

1. A brief overview of your qualifications, career history, professional expertise and major publications

For the benefit of the inquiry, I have also attached a copy of my CV. This includes some of my publications. My ORCID number for my full publication history is 0000-0001-8934-0930

Prior to the pandemic, I was working for Public Health Wales as a Consultant Clinical Scientist in Virology.

My role was diverse in that I led on the development of molecular tests for the routine service and supported the Wales Specialist Virology centre clinical team in delivering a national virology clinical service. My career in virology began in 1994, I've worked at most laboratory levels training in both classical and molecular techniques, first as a Biomedical scientist and then from 2001 as a Clinical Scientist. I reached consultant level in 2017 after passing the FRCPath part 2 exam in virology.

I am a pure virologist, although I note the TAG minutes list me as a clinical scientist in microbiology – My job title should read Consultant Clinical Scientist Virology.

My main area of expertise is in the diagnosis, surveillance and management of respiratory viral infections. I was (and remain) the national focal point for the WHO for influenza and respiratory virus surveillance for Wales. In the past, I have developed and implemented tests for SARS-CoV-1 and MERS-CoV, although my focus was on development and maintenance of a service to allow rapid deployment of diagnostic tests for influenza A viruses with pandemic potential. Using these highly transferable skills in the field of molecular diagnostics, I've also responded to other emerging infections including measles (most notably the Swansea outbreak in 2013), enterovirus D68 and outbreaks caused by hepatitis A. I deployed in 2014 and again in 2015 to support the laboratory response in the west Africa Ebola outbreak.

Because I design and maintain tests for RNA viruses (like SARS-CoV-2) I have an appreciation of emergence, adaptation and mutation rates of these viruses and how these changes can impact detection and also the immune response. Part of my role is in monitoring seasonal influenza viruses for key changes in antigenic recognition sites, that might affect vaccine response, or prior immunity. This is reflected in my publication list that includes vaccine effectiveness studies, and also seasonal reports from Europe to which we in the PHW surveillance team contribute data towards.

2. List of groups for which I was a member with time scales

I was a member of TAG, Environmental TAG, Testing Tag and TCAP all from around June 2020

I didn't attend SAGE, but was an observer on NERVTAG from April/May 2020 until approximately May 2022. First as a deputy, then as the main attendee

I was also a member of the virology cell convened by PHE and then UKHSA

3. Overview of my involvement from January 2020 until May 2022

I was never invited formally to attend or participate in TAG, I don't appear in the TOR until version 6. I don't recall how I was invited, I believe the invite was from my line manager who started to attend in May 2020 as she was the PHW national clinical lead for virology. I do recall from the first two meetings that I wasn't clear what the TOR were, or if I was a core member.

We were under extreme pressure in the laboratory services, particularly in the first wave. I and my line manager, were often finding ourselves dialled into online meetings such as TAG but also working on issues in the laboratory. So presence in meetings is hard to have clarity about, as I might have dialled in so been 'present' but actually not able to be fully involved in the meeting itself. This did improve as the pandemic went on and I was able to engage more readily. However, the group size of TAG was large and I remain unclear on what the roles of some of the members are/were.

In terms of advice and evidence that I gave, it pertained only to virology and testing and included information and data I had from attending WHO/ECDC laboratory network meetings, and the virology cell meetings, although I generally found the WHO/ECDC meetings more informative.

I attended most TAG meetings from July 2020 onwards, except when we were working shifts to cover the clinical and laboratory service. I wasn't directly involved in papers written specifically by TAG, only those from the groups I was involved in that were taken to TAG for review.

The various sub-groups that I was involved in worked well, Testing TAG (tTAG) was much easier to engage with as the group was small and focussed on delivering the appropriate tests and discussing the virology. You weren't able to take notes in NERVTAG, but testing TAG did give an opportunity to discuss some of the salient points raised in NERVTAG and how they might apply to the epidemiology and testing plans going forwards. It was this group I feel that had the most influence and understanding of the challenges associated not only with the virus, but also how we might deliver a service. I was involved in most of the papers that came out of this group.

The environmental TAG (eTAG), I was requested to join May/June 2020. This was a large group, consisting mostly of academic partners from Cardiff, Swansea, Aberystwyth and Bangor universities. As for tTAG, questions would be submitted from WG or policy makers for the group to find evidence and provide that evidence in a report format, this included some significant areas, like use of face masks, transmission in group activities including singing.. Most of the ask of this group was outside of my direct remit, so my participation was largely around how the virus stability might be affected in the various scenarios. I was involved in papers around ice rinks, but largely I was very much in an advisory role specifically about the virus, rather than the dynamics of airflow. All of this was very difficult as key issues about the virus were largely unknown and not easily resolved, this included simple things like infectious dose.

I attended approximately 50-60% of the meetings, but these were very long so certainly during late 2020 into 2021 I could often not attend, or only attend part meetings.

The Testing clinical and advisory and prioritisation group (TCAP) it is again unclear when I started to attend, possibly May 2020, or a group at least with this remit. I know that it was at this point that my line manager who is a consultant medical virologist felt that we should swap some of our meeting commitments, until this point I was only deputising for her at NERVTAG, and she deputised for me at TCAP. It was quite clear that we had been assigned the wrong groups for our skill sets, so we switched meetings, as these usually happened on the same day. It would be fair to say that from June 2020 mid-

week onwards, we were moving from meeting to meeting, whilst still trying to deliver the service. She largely stopped attending TAG, but we continued to both attend tTag until May 2022.

For all of the groups, I tried very hard to remain within the bounds of my expertise, and not comment on areas that would have been conjecture or opinion only - except when drawn from my experience with the areas I was working in, even then, I would back this up with any available evidence.

What was very clear as the pandemic progressed, that the number of participants remained stable at TAG, but in the groups where most of the evidence was being collated, the membership numbers reduced markedly. I stopped attending eTAG earlier than May 2022 as the questions were less frequent and university life had largely returned to normal so very few people attended.

By early 2022, the membership of tTAG had diminished quite dramatically, to the point that for some of the meetings there may have only been the chair and one or two members of public health Wales to discuss any questions that had come in from policy colleagues. As this was the sub-group that I felt had more bearing on the ongoing pandemic response within my work remit, I continued to attend.

TCAP is ongoing and since my line manager retired, I attend instead of her.

4. A summary of documents that I would have given advice for

All documents that came from Testing Tag from at least May 2020

I also was involved in PHW explicit documents pertaining to testing submitted to TAG, but these often overlapped with t TAG as we would write them in PHW, go through tTAG, then finally to TAG

For eTAG – I reviewed early papers on transmission dynamics and ice-skating. Most of the chemistry, physics and modelling was outside my scope of understanding.

5. Articles I contributed to

I wasn't involved in interviews or article writing that would have explicitly related to work about the pandemic response or work with TAG. There are some peer reviewed journal articles that I participated with about some of the outbreaks I was involved in and some of the European wide epidemiology. There are also one or two non-peered review articles that were used as evidence including one that I have attached about using PCR to monitor for new variants of SARS-CoV-2. This was included in a NERVTAG paper.

6. My views on whether the groups succeeded in their aims

I believe most groups succeeded in their aims, the pandemic was a rapidly evolving field in terms of data and evidence and collating all of that and then summarising it into a form that everyone who attended the meetings could understand was a huge task. I felt tTAG especially, by stretching its remit slightly to enable us to discuss immunology and virology allowed the group members to bring together as much of the available evidence as possible to support writing the papers and answering queries from Welsh Government. E-Tag, included some of the main academic experts in their field in Wales, I was always impressed at the way they collated data and discussed as much data and evidence as possible to reach conclusions and produce papers for the policymakers.

In terms of make-up of the groups, it probably wasn't the correct make-up at the onset of the pandemic. One of the biggest criticisms about the pandemic response in the UK was the failure to engage and talk to the clinical virology services, as the people who delivered the routine services including high throughput testing and who had responded to previous epidemics and the 'swine flu' pandemic. This was a complete oversight, and Wales was no different in those early few months.

My experience of sitting on the wider groups, including NERVTAG showed that DHSC and UKHSA had more exposure to the current science as they were active participants. I'm not sure who attended meetings from Wales relating to virology and testing prior to my involvement in May 2020. Interestingly, both my line manager and myself were asked very specific questions during the early phase by email, so presume some of those came from TAG. The PHE/UKHSA virology cell was useful but also very England focussed and didn't always take into account the devolved administrations, so although some of the science was shared here, it wasn't necessarily relevant to the issues nor population in Wales.

It was not clear what the expertise was with the individuals in TAG was and I was often frustrated by points relating to virology and testing being widely discussed by those individuals who seemingly had little or no expertise in the subject. It wasn't uncommon for papers or opinions from social media to be brought up and discussed as being potentially sound science for example. I suspect this stemmed from the seemingly increasing membership of TAG without those people participating really knowing who was present in the group and what their expertise and background was. It would have been helpful to have been given biographies of each of the core members to know this in advance of attending. This inquiry was the first time I've been asked for mine.