COMMISSION ON HUMAN MEDICINES (CHM)
COVID-19 VACCINES BENEFIT RISK EXPERT WORKING GROUP

Minutes of the meeting held on **Monday 21st June 2021** at **10:30** via videoconference

Participants Present

Members

Professor Sir M Pirmohamed (Chair)
Professor J Breuer[1]
Mr VI G Fenton-May
Professor N French[1]
Professor D Goldblatt[1]
Ms S Hunneyball
Professor K Hyrich[1,2]
Sir M Jacobs
Professor H J Lachmann[1]
Professor P J Lehner
Dr S Misbah[1]
Professor Y Perrie
Professor S Price
Dr A Riordan
Professor K M G Taylor
Dr R Thorpe
Professor M Turner[1]
Dr S Walsh
Mrs M Wang
Professor C Weir[1]

Apologies

Professor G Dougan
Mr R Lowe
Professor C Robertson
Professor T Solomon

Visiting / Invited Experts

[redacted][3]
[redacted][4]
[redacted][4]

Observers (left after Item 5)

[redacted][2]
[redacted][5]
[redacted]
Professor WS Lim[2]
[redacted]
[redacted][5]
[redacted]

Secretariat

[redacted]
[redacted]

Professional Staff of MHRA Present

Principal Assessors

Dr J Bonnerjea - LD
[redacted] - VRMM

Presenters supporting specific items

[redacted] - VRMM
[redacted] - VRMM
[redacted] - LD
[redacted] - VRMM
[redacted] - VRMM
Mr P Tregunno - VRMM

MHRA Observers

[redacted] - VRMM
[redacted] - LD
[redacted] - VRMM
[redacted] - LD
Dr S Branch - VRMM
[redacted] - NIBSC
[redacted] – MHRA Policy
[redacted] - VRMM
[redacted] – Comms
[redacted] - VRMM
[redacted] - VRMM
[redacted] - VRMM
[redacted] - LD
[redacted] - LD
[redacted] - NIBSC
[redacted] - LD
[redacted] - VRMM
[redacted] - LD

Key
LD = Licensing Division
VRMM = Vigilance & Risk Management of Medicines
NIBSC = National Institute for Biological Standards & Control
Comms = MHRA Communications

[1] left during item 5
[2] joined during item 2
[3] Participated for item 2 only
[4] Participated for item 3 only
[5] joined during item 3

1. Introduction and Announcement

1.1 The Chair reminded Members, invited Experts and observers that the content of papers and proceeding of the meeting are strictly confidential and should be treated as 'Official – sensitive commercial' and should not be disclosed. There is no consent for members / participants to record the meeting, take screenshots or photographs of presentations. The meeting was recorded by the MHRA Secretariat for minute taking purposes only. The Chair & Members including all participants gave full consent to the recording prior to the start of the meeting.

1.2 Conflict of Interest Policy (Annex I to the minutes)

The Chair reminded members and participants that, in accordance with the CHM Code of Practice, they should declare any financial interests (personal or non-personal, specific or non-specific) which they have, or which an immediate family member has, in any of the agenda items. Members were also reminded to declare any other matter which could reasonably be perceived as affecting their impartiality.

1.3 Participants declared interests and other relevant interests for this meeting listed at **Annex II** to the minutes.

1.4 Apologies were received from Professors Dougan, Robertson, Solomon, and Mr Robert Lowe for this meeting.

1.5 The Chair welcomed the following visiting / invited experts for today's meeting:

[redacted] University of Cambridge

[redacted] Bristol Heart Institute

[redacted]
Associate Professor in Paediatrics and Vaccinology

1.6 The Chair welcomed the following observers:

[redacted] JCVI

[redacted] Public Health England

[redacted]
Public Health Agency

Professor Wei Shen Lim
Chair of JCVI

[redacted]
Public Health Scotland

[redacted]
Public Health England

[redacted]
NHS England and NHS Improvement (National)

2. COM-COV Trial Immunogenicity data

2.1 The EWG was presented with emerging data from National Immunisation Schedule Evaluation Consortium (NISEC) heterologous and prime/boost studies. The aim of these studies was to provide flexibility and resilience of vaccine delivery in the UK by establishing if mixed (heterologous) vaccine schedules would afford similar or improved protection as well as acceptable safety when compared to like-for-like (homologous) schedules.

2.2 Data were only available on the 4 week dosing interval schedule rather than in longer interval (in the range of 8 to 12 weeks) this presented a major caveat when bearing in mind that the AZ vaccine is more immunogenic when given with a longer interval. The data with the longer interval are pending. The other caveats of the study included no eligibility for participants under 50 years of age and that a comprehensive interpretation of immunogenicity data is not possible without the live viral neutralizing antibody data, which are also pending.

2.3 The least immunogenic schedule was still highly effective against COVID-19, all schedules will be followed up to 1 year to assess durability of antibody and cellular responses, and testing against variants of interest, was also stated to be crucial.

2.4 The EWG heard that COM-COV-2 enrols those previously immunised 8 -12 weeks before second dose, randomisation at second dose, whereas COM-COV randomised at first dose. The reactogenicity data from COM-COV-2 were presented.

2.5 Question and Answer

2.5.1 The EWG heard the data from COM-COV and COM-COV-2 did not show a positive correlation between reactogenicity and immunogenicity. Further investigations are required to understand at an individual level the influence of cellular responses on reactogenicity and also gain better insights about the relationships between reactogenicity and immunogenicity with different vaccine schedules. The EWG heard that an option for a potential future study would include monitoring of gene expression at day 1-2 post vaccination.

2.5.2 The EWG heard that based on the data from PHE, vaccine effectiveness is comparable for all schedules in calculations of protection from hospitalisation and death, a comparable level of protection is also seen with infections associated with the delta variant. It is currently unknown if the protection is mainly achieved through the antibody levels or by the T-cell responses. All schedules need to be tested in terms of the humoral and cellular responses with exposure to new variants of interest.

2.5.3 The EWG heard that sub-group analyses showed that neither sex nor age (within the 20-year range enrolled) had an effect on immunogenicity.

2.5.4 The EWG heard a study conducted in Germany compared a Pfizer/Pfizer schedule at 3 weeks and with at AZ/Pfizer at 12 weeks, the latter was more highly immunogenic. The COM-COV data are pending for the head to head comparison of Pfizer/Pfizer versus AZ/AZ at 12 weeks.

2.5.5 The EWG heard the effects of prophylactic use of paracetamol on immunogenicity and reactogenicity is part of the study. The dosing schedule for paracetamol was 2 tablets as soon as possible after vaccination and then three further doses in the next 24 hours. The EWG heard, it so happened that the group of participants not asked to take paracetamol immediately after vaccination had a similar rate of paracetamol use, albeit that use occurred later with the symptomatic onset of systemic reactions.

2.5.6 The EWG heard that onset / elevation of antibody responses was seen at similar times across all schedules e.g. 14 days post first dose and 7 day after the second dose, however, peaks could occur between in the periods between the sampling.

2.5.7 The EWG discussed with the invited expert the scope of further analysis to assist with understanding of the mechanism of immunogenic and reactogenic responses across all schedules.

2.5.8 The EWG noted that the data will be published as a pre-print by Friday 25th June.

2.6 The EWG were reminded that the data presented are confidential until the publication of pre-print:

3. Update review on myocarditis and pericarditis following administration of COVID-19 vaccines

3.1 The EWG were presented with an update on Yellow Card reports for myocarditis and pericarditis with the Pfizer/BioNTech, Moderna and AstraZeneca COVID-19 vaccines as well as international data, company data and analysis from Public Health England (PHE).

3.2 The EWG were informed that there has been an increase in reporting of myocarditis and pericarditis with the Pfizer/BioNtech vaccine, particularly in younger age groups and in males. Reporting rates were higher following the second dose with average onset time of 10 days after administration. For the Moderna vaccine, there were 3 reports at the data lock point of 13 June 2021, however the EWG were informed that 3 additional reports had been received since. While the number of reports is low, these are based on limited exposure to the Moderna vaccine in the UK. For the AstraZeneca vaccine, it was noted that reports occurred in patients with an older average age than the mRNA vaccines and with a more even split between males and females. The EWG were informed that company observed vs expected analysis did not identify a signal for any of the vaccines.

3.3 The EWG were presented an analysis of SUS hospital data from PHE, which has shown an increased risk of myocarditis in younger age groups (15-39 years) for the first dose of AstraZeneca vaccine and second dose of Pfizer/BioNTech vaccine in the 0-6 day risk window.

3.4 The EWG were presented international data on myocarditis and pericarditis. The European Medicines Agency observed vs expected analysis identified an increased risk for myocarditis in males aged 18-24 years for Pfizer/BioNTech, Moderna and AstraZeneca, with an increased risk also seen for the 25-49 age group for Pfizer/BioNTech. The US CDC and FDA observed vs expected analysis of myo/pericarditis reports in the vaccine adverse events reporting system (VAERS) database, an increased risk was identified in the 16-17 and 18-24 age group following the second dose of an mRNA vaccine. The CDC vaccine safety datalink analysis also indicated a potential increased risk with the Moderna vaccine after the second dose. Data from Israel also showed a signal for myocarditis in younger males following the second dose.

3.5 The EWG were informed that based on the available data on myocarditis and pericarditis in the UK and worldwide, the MHRA had concluded that the product information should be updated for the Pfizer/BioNTech and Moderna vaccines to include a warning on the risk of myocarditis and pericarditis. The EWG considered the totality of the available data, concluding that the data supported a potential rare risk of myocarditis and pericarditis following administration of an mRNA vaccine. The EWG endorsed the proposed updates to the mRNA vaccines product information, to ensure patients know the signs and symptoms of myocarditis and the need to seek medical attention should these occur. The EWG considered that the available data for the AstraZeneca did not indicate an identified risk and therefore did not support an update to the product information.

3.6 The EWG considered that the signal of myocarditis and pericarditis should continue to be closely monitored, to further characterise the clinical course and outcomes of the events and to investigate any potential risk factors such as prior COVID-19 infection.

3.7 The EWG were presented with the case definitions being used to assess reports of myocarditis and pericarditis by other regulators, with the differences between the definitions highlighted. The EWG concluded that the CDC case definition was most appropriate for assessing spontaneous reports received through the Yellow Card scheme. The EWG also endorsed the follow-up form for collecting additional details on events of myocarditis and pericarditis.

4. Update on COVID-19 Vaccines and risk of thromboembolic events with concurrent thrombocytopenia

4.1 The EWG was presented with the latest data on thromboembolic events with thrombocytopenia associated with the authorised COVID-19 Vaccines up to a data lock point of 16 June 2021.

4.2 The EWG was made aware of the following publications of interest; one case report from Germany outlining portal vein thrombosis associated with the AstraZeneca COVID-19 vaccine, one case report from Belgium and one case series from Israel outlining cases of thrombotic thrombocytopenic purpura in association with Pfizer COVID-19 vaccine and a letter to the editor of the Journal of Thrombosis and Haemostasis outlining a proposal for an online International Society on Thrombosis and Haemostasis (ISTH) registry to gather clinically relevant information for patients with suspected COVID vaccine related thrombosis and/or thrombocytopenia. The EWG agreed with the need to keep the issues raised by these publications under monitoring.

4.3 The EWG was presented with an overview of the UK case reports associated with the AstraZeneca (AZ) COVID-19 Vaccine. This included the total number of UK cases classified as confirmed, probable or possible (389 cases) as well as summary tables of the 31 reported confirmed, probable and possible UK cases occurring after a second dose. The EWG noted that the total number of UK cases classified as confirmed, probable or possible remains similar in comparison to the previous update (390 cases) despite new cases being reported because of the merging of duplicate cases as well as reclassification of cases based on new information received.

4.4 The EWG was presented with the details of two reports concerning patients aged <30 years old who received the AstraZeneca vaccine after the Joint Committee on Vaccination and Immunisation update on 07 April 2021 regarding the choice of vaccine in this age group. Both patients experienced a cerebral venous sinus thrombosis with thrombocytopenia. One case was noted as fatal and has been reported to the coroner. Preliminary investigations into the fatal case indicate the patient chose the AstraZeneca vaccine following an informed consent process which outlined that the AstraZeneca vaccine was not the ideal choice given the age of the patient at the time of vaccination. Both cases will be updated as new information is received.

4.5 Data from the weekly COVID-19 safety report published by the Therapeutic Goods Administration (TGA) was summarised for the EWG. Up to 13 June 2021 the TGA reported 60 thrombotic thrombocytopenia cases attributed to AstraZeneca COVID-19 vaccine exposure in Australia. This is a rise from the previously reported 48 cases up to 06 June 2021.

4.6 The UK and foreign cases associated with the Pfizer, Moderna and Janssen COVID-19 vaccines were summarised using the same case definition. 1 new confirmed case was identified from the non-UK data for the Pfizer COVID-19 vaccine, and the details of this case were presented to the EWG.

4.7 The estimated number of second AstraZeneca COVID-19 vaccine doses administered has increased to 19.6 million whilst the number of first doses has not increased. Estimated case incidence rates for CVST and CVST plus other thromboembolic events were presented by age-stratified 10-year intervals and by gender. The overall incidence rate of CVST plus other TE is stable at 14.6 (13.1, 16.2) per million for first/unknown doses and the overall fatal incidence rate is also stable at 2.6 (2.0, 3.3) per million first/unknown doses. The age-stratified incidence rates associated with second doses were presented and the overall rate increased slightly to 1.6 (1.1, 2.3) per million doses. No new fatal cases following a 2nd dose have been reported up to the data lock point of 16 June 2021. The case incidence rates per 100,000 patient years were also compared for first and second doses. The case incidence rates (per 100,000 patient years) were 14.6 (13.1,16.2) for the first or unknown doses and 1.6 (1.1, 2.3) for second doses. The risk estimates were then compared with the expected benefits of vaccine in age subgroups. The reported incidence rates showed no increase since last data lock point with overlapping 95% confidence intervals, while risk-benefit ratio remained relatively unchanged.

4.8 The EWG then considered the following 3 questions:

4.8.1 Question 1: based on the evidence presented does the EWG consider the benefit-risk balance remains favourable for all patients and for all age groups?

The EWG advised that the overall benefit-risk profile of the AstraZeneca COVID-19 Vaccine remains positive although depending on the status of the COVID-19, its severity and impact on hospitalisation, the benefits of immunisation in individuals aged under 40 years are probably outweighed by the potential risks. The benefit-risk assessment has not changed since it was last reviewed on 14th June 2021.

4.8.2 Question 2: Does the EWG consider there might be an increased risk for the second dose of the vaccine?

The EWG advised that the emerging data on the risk of thromboembolic events occurring with thrombocytopenia following second doses remains reassuring. The EWG noted the use of IV immunoglobulins has decreased from April to May despite the continued rollout of second doses of AstraZeneca vaccine. The MHRA should continue to monitor second dose cases closely, particularly as younger patients will be receiving their booster immunisations.

4.8.3 Question 3: Does the EWG consider there is any need for action with regards to the Pfizer, Moderna or Janssen vaccines in relation to this potential risk?

Based on available data, the risk associated with the Pfizer and Moderna COVID-19 vaccines appears lower than that associated with the AstraZeneca COVID-19 Vaccine. This risk should be monitored and there is no need for regulatory action. Events associated with other COVID-19 vaccines should continue to be closely monitored.

5. Sharing and Publicising safety assessments

5.1 The EWG was presented information on safety topics currently included in the Weekly ADR report, and the importance of sharing summaries of safety reviews with both the UK public and international stakeholders.

5.2 The MHRA described the process and controls that are in place when sharing data with UK health bodies and international regulators, while also noting the potential for international publications to generate news stories in the UK.

5.3 The MHRA described the approach for sharing assessments with trusted international regulatory partners. MHRA outlined a proposal that EWG/ CHM should be asked whether summaries of assessments should be presented in the weekly ADR Report, or whether amendments should be made as a result of updated data/ analysis, and outlined some of the considerations that might be taken into account.

5.4 The EWG endorsed the approach that was outlined and the considerations for publication.

6. Moderna Quality Variations

6.1 A group of variations submitted by Moderna, advice is required primarily on the variation to extend the shelf life of the finished product after first opening, from 6 hours to 24 hours when stored at [redacted] ºC. The data and information submitted to support the other variations in the group, those listed below, was considered acceptable.

- To extend the shelf life of finished (closed) product when out of fridge from 12 – 24 hours (stability data supportive of this proposal).

- A modification to how to store the product in the freezer.

- Inclusion of information how to transport [redacted] This information was included for the Regulation 174 approval, but it was omitted in the conditional marketing authorisation.

- Information about where to pierce the stopper with the needle, and advice on handling to explain that both handling of the vial and filling of the syringe can take place in room-light conditions.

6.2 The data that have been submitted to support the after opening shelf life extension are the same as those submitted in the original submission (Reg 174). The EMA, approved up an in-use time of up to 19 hours for punctured vial, but their decision was not solely based on the data, it was also based on the urgency of vaccine roll-out / status of the supply during this phase of the pandemic.

6.3 The MHRA assessment of the Regulation 174 considered the EMA position, in conjunction with the views of the WHO and the relevant aspects of UK best practice. The assessment outcome was that the in-use shelf life should not exceed 6 hours because the vaccine does not contain preservative/s.

6.4 There is concern that a 19 hour in-use shelf life (after puncture of the vial) will encourage poor clinical practice, contributing to risks associated with leaving opened vials in situ overnight. The EWG heard that the AZ or Pfizer vaccines adhere to the 6 hours in-use shelf-life. The variation may risk of setting a precedent and one that deviates from best practice. The MHRA is not

aware of issues of Moderna vaccine wastage due to the 6 hour in-use (opened) shelf life, which challenges the rationale for an extended in-use shelf-life.

6.5 The EWG heard there are also outstanding minor technical issues, that are simple to address.

6.6 The EWG noted that to allow an extension to 19 hours would be poor practice for an unpreserved vaccine in a multi-dose open vial. While the location of vial puncture may reduce the degree of coring, it does not prevent the ingress of bacteria each time the vial is entered, nor the risk of evaporation. The change would also risk setting a negative precedent for other intravenous products / vaccines.

6.7 The EWG mentioned that in-depth discussions of the 6 hour in-use shelf life have occurred in relation to the other COVID-19 vaccines. The outcomes of the CMA assessment of the Moderna vaccine are consistent with those discussions, as well as being in line with best practice.

6.8 The Chair of the EWG asked about the potential operational difficulties that could arise due to the Northern Ireland Protocol, due to the divergence from the EU position on the in-use shelf life. The EWG heard, the MHRA is aware of the potential for divergence in NI, but the rationale behind the MHRA decision will be provided to NI pharmacists, and it is expected that NI will follow the 6 hour in-use shelf life practice.

6.9 The EWG fully supported the assessment including recommendations related to the variations.

7. Any Other Business

None.

8. Date and time of next meeting

The next scheduled meeting is to take place **on Monday 25th June** at **10.30am**.

The Meeting today started at 10:33 and ended at 13:13.

[redacted]

22nd July 2022

Members are reminded that the content of papers and proceeding of the meetings are to be treated as 'Official – sensitive commercial'. Members are also reminded that, in accordance with the Code of Practice, they should declare any financial interests (personal or non-personal, specific or non-specific) which they have, or which an immediate family member has, in any of the agenda items. Members must also declare any other matter which could reasonably be perceived as affecting their impartiality. Detailed guidance is set out in the Code of Practice

Annex I

Conflict of Interest Policy for CHM COVID-19 Vaccine Benefit Risk EWG

Chair and Members

- May not hold current personal interests in one or more companies associated with the development of COVID-19 vaccines
- May not currently be or have previously been involved in the development of COVID-19 vaccines

Invited to all meetings, receives all papers and presentations and is permitted full participation in discussion, including drawing up conclusions and recommendations

Invited experts

- May hold current personal interests in one or more companies associated with the development of COVID-19 vaccines
- May currently be or have previously been involved in the development of COVID-19 vaccines

May be invited to all relevant meetings, receives all papers and presentations and is permitted to participate in discussions when invited by the Chair. Does not contribute to conclusions and recommendations

Observers

Are invited to attend all meetings. Will not participate in drawing up conclusions and recommendations.

Annex II

The following participants declared interests and other relevant interests at the meeting today:

Apologies were received from Professors Lehner, Robertson, Solomon and Mrs Wang for this meeting.

Professor Sir Munir Pirmohamed - NPNS AstraZeneca - Research grant to UOL to support PhD in drug interactions.
Other relevant interests in Pfizer, Janssen, Sanofi – Sir Munir is part of an EU-funded IMI consortium on gene therapy, and these companies are partners in the project. The University of Liverpool will get funding from the EU (but not from the partners), this IMI project commences on 3rd November 2020.
AGILE – this is a Liverpool early phase trial platform (between University of Liverpool and Liverpool School of Tropical Medicine). It is funded by the Wellcome Trust and UKRI/DHSC/NIHR. It is NOT evaluating vaccines, but only drugs to treat COVID-19. Sir Munir is not on the trial management group, and he is not directly involved in choosing the compounds for the study. Sir Munir has no involvement with any of the developers of the compounds to be studied (academic or industrial).
Sir Munir is a member of the UK COVID Therapeutics Advisory Panel (UK-CTAP), which is advising the CMO on which compounds need to be prioritised for the RECOVERY+ trial (RECOVERY is funded via NIHR/DHSC).

Professor Breuer– NPNS – Professor Breuer is on the data safety monitoring committee, DSMB, a study looking at combining vaccines being run by Matthew Snape in Oxford. There does not appear to be any involvement of the vaccine manufacturers and is for already licensed vaccines. The study is funded by the NIHR (Dec 2020).

Professor French - Other relevant interest - Provides clinical care when in covering the acute medical wards where patients with COVID-19 are cared. NPNS in GSK - In September 2020 a sub-contract was signed with the Liverpool School of Tropical Medicine to undertake work evaluating the safety and effectiveness of GSK's RTS's malaria vaccine in Malawi. GSK are the primary funders to the LSTM.

Ms Hunneyball - Other relevant interest – writes articles published in the Chemist and Druggist magazine, a trade magazine for pharmacists, but receives no payment for these articles. The information referred to in the articles is in the public domain. Ms Hunneyball makes it clear that these are her personal views and reflections and references all sources of information used.

Professor Hyrich – NPNS - Professor Hyrich was co-I on an investigator-initiated research grant exploring predictors of outcome in rheumatoid arthritis. NPNS Pfizer- she is a Co-I on a grant exploring adherence to JAK inhibitors in rheumatoid arthritis. NPNS in Abbvie, Professor Hyrich gave some lectures at an education conference on effectiveness of treatment for rheumatoid arthritis.

Sir Michael Jacobs - Other relevant interest - As part of the academic role at the Liverpool School of Tropical Medicine, Sir Michael is a member of the Study Management Team and antiviral drug prioritisation group for the AGILE proof of concept (phase I/II) platform study. Sir Michael is also part of the team that submits new antiviral compounds against SARS-CoV2 for consideration by NIHR for testing on this platform. No commercial or financial interest in the trial or any of the compounds, or any pharmaceutical or biotechnology company.

Professor Lachmann – Other relevant interest as a volunteer participant in the Oxford vaccine study and no other involvement in the study.

Professor Lehner - Other relevant interest – Professor Lehner previously held a DPAC (Discovery Partnership with Academia) agreement with GSK, but this has been completed. Professor Lehner's participation in his local hospital D and T governance committee deliberations would form the normal activity and professional responsibility in his post and does not interfere with the EWG considerations (Sept 2020).

Dr Misbah - NPNS - Holds honorary Senior Lectureship with University of Oxford & Oxford University Hospitals NHS Foundation Trust.

Professor Perrie - NPNS in Pfizer & AstraZeneca arising from a contract for a grant (March 2018), which includes contributions from these companies to the University of Strathclyde, Janssen in writing a grant for a PhD (now funded), GSK – arising from an EU grant to University of Strathclyde (Jan 2019-Dec 2019).

Professor Price - NPNS in GSK and AstraZeneca – which relates to donations provided by both companies to the British Toxicology Society (BTS) to support their Annual Congress and Education and Training of which Professor Price is currently President of the Society (2020-2022).

Dr Riordan - Other relevant interests - Participant in Oxford University's ChAdOx1 nCoV-19 clinical trial –received immunisation 27/8/2020. NPNS - Postgraduate External Examiner for Oxford University (Postgraduate Diploma in Paediatric Infectious Diseases). Member of the independent Data Safety Monitoring Board for COV-BOOST trial.

Mrs Wang – Other relevant interests arising from being highly sensitive to insect stings, and plant products such as Hyacinth bulbs, as recorded on Mrs Wang's medical records. The family of Mrs Wang lives with several rare diseases and conditions, some of which result in epileptic fits.

Professor Weir - NPNS - Imperial College and Other relevant interest arising from his department collaborates with Imperial College on a number of clinical trials

Observers

Professor Wei Shen Lim - NPNS arises from the institution (Nottingham University Hospitals NHS Trust) where Professor Lim works has received unrestricted investigator-initiated research funding from Pfizer for an unrelated prospective population-based cohort study of pneumococcal pneumonia in which Professor Lim is the Chief Investigator.

[redacted] - Lapsed and NPNS - Regarding companies to declare interests for, prior to joining Public Health Scotland, [redacted] worked for a company that provided epidemiological services to the pharmaceutical industry. Whilst working there, [redacted] supported respiratory vaccine development activities at [redacted] has now left that role.

[redacted] - Other relevant interests in Pfizer & GSK- The Immunisation and Countermeasures Division has provided vaccine manufacturers (including Pfizer and GSK) with post-marketing surveillance reports on pneumococcal and meningococcal infection which the companies are required to submit to the UK Licensing authority in compliance with their Risk Management Strategy. A cost recovery charge is made for these reports.