2x	8	8	8			
1 plasma don	4.5	4.5	4.5			28% / 6.4
2x	9	9	9			
diet?						

In addition to the evidence for blood or plasma removal, there are interventional studies that examined the effect of two medications. The panel heard about one of the studies in September's panel meeting by Dr Axel Andersson on probenecid. This study concluded that taking probenecid

for 1 month did not have any effect on levels in blood or urine. The other interventional study is one on bile acid sequestrants which will be described later in this meeting.

In summary, the evidence suggests that bile acid sequestrants have the biggest benefit of reducing body burden, in comparison to natural excretion, phlebotomy or plasma donation. Additionally, Dr Fletcher finished by commenting that interventions to reduce PFAS in blood need to be done at the same time as stopping significant PFAS exposures.

Dr Hajioff thanked Dr Fletcher for his presentation. He suggested that some of these interventions could be used at the same time, and that the panel should discuss this further in the December meeting when setting recommendations for Report 3.

Dr Hajioff cautioned that within these recommendations there will be uncertainty in provable differences within individuals due to the variation between people. The panel would be recommending that interventions are made available rather than that individuals should access them.

Grace asked Dr Fletcher about the average calculation in the table. Dr Fletcher explained that this was his calculations because the study reported an average total reduction of 28% due to plasma donation, and that they had 6.4 sessions of plasma donation on average over a year, therefore Dr Fletcher had calculated the impact of one individual session for purposes of comparison.

Prof Cousins asked why there is such a big variation between elimination of each PFAS between individuals. Dr Fletcher explained that there are several hypotheses although none are proven:

1. Concurrent differences in diet e.g. high fibre which may help excretion, while certain food have higher loads of PFAS e.g. seafood
2. Genetic differences in individual's natural ability to mobilise, metabolise, excrete, reabsorb in the gut. Researchers have looked into gene impacts, but not found significant differences to date
3. Microbiome in gut – a healthy microbiome results in healthy digestion. Natural differences in a gut microbiome may explain differences in PFAS elimination rates. There is some data generated recently showing some associations between microbial populations and levels of excretion
4. Ongoing exposure to PFAS will vary between people

Ann Christine Lyngberg commented that the natural decline should be controlled for when looking at the intervention options as well, in order to truly see what the intervention benefit is. Dr Fletcher agreed, noted that he had done that in Report 1 and that it will be done for this analysis as well. It is not accounted for in the table contained in the minutes above, but will be addressed for the version in the report.

Ann Christine noted that discussions on excretion and absorption are being held within a working group she is a member of on a similar topic. She indicated that a liver specialist they consulted as part of this work had said that the acidity of the meal has an impact on the absorption of food. She also believes there are factors impacting this that we do not yet know.

Dr Hajioff thanked Dr Flecher for his presentation.

Agenda item 7 – Dr Ann Christine Lyngberg, Subject Matter Expert

Dr Hajioff welcomed Dr Ann Christine Lyngberg to the meeting and asked her to introduce herself to the meeting before presenting to the panel.

Dr Lyngberg has a medical background in public health and a research background in epidemiology. She is currently Chief Medical Officer for Occupational and Environmental medicine in Region Zealand, Denmark.

Dr Lyngberg's presentation was entitled "The Danish experiences".

Presentation PFAS panel Jersey 9.10.202

In 2021, there was contamination with PFAS in Korsør, Denmark due to AFFF use at a firefighting educational facility. Nearby meadows had cow grazing, and ground water from the facility went down to the meadow where the cows were drinking it and got highly exposed. The people in the Cow Grazing Association (who ate the cattle grazed in this area) had high levels of PFOS and PFHxS in their blood at much higher levels than the Danish background population. There was also a very big variation between individuals despite their similar diets, indicating that there are factors that are not yet known about.

Dr Lyngberg explained about the research being conducted in this area. She explained that there are several studies that indicate a possible treatment. One of the studies was on rats, that although it can't be directly extrapolated to humans, there may be useful information to apply.

An NHANES study from 2003-2016 found that PFAS was 80% lower among users of anion exchange resin/bile acid sequestrants such as cholestyramine. These stay in the gut and trap bile acids but also many other drugs and vitamins so it was hypothesised that these drugs could also trap PFAS in the gut and stop it from being absorbed.

Dr Lyngberg described a cholestyramine cross-over trial that her research team ran with the cow grazing association which was designed to assess the impact of the drug on PFAS levels. All participants received the drug for 12 weeks, randomised between those who received it before or after an observational period. The study only included people with PFAS levels above 97.5% centile level for the general population, which was 21ng/ml at that time. 45 people were included, and many experienced gastrointestinal side effects, resulting in some people not continuing with the intervention for the full 12 weeks.

Dr Lyngberg explained that statins are not thought to reduce levels of PFAS in blood, but there have not been any controlled trials on this topic to date. Dr Hajioff mentioned that there was a misunderstanding amongst Islanders that statins do not work in PFAS exposed people to treat high cholesterol. Dr Lyngberg confirmed that people should stay on statins if they have been prescribed them for high cholesterol, and that if their doctor recommends them then they should take them as they are much more potent for lowering cholesterol. There is no evidence that show that statins do not work for reducing cholesterol in PFAS affected populations. The advice in Denmark is to continue to take statins if the PFAS exposed patient is already taking them. Dr Hajioff thanked Dr Lyngberg for confirming that this is indeed a misunderstanding.

Grace asked to confirm what percentage of eligible cow grazers took up the offer of being involved in the study and the answer was around 60%.

Prof Cousins pointed out that the exposure in this scenario is different to in Jersey, as there is a longer, indirect exposure from water to cows to humans, rather than water to humans in Jersey. Therefore, due to the half life of PFHxS being faster than other PFAS compounds, less PFHxS may be found in the cow grazers than would be expected from direct water exposure. Dr Lyngberg had

not noticed that difference, but did confirm that PFOS was the compound found in highest numbers both in the meat and in the cow grazers.

Grace asked why the 97.5 centile rather than 95th centile or another measure for determining eligibility for the study was used? Dr Lyngberg replied that this is standard practice in clinical practice reference ranges.

Eligibility for the study Dr Lyngberg described was above 21ng/ml for PFOS, as the other PFAS compounds were not above normal levels. The panel asked whether there was any disappointment amongst people who had levels lower than 21ng/ml who were excluded from the study? Dr Lyngberg explained that they had several meetings with people in the Cow Grazing Association to explain the health risks in terms of the additional absolute risk, which is small. This communication reassured people that their levels were within the normal range, and so there was no push back about not being eligible for the study.

The panel asked if the measurements in cow meat are available as they would be very useful to see for Report 4. Dr Lyngberg agreed to forward the panel those figures, and cautioned that these cows were highly exposed. As soon as the high levels were identified in the cows, all members were told not to eat the meat. There are a range of levels available identified in different food stuffs from the Danish Health Department.

The results of the cholestyramine study are available in a paper authored by Moller *et al* (Substantial decrease of PFAS with anion exchange resin treatment – A clinical cross-over trial - ScienceDirect) The study found a 63% reduction of PFOS after the 12 week intervention period. Most people were given cholestyramine granules due to lack of availability of the tablet form, and the unpalatable taste was one of the reasons why many dropped out. Dr Lyngberg wishes to investigate a lower dose for a longer term to investigate whether this has an impact on side effects, however it is not yet underway. Dr Hajioff agreed that a lower dose may be effective for PFAS due to PFAS being present at lower levels than bile acids on which the dose has been set therapeutically.

The study found that there was an increase in PFNA and PFDA during the observational period – the reason is unknown although is thought to be due to an ongoing exposure from other sources, as PFNA and PFDA are not often found in AFFF.

Dr Lyngberg described the conclusions from the trial. This is the first trial looking at PFAS elimination using an ion exchange resin. There is no clear evidence that a reduction in serum PFAS results in a decrease in health risk or health effects, which is an important limitation of the science and needs to be further investigated.

Dr Lyngberg cautioned about whether it is ethical to offer an intervention for elevated PFAS levels at this point in time. For an intervention to be offered, the effects and side effects must be well understood, which is not the case for PFAS interventions. In the past medical history, there have been interventions recommended where no health benefits have been seen, and even some adverse effects, and it is important that these historic mistakes are not perpetuated and that decisions are evidence-based. For example, there is no evidence that interventions to reduce serum PFAS actually reduces the risk of adverse health effects, and this is important evidence required to make an informed decision. Dr Lyngberg reminded the Panel that knowledge and data are necessary to make an informed decision, not assumption.

Dr Lyngberg explained the current situation in Denmark. There is not yet enough evidence to provide interventions, even in highly exposed hotspot populations. The research group in Denmark, of which Dr Lyngberg is a member, have spoken with affected residents and offered individual counselling. She reiterated that interventions cannot be provided if the benefits are not fully defined.

There is though one group of the population which is offered an intervention however, which is highly exposed women of reproductive age who are planning a pregnancy in the future. Dr Lyngberg noted that as a medical doctor, she can treat these residents ethically in order to reduce PFAS exposure of the next generation, preventing the high exposure to an unborn person to compounds which are known to affect the immune system of children. The intervention is off label, and so requires and careful individual assessment and fully-informed consent.

Dr Lyngberg explained that for all other residents, if the PFAS is removed, the cancer risk might not be removed. Dr Hajioff agreed, and also mentioned that it depends on the mechanism of the cancer, whether it is a mutation or whether it suppresses the immune system's ability to fight new cancers, and this makes a difference.

Dr Lyngberg told that panel, that they have not, in the cow grazers, seen any cases of cancer which could be expected to be related to PFAS. Some residents had slightly elevated cholesterol which could be due to PFAS exposure, however mentioned that diet and exercise has a bigger impact on cholesterol than PFAS. For these residents, the research team could not determine whether their diet (which was high in meat) is the cause of their high cholesterol or the PFAS from the meat.

The panel asked about the residents opinions about whether they believe their symptoms are related to PFAS, and whether they want intervention or not. Dr Lyngberg replied to say that there are of course people who want intervention that ethically she cannot provide. Instead Dr Lyngberg provides individual counselling as having the conversation with people puts their minds at rest.

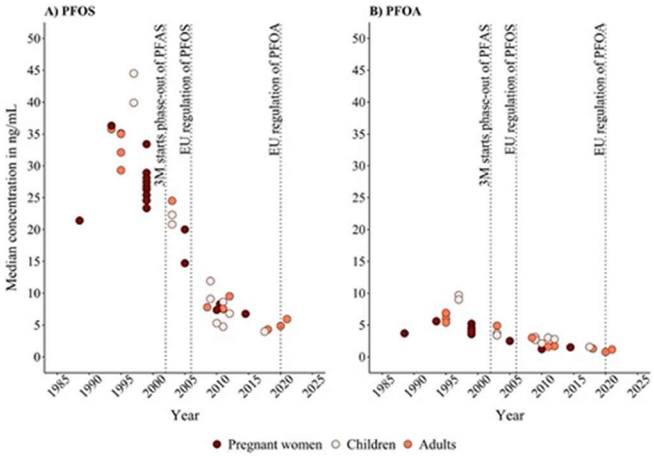
For the future, Dr Lyngberg explained that she wants further regulation to make sure that the levels of PFAS the population is exposed to are reduced.

On the subject of re-testing, Dr Lyngberg confirmed that the research group in Denmark do not offer re-testing for PFAS. This is for the following reasons:

- PFAS level has not been found to predict the health outcome of an individual
- Counselling and medical care for highly exposed individuals does not differ from that of low exposed or background population
- Tests or blood samples need to be actionable and to guide medical decisions and intervention. There is not a situation in which knowing a PFAS level will guide medical intervention
- Screening a population for PFAS is ad hoc screening and screening must adhere to WHO guidelines for screening, which PFAS screening would not meet.

Dr Lyngberg displayed a slide of PFAS time trends in Denmark. This is a published paper (Time trends in per- and polyfluoroalkyl substances (PFAS) concentrations in the Danish population: A review based on published and newly analyzed data - ScienceDirect) which summarises levels of PFAS in populations over time. PFOS has been reduced from 24-40ng/ml in the 1990s to around 4/5ng/ml in the 2020s. The average now in the cow grazers is the same as the average from 30 years ago in the general population. This slide indicates that PFOS does get excreted, and that regulations are important as they do work at reducing PFAS exposure.

PFAS time trends in Denmark



Time trends in per- and polyfluoroalkyl substances (PFAS) concentrations in the Danish population: A review

Dr Lyngberg moved on to discuss risk communication, focusing on population risk vs individual risk.

Several papers indicate there is a relative increase of 20-30% for kidney cancer among workers with massive, long time exposure of PFOA. Many patients when hearing this interpret it to mean 20-30% of the population will get kidney cancer, but that isn't what that increase means. When communicating risk for individuals, the lifetime risk and the increase must be considered and calculated together to find the 'absolute risk'. The lifetime risk of kidney cancer in Denmark is very low, 1.5% for men and 0.7% for women, or about 1.1% on average. In order to calculate the absolute risk, you have to take the lifetime risk and add another 20-30% on top of the lifetime risk. The table below shows how this risk is calculated, assuming there is an additional 30% risk caused by PFAS exposure. It shows that an extra 3 cases per 1,000 of the population of kidney cancer could be caused by high PFAS exposure.

	Lifetime risk for kidney cancer in Denmark (%)	Additional risk, assuming 30% extra risk from PFAS (%)	Total absolute risk for highly exposed populations (%)	Additional risk due to PFAS (%)	Number of expected kidney cancer cases in the general population, Denmark (per 1,000 people)	Number of expected kidney cancer cases in a highly exposed population (per 1,000)	Number of additional kidney cancer cases due to PFAS exposure (per 1,000)	Number of additional kidney cancer cases due to PFAS exposure, per 200 people
Men	1.5	0.45	1.95	0.45	15	19.5	4.5	0.9
Women	0.7	0.21	0.91	0.21	7	9.1	2.1	0.42
Average	1.1	0.33	1.43	0.33	11	14.3	3.3	0.66

This is why it was not a surprise to the research group that there were no extra kidney cancer cases in the cow grazing association population of 200 people, because for a population of that size, only an extra 0.6 cases would be expected. The risk with lower exposure levels than highly exposed workers is not known. It could be lower or the same, but it is unlikely to be higher.

For comparison, air pollution or passive smoking – which are other factors from the environment which affect cancer rates - increases the risk of lung cancer of 25-30% (i.e. a similar relative increase risk as PFOA for kidney cancer) which has a lifetime risk of 4.5% which is 3 times higher than the increased risk for kidney cancer. Therefore, it is 3 times more likely that someone would get cancer caused by air pollution or passive smoking than from high PFAS exposure.

Dr Hajioff agreed and also reminded everyone that getting a cancer doesn't necessarily mean that you will die from it either, the 5 year survival rate is important too. Dr Lyngberg agreed and told the panel that in Denmark it is around 85% of cases will recover from it.

When this was explained to the affected population in Denmark, the population understood that the additional risk is low and that they may not see the disease in their population.

Take home messages

1. PFAS elimination can be enhanced by administration of an anion exchange resin, but there is no evidence that this intervention decreases the risk of adverse health effects
2. Interventions should not be implemented at a population level without evidence of health benefits
3. Screening must adhere to WHO guidelines, and so should not be implemented for PFAS exposure as the criteria for screening are not all met
4. The additional risk (relative risk) caused by PFAS must be translated to individual absolute risk to enable people to understand their likelihood of developing a condition due to PFAS
5. There is not enough evidence to provide intervention to all highly exposed individuals. In Denmark, off label intervention is though offered to highly exposed women who are planning a pregnancy.
6. Retesting for PFAS is not offered in Denmark as test results are not actionable, i.e. they do not result in different individual action as a consequence of the result .

Dr Lyngberg finished her presentation and invited any other questions.

Prof Cousins asked if the testing data presented today is all published in reports and papers. Dr Lyngberg explained the majority is and additionally that there is a paper in development correlating meat intake and PFAS levels. The other numbers are public, but in Danish. Dr Lyngberg offered to discuss further on risk communication as it is an area that requires more focus. Dr Hajioff thanked her and agreed that it is very important.

Dr Fletcher asked if another source of PFAS was detected whether those individuals be tested. Dr Lyngberg replied that it would depend if there was information that could be learned from testing, or if it could drive action. There was another cow source with lower exposure measured in meat (2ng/g in comparison to180ng/g), and therefore blood levels could be estimated based on the blood levels in people exposed to 180ng/g. These levels were estimated to be near background levels and as appropriate action could be taken (stop ingesting the meat), no blood tests were offered as there would be no useful information gained.

In an exposure caused by a manufacturing facility in Veneto, Italy, the authorities offered testing to everyone, which was approximately 50,000 people. They also offered cholesterol testing, and this was very expensive.

Dr Lyngberg explained another example of testing of surfers in Jutland, Denmark. High PFAS levels in foam were discovered. It was discussed with the surfers, pointing out that there would be no individual health impact to being tested, but blood testing would help the researchers identify the exposure route. Approximately 20 people were offered testing, and very low levels were found in the blood.

Dr Hajioff explained that there are three potential benefits of testing:

1. Clinical benefit
2. Research benefit
3. Political benefit

He explained that there are risks from testing including that it is not known what tests mean in a non-symptomatic population. It often purely increases levels of anxiety in those who are tested.

Dr Lyngberg agreed and explained that for breast cancer, screening is conducted and this sometimes find tumours which wouldn't have developed into cancer but the tumours are treated as though they are cancer and therefore there is both psychological and physical harm caused by screening. This is an example of why it is important that screening decisions are made with full understanding of the risks and health benefits, which is not the case with PFAS.

Dr Fletcher explained that some people could choose to use blood donation services to reduce their PFAS levels, and asked if this had happened in the cow grazing population because interventions are not being offered. Dr Lyngberg explained that the topic had been raised but that she discussed this with individuals, explaining that giving blood is a gift to someone else, and it cannot be a gift if it's given for the wrong reasons. She also said that if the contaminated meat had been distributed among all the supermarkets in Denmark, PFAS levels would not be increased in the general population, and the same is true for blood, because the increased levels would be diffused across the population.

Dr Hajioff mentioned that the panel had discussed this topic when investigating phlebotomy in Report 1. The only situation in which people with high levels donating blood could cause a problem for recipients would be if someone had very high levels of PFAS and a very rare blood type, and the PFAS-containing blood was stock piled and all given to one person who needed a lot of blood all at once. In this situation, there would be an increase for the person receiving the blood. The Panel concluded that this was an unlikely situation.

Dr Fletcher asked if there was any bounce-back in PFAS levels in the crossover study after the intervention finished, as a consequence of it being redistributed from the body's organs to the blood. Dr Lyngberg replied to say that the research team considered that, had lots of discussions and calculated to detect any rebound, but there was no difference seen. Dr Fletcher noted that in the Italian data from Veneto, where they offered plasmapheresis, there was an initial big drop due to the intervention, but then levels increased again later. Dr Lyngberg agreed, and explained that there is redistribution between blood and organs but because cholestyramine is delivered daily, less rebound effect was likely. If it was a one off or less regular intervention (such as with blood removal), then the rebound effect may have been seen.

Dr Hajioff agreed and noted that it was an important point. Redistribution happens every day, not over months. There is a reduction on the redistributed portion every time. For phlebotomy or plasma donation, it is a single event and then takes a while to redistribute. The anion exchange resin approach helps to deplete the other reservoirs in the body during the intervention period.

Dr Hajioff thanked Dr Lyngberg for her fascinating presentation and discussion. Dr Lyngberg offered for the panel to contact her for any further questions.

Any other business

No other business was raised by the panel.

Date of next meeting

Thursday 7 November 2024. It will be held 10am-1pm online. The review of the literature on testing will be reviewed, along with testing for other potential consequences of PFAS exposure such as cholesterol, and the side effects and tolerability of different forms of intervention considered by the panel.

The Chair thanked everyone for their contributions, those watching the meeting and Julia for her support throughout the whole process. A reminder to the public that this meeting has been recorded and the video will be available online on request by emailing the PFAS mailbox. This will take a couple of days to make sure the observers are anonymised.

There being no further business, the meeting was closed.

To note that the Panel can be emailed via PFASpanel@gov.je.

Details of meeting dates and times can be found at PFAS in Jersey (gov.je)