

## Rule 9 response – Technical Advisory Group

Chris J Williams, Consultant epidemiologist, Public Health Wales

6 March 2023

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

I am a Consultant Epidemiologist at the Communicable Disease Surveillance Centre, Public Health Wales, with a lead role for the service, having started in September 2013. I have also worked with the European Programme for Intervention Epidemiology Training (EPIET) and the UK Field epidemiology training programme, currently as a supervisor and previously as a scientific co-ordinator (EPIET coordinator working for ECDC, 2013-2018).

I am a graduate of Cambridge (Natural Sciences) and London (Medicine) Universities. After medical training (including gaining membership of the Royal College of Physicians) and hospital posts in internal medicine and infectious diseases, I completed specialist training in Public Health in the East of England, including a Diploma in Public Health (now MPhil Population Health Sciences). This was followed by a two year EPIET fellowship at the Robert Koch institute in Berlin, and five years as a consultant in communicable disease control in the East of England.

I have also worked for WHO as an epidemiology consultant in Turkey (teaching), Egypt (avian influenza), and Guinea (Ebola response 2015). I am a fellow of the faculty of Public Health (FFPH) and an examiner for the FPH OSPHE exams (since 2022).

Within CDSC I leads the specialty group in emerging, gastrointestinal and zoonotic infections, and also leads on genomic surveillance from the epidemiological side. I have been principal investigator for the Wales sites of two Oxford Vaccine Group trials (meningococcal group B vaccine and the COVID-19 vaccination trial) and also for research into vaccine safety and effectiveness in the Swansea University SAIL databank.

Publications are listed in the appendix.

### **2. A list of the groups (i.e. TAG and/or any of its subgroups) in which you have been a participant, and the relevant time periods. Please also confirm if you are or have been a participant in SAGE or other relevant groups.**

### **3. An overview of your involvement with those groups between January 2020 and May 2022, including:**

#### **Technical advisory cell / then Technical advisory Group for Welsh Government**

##### **a. When and how you came to be a participant;**

I was invited to participate in TAG in March 2020, by the Chief Scientific Officer and TAG chair. This followed contributions to analysis on expected hospital and mortality impacts of COVID-19, adapted from models from NHS England based on existing models of likely new infections. I was also invited due to my role in surveillance and epidemiology.

##### **b. The number of meetings you attended, and your contributions to those meetings**

Meetings started in April 2020, with some earlier meetings involving similar actors within Welsh Government (e.g. TAG chair). Initially they were around 3 times per week but the frequency reduced to eventually once per week and are now less frequent.

To my recollection, I attended most of these meetings, particularly in the first years (2020 and 2021) of the pandemic. There were some periods of 1-2 weeks at a time in April, June and August 2020 when I probably missed meetings due to my working on the COVID-19 vaccine trial, which required in person clinical attendance at a site in Newport.

c. Your role in providing research, information and advice.

Initially I provided figures on suspected and confirmed case numbers, then on the wider surveillance such as trends in cases over time, place and by age group and other factors. As I became involved in the vaccine trial, I gave updates on progress of this work, and later (with colleagues) on estimates of vaccine effectiveness.

The role generally settled into one of providing regular updates on the surveillance data for COVID-19, by presenting our routine slide outputs with some context and interpretation.

Following the emergence of the first major SARS-CoV-2 variant, alpha, I became the lead on variant surveillance and reported on the epidemiology of this and subsequent variants, complemented by the work of colleagues in microbiology and pathogen genomics. As a regular member of the UKHSA variant technical group, I summarised the weekly proceedings and discussed these at TAG meetings as required.

#### SAGE

a. When and how you came to be a participant;

b. The number of meetings you attended, and your contributions to those meetings; and

c. Your role in providing research, information and advice.

I have not provided any research or advice to SAGE, given my role. I was able to observe at some meetings in March 2020 through joining via a common teleconference facility in Welsh Government. I attended more formally as an observer later on - from my recollection and records (for example rough notes taken and the meeting) starting in May 2021.

#### Scientific group for Pandemic Influenza- Modelling

a. When and how you came to be a participant

I initially attended some meetings of the Epidemiology and modelling cell nCoV, led by PHE, from 29 January 2020. I don't recall attending SPI-M as a member in addition, but I was invited to join SPI-M in the later phase of the pandemic, attending my first meeting in May 2022. I did not contribute research evidence to SPI-M but have made some contributions based on my surveillance experience (for example edits to a document on data requirements for a future pandemic).

b. The number of meetings you attended, and your contributions to those meetings; and

c. Your role in providing research, information and advice.

To my recollection I only attended in Jan/Feb and possibly some of March meetings for the Epidemiology and modelling cell. I did not contribute research, information or advice formally to the group, other than some rough estimates of R0 that I had made based on case numbers reported from China – but in relation to other work, this was a minor contribution.

I did not contribute research evidence to SPI-M but have made some contributions based on my surveillance experience (for example edits to a document on data requirements for a future pandemic). We (Communicable Disease Surveillance Centre) provided SPI-M with data on our

COVID-19 testing and cases, via WG colleagues, from early on in the pandemic and added in genomic data from 8 June 2021

4. A summary of any documents to which you contributed for the purpose of advising TAG and/or its related subgroups on the Covid-19 pandemic. Please include links to those documents where publicly available.

My main contribution was in presenting routine surveillance reports in the form of slides and commentary. Many contributions were not formally to TAG but were to the TAG co-chairs or other members in response to questions that arose between meetings -for example the variant reports and analysis, and the approach to variant management. There was increased interest in variant surveillance during the emergence of alpha in late 2020, delta in 2021, and then omicron in late 2021.

The paper on additional targeted vaccination was directed at the vaccination lead within WG who also attended TAG.

#### **Specific reports**

Summary of risk assessment for the risk of infection in care homes, from April 2020, following UK meetings and intelligence. This was communicated to WG colleagues but not formally to TAG

Regular surveillance reports, used at TAG briefings and other meetings. Examples include:

Daily epidemiological summary for individual health board

Lateral flow testing weekly report, describing testing and positivity by time, age and geography in Wales

Variant surveillance report- describing current prevalent variants and trends by time and place; early reports from late 2020 on S gene target failure as a proxy for alpha spread.

Variant technical group (PHE/UKHSA led meeting) – notes taken and distributed by me (including to TAG chair), and often presented at TAG or other meetings.

Examples:

Initial assessment of Omicron transmissibility and severity, and revised assessment, based on variant technical group notes, from December 2021

Bespoke analysis for individual variants, showing trends and geography for newer variants.

Examples:

Report from June 2021 showing emergence of delta, travel-related cases, geography of individual cases and age/sex trends, vaccination status, growth rates.

Omicron analysis

Documents outlining approach to management of variants in Wales:

e.g. Variants and mutations of concern approach for Wales – surveillance, assessment and response

Summary of school surveillance data- to inform education response in Welsh Government- including infection rates in schools, staff infection rates compared to local population incidence.

Some inputs were not directly to TAG but to other individuals or groups within Welsh Government. For example, an analysis of COVID cumulative incidence intended to drive targeting of additional vaccination efforts – 20 May 2021.

Requested assessment of resurgent infections (non-COVID) for winter 2022

5. A summary of any articles you have written, interviews and/or evidence you have given regarding the work of the above-mentioned groups and/or the Welsh Government's response to the Covid-19 pandemic. Please include links to those documents where publicly available.

Publications in peer reviewed journals to which I contributed regarding COVID-19.

1. Hollinghurst, J., North, L., Emmerson, C., Akbari, A., Torabi, F., Williams, C., Lyons, R. A., Hawkes, A. G., Bennett, E., Gravenor, M. B., & Fry, R. (2022). Intensity of COVID-19 in care homes following hospital discharge in the early stages of the UK epidemic. *Age and Ageing*, 51(5). <https://doi.org/10.1093/ageing/afac072>
2. Ohaeri, C., Thomas, D. R., Salmon, J., Cottrell, S., Lyons, J., Akbari, A., Lyons, R. A., Torabi, F., Davies, G. G. I., & Williams, C. (2022). Comparative risk of cerebral venous sinus thrombosis (CVST) following COVID-19 vaccination or infection: A national cohort study using linked electronic health records. *Human Vaccines and Immunotherapeutics*. <https://doi.org/10.1080/21645515.2022.2127572>
3. Perry, M., Gravenor, M. B., Cottrell, S., Bedston, S., Roberts, R., Williams, C., Salmon, J., Lyons, J., Akbari, A., Lyons, R. A., Torabi, F., & Griffiths, L. J. (2022). COVID-19 vaccine uptake and effectiveness in adults aged 50 years and older in Wales UK: a 1.2m population data-linkage cohort approach. *Human Vaccines and Immunotherapeutics*, 18(1). <https://doi.org/10.1080/21645515.2022.2031774>
4. Thomas, D. R., Fina, L. H., Adamson, J. P., Sawyer, C., Jones, A., Nnoaham, K., Barrasa, A., Shankar, A. G., & Williams, C. J. (2022). Social, demographic and behavioural determinants of SARS-CoV-2 infection: A case-control study carried out during mass community testing of asymptomatic individuals in South Wales, December 2020. *Epidemiology and Infection*, 150. <https://doi.org/10.1017/S0950268822000620>
5. Vidal, A. R., Vaughan, A., Innocenti, F., Colombe, S., Nerlander, L., Rachwal, N., Ciano, B. C., Mougkou, A., Carvalho, C., Delgado, E., Mook, P., de Muijder, G., Peeters, M., Tenev, T., Golkocheva-Markova, E., Jensen, V. V. S., Koch, A., Figoni, J., Brouard, C., ... Pebody, R. (2022). Hepatitis of unknown aetiology in children - epidemiological overview of cases reported in Europe, 1 January to 16 June 2022. *Eurosurveillance*, 27(31). <https://doi.org/10.2807/1560-7917.ES.2022.27.31.2200483>
6. Ponsford, M. J., Jefferies, R., Davies, C., Farewell, D., Humphreys, I. R., Jolles, S., Fairbairn, S., Lewis, K., Menzies, D., Benjamin, A., Thaivalappil, F., Williams, C., & Barry, S. M. (2021). Burden of nosocomial COVID-19 in Wales: Results from a multicentre retrospective observational study of 2508 hospitalised adults. *Thorax*, 76(12), 1246–1249. <https://doi.org/10.1136/thoraxjnl-2021-216964>

7. Pacchiarini N, Sawyer C, Williams C, Sutton D, Roberts C, Simkin F, King G, McClure V, Cottrell S, Clayton H, Beazer A, Williams C, Rey S, Connor T, Moore C. Epidemiological analysis of the first 1,000 cases of SARS-CoV-2 lineage BA.1 (B.1.1.529, Omicron) compared to co-circulating Delta, in Wales, United Kingdom <https://doi.org/10.22541/au.165158283.35240909/v1>
  8. Emary KRW et al. Efficacy of ChAdOx1 nCoV-19 (AZD1222) vaccine against SARS-CoV-2 variant of concern 202012/01 (B.1.1.7): an exploratory analysis of a randomised controlled trial. *The Lancet* April 2021; 397(10282) . [https://doi.org/10.1016/S0140-6736\(21\)00628-0](https://doi.org/10.1016/S0140-6736(21)00628-0)
  9. Flood et al. Paediatric multisystem inflammatory syndrome temporally associated with SARS-CoV-2 (PIMS-TS): Prospective, national surveillance, United Kingdom and Ireland, 2020. *Lancet regional health* 2021;3(100075). DOI:<https://doi.org/10.1016/j.lanepe.2021.100075>
  10. Voysey et al, on behalf of the Oxford COVID Vaccine Trial Group. Safety and efficacy of the ChAdOx1 nCoV-19 vaccine (AZD1222) against SARS-CoV-2: an interim analysis of four randomised controlled trials in Brazil, South Africa, and the UK. *Lancet* 2020 Dec; 397(10269). [https://doi.org/10.1016/S0140-6736\(20\)32661-1](https://doi.org/10.1016/S0140-6736(20)32661-1)
  11. Thomas DR; Orife O; Plimmer A; Williams C; Karani G; Evans ME; Longley PA; JJaniec J; Saltus R; Shankar AG. Ethnic variation in outcome of people hospitalised with Covid-19 in Wales (UK): A rapid analysis of surveillance data using Onomap, a name-based ethnicity classification tool. *BMJ Open* 2021;11:e048335. doi: 10.1136/bmjopen-2020-048335
  12. Emmerson C, Adamson J, Turner D, Gravenor B, Salmon J, Cottrell S, Middleton V, Thomas B, Mason B, Williams CJ. Risk factors for outbreaks of COVID-19 in care homes following hospital discharge: a national cohort analysis. Preprint from medRxiv Aug 2020. <https://doi.org/10.1101/2020.08.24.20168955>
  13. Williams O, Williams C, Turner D, Bull M, Watkins J, Hurt L. An epidemiological investigation of COVID-19 outbreaks in a group of care homes in Wales, UK: a retrospective cohort study. *J Public Health (Oxf)*. 2022 Aug 25;44(3):606-613. doi: 10.1093/pubmed/fdab150. PMID: 33993283; PMCID: PMC8194567.
6. Your views as to whether the work of the above-mentioned groups in responding to the Covid-19 pandemic (or Wales's response more generally) succeeded in its aims. This may include, but is not limited to, your views on:
- a. The composition of the groups and/or their diversity of expertise;
  - b. The way in which the groups were commissioned to work on the relevant issues;
  - c. The resources and support that were available;
  - d. The advice given and/or recommendations that were made;
  - e. The extent to which the groups worked effectively together; and
  - f. The extent to which applicable structures and policies were utilised and/or complied with and their effectiveness.

The group did contain diverse expertise which was helpful to balance views, and did commission individual pieces of analysis in an appropriate way. The processes were less well developed earlier in the pandemic and then the group widened and was more formal when formulating questions and commissioning.

The diversity was sometimes challenging from a surveillance and epidemiology point of view, as experts in other areas could comment on the likely and actual spread of infection in ways that sometimes went beyond their area of expertise. However, as stated above, the availability of other viewpoints on the wider questions and particularly on societal controls, was very helpful in moving beyond a strictly infection-focused assessment of harms and benefits. I was not party to the organisation of the groups but it appeared to be well-coordinated and resourced, with much helpful technical work also ongoing within Welsh Government.

The only other difficulty with advising TAG and other colleagues in Welsh Government was that there were many groups and individuals requesting data, information and advice. These information requests came infrequently from TAG itself, more often being from WG members of TAG and other WG departments. This multiplicity of requests sometimes led to duplication and was difficult to manage.

7. Your views as to any lessons that can be learned from the Welsh Government's response to the Covid-19 pandemic, in particular relating to the work of the above-mentioned groups. Please describe any changes that have already been made, and set out any recommendations for further changes that you think the Inquiry should consider making.

As above, a focal point (or points) for asking for information and advice would be helpful so that duplicate requests could be identified in advance and also allowing for planning of responses. TAG provided a forum in which we (PHW) were able to help shape and refine questions, and this ability to shape questions rather than deal with them raw would be helpful for other sources within Welsh Government. There was some development in this area, with representation at some groups asking questions and also some ability to ask for refinement of information or technical requests. One area that appeared to work well was in technical briefings to media. There were several of these sessions on specific topics and media could ask questions to technical staff to receive more detailed answers which helped them to understand and interpret data.

8. A brief description of documentation relating to these matters that you hold (including soft copy material held electronically). Please retain all such material. I am not asking for you to provide us with this material at this stage, but I may request that you do so in due course.

See above for lists of documents

#### **APPENDIX- publications and conference presentations where I contributed as a co-author or lead author.**

14. Carr, J. P., MacLennan, J. M., Plested, E., Bratcher, H. B., Harrison, O. B., Aley, P. K., Bray, J. E., Camara, S., Rodrigues, C. M. C., Davis, K., Bartolf, A., Baxter, D., Cameron, J. C., Cunningham, R., Faust, S. N., Fidler, K., Gowda, R., Heath, P. T., Hughes, S., ... Duale, K. (2022). Impact of meningococcal ACWY conjugate vaccines on pharyngeal carriage in

- adolescents: evidence for herd protection from the UK MenACWY programme. *Clinical Microbiology and Infection*. <https://doi.org/10.1016/j.cmi.2022.07.004>
15. Hollinghurst, J., North, L., Emmerson, C., Akbari, A., Torabi, F., Williams, C., Lyons, R. A., Hawkes, A. G., Bennett, E., Gravenor, M. B., & Fry, R. (2022). Intensity of COVID-19 in care homes following hospital discharge in the early stages of the UK epidemic. *Age and Ageing*, 51(5). <https://doi.org/10.1093/ageing/afac072>
  16. Ohaeri, C., Thomas, D. R., Salmon, J., Cottrell, S., Lyons, J., Akbari, A., Lyons, R. A., Torabi, F., Davies, G. G. I., & Williams, C. (2022). Comparative risk of cerebral venous sinus thrombosis (CVST) following COVID-19 vaccination or infection: A national cohort study using linked electronic health records. *Human Vaccines and Immunotherapeutics*. <https://doi.org/10.1080/21645515.2022.2127572>
  17. Perry, M., Gravenor, M. B., Cottrell, S., Bedston, S., Roberts, R., Williams, C., Salmon, J., Lyons, J., Akbari, A., Lyons, R. A., Torabi, F., & Griffiths, L. J. (2022). COVID-19 vaccine uptake and effectiveness in adults aged 50 years and older in Wales UK: a 1.2m population data-linkage cohort approach. *Human Vaccines and Immunotherapeutics*, 18(1). <https://doi.org/10.1080/21645515.2022.2031774>
  18. Thomas, D. R., Fina, L. H., Adamson, J. P., Sawyer, C., Jones, A., Nnoaham, K., Barrasa, A., Shankar, A. G., & Williams, C. J. (2022). Social, demographic and behavioural determinants of SARS-CoV-2 infection: A case-control study carried out during mass community testing of asymptomatic individuals in South Wales, December 2020. *Epidemiology and Infection*, 150. <https://doi.org/10.1017/S0950268822000620>
  19. Vidal, A. R., Vaughan, A., Innocenti, F., Colombe, S., Nerlander, L., Rachwal, N., Ciancio, B. C., Mougkou, A., Carvalho, C., Delgado, E., Mook, P., de Muylder, G., Peeters, M., Tenev, T., Golkocheva-Markova, E., Jensen, V. V. S., Koch, A., Figoni, J., Brouard, C., ... Pebody, R. (2022). Hepatitis of unknown aetiology in children - epidemiological overview of cases reported in Europe, 1 January to 16 June 2022. *Eurosurveillance*, 27(31). <https://doi.org/10.2807/1560-7917.ES.2022.27.31.2200483>
  20. Ponsford, M. J., Jefferies, R., Davies, C., Farewell, D., Humphreys, I. R., Jolles, S., Fairbairn, S., Lewis, K., Menzies, D., Benjamin, A., Thaivalappil, F., Williams, C., & Barry, S. M. (2021). Burden of nosocomial COVID-19 in Wales: Results from a multicentre retrospective observational study of 2508 hospitalised adults. *Thorax*, 76(12), 1246–1249. <https://doi.org/10.1136/thoraxjnl-2021-216964>
  21. Pacchiarini N, Sawyer C, Williams C, Sutton D, Roberts C, Simkin F, King G, McClure V, Cottrell S, Clayton H, Beazer A, Williams C, Rey S, Connor T, Moore C. Epidemiological analysis of the first 1,000 cases of SARS-CoV-2 lineage BA.1 (B.1.1.529, Omicron) compared to co-circulating Delta, in Wales, United Kingdom <https://doi.org/10.22541/au.165158283.35240909/v1>
  22. Emary KRW et al. Efficacy of ChAdOx1 nCoV-19 (AZD1222) vaccine against SARS-CoV-2 variant of concern 202012/01 (B.1.1.7): an exploratory analysis of a randomised controlled trial. *The Lancet* April 2021; 397(10282) . [https://doi.org/10.1016/S0140-6736\(21\)00628-0](https://doi.org/10.1016/S0140-6736(21)00628-0)
  23. Williams O, Williams C, Turner D, Bull M, Watkins J, Hurt L. An epidemiological investigation of COVID-19 outbreaks in a group of care homes in Wales, UK: a retrospective cohort study. *J*

Public Health (Oxf). 2022 Aug 25;44(3):606-613. doi: 10.1093/pubmed/fdab150. PMID: 33993283; PMCID: PMC8194567.

24. Flood et al. Paediatric multisystem inflammatory syndrome temporally associated with SARS-CoV-2 (PIMS-TS): Prospective, national surveillance, United Kingdom and Ireland, 2020. *Lancet regional health* 2021;3(100075). DOI:<https://doi.org/10.1016/j.lanepe.2021.100075>
25. Voysey et al, on behalf of the Oxford COVID Vaccine Trial Group. Safety and efficacy of the ChAdOx1 nCoV-19 vaccine (AZD1222) against SARS-CoV-2: an interim analysis of four randomised controlled trials in Brazil, South Africa, and the UK. *Lancet* 2020 Dec; 397(10269). [https://doi.org/10.1016/S0140-6736\(20\)32661-1](https://doi.org/10.1016/S0140-6736(20)32661-1)
26. Thomas DR; Orife O; Plimmer A; Williams C; Karani G; Evans ME; Longley PA; Jjaniec J; Saltus R; Shankar AG. Ethnic variation in outcome of people hospitalised with Covid-19 in Wales (UK): A rapid analysis of surveillance data using Onomap, a name-based ethnicity classification tool. *BMJ Open* 2021;11:e048335. doi: 10.1136/bmjopen-2020-048335
27. Emmerson C, Adamson J, Turner D, Gravenor B, Salmon J, Cottrell S, Middleton V, Thomas B, Mason B, Williams CJ. Risk factors for outbreaks of COVID-19 in care homes following hospital discharge: a national cohort analysis. Preprint from medRxiv Aug 2020. <https://doi.org/10.1101/2020.08.24.20168955>
28. Morgan M, Watts V, Allen D, Curtis D, Kirolos A, Macdonald N, Maslen E, Morgan D, Saei A, Sedgwick J, Stevenson J, Turbitt D, Vivancos R, Waugh C, Williams C, Decraene V. Challenges of investigating a large food-borne norovirus outbreak across all branches of a restaurant group in the United Kingdom, October 2016. *Euro Surveill.* 2019 May;24(18). doi: 10.2807/1560-7917.ES.2019.24.18.1800511.
29. Cottrell S, Moore C, Perry M, Hilvers E, Williams C, Shankar AG. Prospective enterovirus D68 (EV-D68) surveillance from September 2015 to November 2018 indicates a current wave of activity in Wales. *Euro Surveill.* 2018 Nov;23(46). doi: 10.2807/1560-7917.ES.2018.23.46.1800578.
30. Ndumbi P, Freidl GS, Williams CJ and Members Of The European Hepatitis A Outbreak Investigation Team. Hepatitis A outbreak disproportionately affecting men who have sex with men (MSM) in the European Union and European Economic Area, June 2016 to May 2017. *Euro Surveill.* 2018 Aug;23(33). doi: 10.2807/1560-7917.ES.2018.23.33.1700641.
31. Inns T, Cleary P, Bundle N, Foulkes S, Sharp A, Utsi L, McBrien C, Teagle R, Waldram A, Williams C, McCann C, Smith R, Saleh S, McCarthy N, Vivancos R, Hawker J, Decraene V. Novel application of the matched case-control design to compare food supply chains during an *Escherichia coli* O157 outbreak, United Kingdom, 2016. *Euro Surveill.* 2018 May;23(18). doi: 10.2807/1560-7917.ES.2018.23.18.17-00195.



32. Duarte G, Williams CJ, Vasconcelos P, Nogueira P. Capacity to report on mortality attributable to chronic Hepatitis B and C infections by Member States: an exercise to monitor progress toward viral hepatitis elimination. *J Viral Hepat.* 2018 Feb 25. doi: 10.1111/jvh.12882. [Epub ahead of print] PubMed PMID: 29479771.
33. Currie J, Davies L, McCarthy J, Perry M, Moore C, Cottrell S, Bowley M, Williams C, Shankar AG, Stiff R. Measles outbreak linked to European B3 outbreaks, Wales, United Kingdom, 2017. *Euro Surveill.* 2017 Oct;22(42). doi: 10.2807/1560-7917.ES.2017.22.42.17-00673.
34. Moore C, Cottrell S, Watkins J, Mason B, Williams C, Jones R. Increased detection of enterovirus type D68 associated with acute flaccid paralysis and severe respiratory illness in Wales, January-February 2016. *Journal of Clinical Virology* 2016, Sep (82) pS4. Available from: [http://www.journalofclinicalvirology.com/article/S1386-6532\(16\)30200-1/abstract](http://www.journalofclinicalvirology.com/article/S1386-6532(16)30200-1/abstract)
35. Wendland A, Ehmsen BK, Lenskjold V, Astrup BS, Mohr M, Williams CJ, Cowan SA. Undocumented migrant women in Denmark have inadequate access to pregnancy screening and have a higher prevalence Hepatitis B virus infection compared to documented migrants in Denmark: a prevalence study. *BMC Public Health* May 2016, available from <http://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-016-3096-8>
36. Williams CJ, Thomas RH, Pickersgill TP, Lyons M, Lowe G, Stiff RE, Moore C, Jones R, Howe R, Brunt H, Ashman A, Mason BW. Cluster of atypical adult Guillain-Barré syndrome temporally associated with neurological illness due to EV-D68 in children, South Wales, United Kingdom, October 2015 to January 2016. *Euro Surveill.* 2016;21(4). doi: 10.2807/1560-7917.ES.2016.21.4.30119. PubMed PMID: 26848143.
37. Quick J et al. Real-time, portable genome sequencing for Ebola surveillance. *Nature.* 2016 Feb 11;530(7589):228-32. doi: 10.1038/nature16996. Epub 2016 Feb 3. PubMed PMID: 26840485; PubMed Central PMCID: PMC4817224.
38. Nichols GL, Freedman J, Pollock KG, Rumble C, Chalmers RM, Chiodini P, Hawkins G, Alexander CL, Godbole G, Williams C, Kirkbride HA, Hamel M, Hawker JI. Cyclospora infection linked to travel to Mexico, June to September 2015. *Euro Surveill.* 2015;20(43):pii=30048. DOI: <http://dx.doi.org/10.2807/1560-7917.ES.2015.20.43.30048>
39. Thomas DR, Williams CJ, Andradu U, Anderson V, Humphreys S, Midgley CM, Fina L, Craine N, Porter-Jones G, Wilde A, Whiteside C. Outbreak of syphilis in men who have sex with men living in rural North Wales (UK) associated with the use of social media. *Sex Transm Infect.* 2016 Aug;92(5):359-64. doi: 10.1136/sextrans-2015-052323. Epub 2016 May 4. PubMed PMID: 27147613.
40. Pezzoli L, Keramarou M, Ladbury G, Jamarillo Gutierrez G, Williams CJ, Menach A. Time, place, and people: composition of the EPIET Alumni Network and its contribution to the European public health resource in 2013. *Epidemiology and Infection*, in press. doi:10.1017/S0950268814003392.

41. Aasheim ET, Seymour M, Balogun K, Ngui SL, Williams CJ, Shankar AG. Acute Hepatitis A in an elderly patient after care worker travel to high endemicity country. *Hum Vaccin Immunother*. 2013 Nov;9(11):2480-2. Epub 2013 Jul 23. Available from <http://www.ncbi.nlm.nih.gov/pubmed/23880980>
42. Guy R, Williams C, Irvine N, Reynolds A, Coelho J, Saliba V, Thomas D, Doherty L, Chalker V, von Wissmann B, Chand M, Efstratiou A, Ramsay M, Lamagni T. Increase in scarlet fever notifications in the United Kingdom, 2013/2014. *Euro Surveill*. 2014;19(12):pii=20749. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20749>
43. Aasheim ET, Inns T, Trindall A, Emmet L, Brown KE, Williams CJ, Reacher M. Outbreak of mumps in a school setting, United Kingdom, 2013. *Hum Vaccin Immunother*. 2014 Aug; 10(8): 2446–2449. doi: <http://dx.doi.org/10.4161/hv.29484>
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## Conference presentations

1. Rowley F, Harris C, Jones G, Hogg C, McDermott C, Polani Chandrasekar R, Sawyer C, Eveleigh M, Jones E, Gifford L, Froude S, Moore C, Williams C, Gjini A. Association between Paediatric Hepatitis Cases of Unknown Aetiology and Adenovirus in Wales, July 2022. ESCAIDE 2022 (oral)
2. Ohaeri C, Thomas DRh, Salmon J, Cottrell S, Lyons J, Akbari A, Lyons R, Torabi F, Davies G, . Williams C. Comparative risk of cerebral venous sinus thrombosis (CVST) following SARS-CoV-2 vaccination or infection: A national cohort study using linked electronic health records. ESCAIDE 2022 (oral)
3. Pacchiarini N, Plimmer A, McKerr C, Asad H, Morgan M, Williams C, Connor T. Rapid implementation of real-time SARS-CoV-2 sequencing supports outbreak understanding in acute tertiary hospitals, Wales, October – December 2020. ESCAIDE 2022 (poster)
4. Hogg C, Boots S, Salmon J, Williams C. Enhanced process error detection using dataset linkage through retrospective analysis of COVID-19 testing data. ESCAIDE 2022 (poster)
5. Merrick R, McClure V, Cottrell S, Perry M, Williams C, Morgan M. Evaluating the validity of a national surveillance system for COVID-19 hospital admissions, Wales, July to December 2021. ESCAIDE 2022 (poster)
6. Merrick R, Pacchiarini N, Sawyer C, Tonnor T, Williams C. Coverage of a national sequence-based SARS-CoV-2 surveillance system, Wales, April 2020 to January 2022. ESCAIDE 2022 (poster)
7. Vaz J, Cottrell S, Williams C (presenter), Evans M. Impact of rotavirus vaccine introduction on gastrointestinal rates in children under 5 in Wales, a time series analysis. ESCAIDE 2017 (oral)
8. Mikhail A, Williams CJ, Slaoui N, , Garcia A, Ghosn N, Saidouni A, Decool E, Hutin Y, Formenty P, Diallo B, Jansa J. Determinants of delayed isolation for Ebola Virus Disease, Guinea 2014-2015. 5 Nations Health Protection Conference, Cardiff 2016 (accepted as poster)
9. Fina Homar L, Thomas D, Craine N, Smith J, Lingard S, Perry M, Malone A, Midgley C, Williams C. Evidence for an increase in recent transmission of hepatitis C amongst people who inject drugs in Wales. ESCAIDE 2015 (poster)
10. Thomas D, Jones S, Elliott C, Holley L, Austin J, Pinch M, Thomas D, Carrington M, Evans H, Cottrell S, Williams CJ. Event-based surveillance in hotels in South East Wales (UK) during the 2014 NATO Summit. ESCAIDE 2015 (poster)
11. Cottrell S, Evans H, Moore C, Hoffman J, Hayes S, Elliott C, Midgley C, Thomas D, Jones R, Lyons M, Roberts R, Williams C. A large and foreseeable outbreak of measles in Wales. ESCAIDE 2015 (oral)
12. Williams C, Mason BW, Evans M, Cottrell S, Smith R, Simmons M, Lane C, Gregory B, Beynon D, Hoffman J. Outbreak of Salmonella infantis associated with laver bread. ESCAIDE 2014 (poster)
13. Swift A, Williams CJ, Gent N, Reacher M, Rolfe K, Ellis J, Hoschler K, Brown I, Phin N, Nair P, Kearney J. Outbreak of Avian Influenza H9N1 in a poultry farm, East of England, 2010. Health Protection 2011, Warwick, UK (oral); ESCAIDE 2011, Stockholm, Sweden (poster)
14. Williams CJ, Mahgoub H, Double G, Hawtin L, Swift A, Waters E, Reacher M, Verlander NQ, Efstratiou A, Nair P. Outbreak of group A streptococcal infection linked to an orthopaedic department. ESCAIDE 2011, Stockholm, Sweden (poster)
15. Williams CJ, Woodburn P, Hughes G, Karas A, Efstratiou A, Emery M, Nazareth B, , Eagle H, Reacher M. Epidemiological and microbiological investigation of an outbreak of invasive group A streptococcal infection in a maternity unit. Health Protection 2010, Warwick, UK (oral)
16. Rechel B, Pritchard G, Williams CJ, Nair P. Verocytotoxin-producing Escherichia coli O157 gastroenteritis associated with an open farm in Eastern England: investigations, collaborations and actions. Health Protection 2010, Warwick, UK (oral)
17. Williams CJ, Rechel B; Nair P; Smith P; Mahgoub H, Barker D. Barker Deborah Semi-liquid food items as a vehicle for norovirus transmission in outbreaks related to food-handlers. Health Protection 2010, Warwick, UK (poster)
18. Williams CJ, Sillis M, Nair P. Psittacosis outbreak in poultry processing workers in the East of England, 2008. IMED 2009, Vienna (poster)