Witness Name:
Professor Catherine Noakes
Dated: 10 October 2022
Ref: M2/SAGE/01/CK

COVID-19 INQUIRY – MODULE 2

Questionnaire Response – Professor Catherine Noakes

1: Overview of qualifications, career history, professional expertise and major publications:

Qualifications

1.1. The following table outlines my qualifications:

Table 1 – Qualification

1993-1996	BEng (Hons) Class 1 Mathematical Engineering, University of Leeds
1996-2000	PhD, Computational Fluid Dynamics, University of Leeds
2009	Certificate in Management, Open University

1.2. The following table outlines my professional recognitions and awards:

Table 2 – Professional recognition and awards

2009	Chartered Engineer
2009	Fellow of the Higher Education Academy
2013	Fellow of Institute of Healthcare Engineering and Estates Management (FIHEEM)
2014	Fellow of Institution of Mechanical Engineers (FIMechE)

2018	Academy of Fellows International Society for Indoor Air Quality (FISIAQ)
2021	Fellow of Royal Academy of Engineering (FREng)
2021	OBE for services to the pandemic
2022	Honorary Fellowship, Chartered Institution of Building Services Engineers (HonFCIBSE)

Employment History

1.3. I have been employed at the University of Leeds since 2000. The following table outlines my key appointments within the University:

Table 3 – Key Appointments

2000 – 2002	KTP associate, University of Leeds
2002 – 2007	Post-doctoral researcher, University of Leeds
2007 – 2010	Lecturer, University of Leeds
2010 – 2014	Reader, University of Leeds
2010 – 2014	Director of PACE Institute, School of Civil Engineering, University of Leeds
2014 – 2020	Director of Research and Innovation, School of Civil Engineering, University of Leeds
2014 – Present	Professor, University of Leeds
2018 – Present	Deputy Director of Leeds Institute for Fluid Dynamics, University of Leeds

Professional Expertise:

1.4. I am a Professor of Environmental Engineering for Buildings in the School of Civil Engineering at the University of Leeds. I am also a chartered mechanical engineer, with a background in fluid dynamics. I am also the Deputy Director for Leeds Institute for Fluid Dynamics since 2018.

1.5. I lead research into ventilation, indoor air quality and infection control in the built environment. My research group carry out experimental and modelling based studies, to explore the transport of airborne pathogens, the influence of indoor

airflows and effectiveness of engineering approaches to controlling airborne disease transmission. I have worked in this area since 2002.

1.6. I teach undergraduate and MSc modules on building physics, sustainability and indoor and urban air quality. I am co-director of the EPSRC Centre for Doctoral Training in Fluid Dynamics and support the training of PhD students through this funding and other research funding.

1.7. I have a undertaken a number of external roles in addition to my advisory roles during Covid-19. Of potential relevance are: Member of UKRI SPF Clean Air Steering Group (2020-), Member UK Fluids Network steering board (2020-), Member editorial boards for three journals: Indoor Air, Building and Environment, Indoor and Built Environment

Research Funding

1.8. I have led and taken part in a large number of research projects, some of which related directly to the Covid-19 pandemic. Details of these and other relevant research projects are summarised below:

Covid-19 Research

1.9. *Class-ACT*, 2021-22, Department of Health & Social Care (DHSC) funded project (£1.85M) on air cleaning interventions in schools to mitigate infection transmission. Project led by Professor Mon-Williams, University of Leeds with Leeds Beckett University, Bradford Teaching Hospitals, Queen Mary University London. I am Co investigator on this project and provide expert input on ventilation and transmission. Funding was via Covid-19 test and trace innovation team in DHSC and is now managed by UK Health Security Agency (UKHSA) with input from Department for Education (DfE).

1.10. *Far UV projects*, 2021 DHSC funding, 2022 NHS Scotland Assure funding (£122K) collaboration led by St Andrews with Leeds, Dundee, Ninewells hospital, Colombia University, USA to evaluate far UV devices for mitigating airborne infection transmission at room scale. I am a co-investigator and provide expert input on designing and interpreting experimental results which are carried out at Leeds. Funding was via Covid-19 test and trace innovation team in DHSC and is now managed by UKHSA with input from DfE.

1.11. *PROTECT National Core Study on Transmission*, 2020-2023, £21M programme led by Professor A Curran at HSE involving 37 projects and over 200 researchers. I am a member of the delivery management board and responsible for overall leadership of theme 2 which focuses on transmission modelling and involves around 20 projects across 12 partner organisations. I am also involved in technical aspects of several projects including risk modelling, ventilation studies, Computational Fluid Dynamics (CFD) modelling. Funding as part of one of six national core studies supported directly by HM government.

1.12. *CONTACT*, 2020-2023, NIHR, £1.6M. Large scale collaborative programme on digital contact tracing in care homes for COVID-19 transmission risk. Project led by Professor C Thompson, University of Leeds. I am a co-investigator and co-supervise a postdoctoral researcher who is focusing on the sensor technology and deployment.

1.13. *TRACK: Transport Risk Assessment for COVID Knowledge*, 2020-2023, EPSRC, £3.4. Multi-partner project with Universities of Manchester, Cambridge, Newcastle, Imperial, UKHSA, Dstl, Department for Transport and multiple transport stakeholders. I am the overall lead for this project providing coordination across workstreams as well as technical input to risk modelling. Project was funded through the UKRI Covid-19 rapid funding with support from Department for Transport (DfT).

Other Current Research

1.14. Breathing City: Future Urban Ventilation Network, 2020-2023, UKRI SPF Clean Air Programme network, £500K. Multi-institution programme to build collaborations on indoor-outdoor air exchange. I am the overall lead for this network.

1.15. Centre for Doctoral Training in Fluid Dynamics, 2019-2027, Engineering and Physical Sciences Research Council (EPSRC), £4.2M. Cross faculty programme at Leeds to train 50 PhD students over 8 years, renewal funding. Led by Prof P Jimack, I am one of three co-directors

1.16. CECAM: Chamber for Environmental Control of Airborne Microorganisms, 2022-2026, EPSRC, £1M. Leeds only, I am the lead for this equipment funding to build a new research facility for airborne infection studies.

Previous Relevant Research

1.17. *HECOIRA: Healthcare Environment Control, Optimisation and Infection Risk Assessment*, 2017-2021, EPSRC Healthcare Impact Partnership between Leeds and NHS trusts, £1M. I was the overall lead for this project.

1.18. *Excising Infection in the Surgical Environment [ExISE]* (CoI, Leeds lead) 2017-2019, AHRC, £200K total. Led by University of Cambridge (Prof Alan Short)

1.19. *Influence of ventilation design on the prevalence of anti-microbial bacteria in homes* (CoI, Leeds lead) 2017-2019, AHRC, £200K total. Led by MEARU Glasgow School of Art (Prof Tim Sharpe), in collaboration with clinical microbiology at Hairmyres Hospital.

1.20. *Targeting airborne bacterial infection: Studies on patient- and laboratory-generated mycobacterium tuberculosis aerosols* (CoI, Leeds lead), 2017-2019, MRC, £455K total. Led by Leicester University (Prof Mike Barer), in collaboration with Porton Down, Pretoria.

1.21. *Centre for Doctoral Training in Fluid Dynamics* (Management team member/Co-I, PI Prof P Jimack), 2014-2022, Engineering and Physical Sciences Research Council (EPSRC), £3.9M.

1.22. *Refresh: Remodelling Building Design Sustainability from a Human Centred Approach*, (Co-PI) 2013-2018, Engineering and Physical Sciences Research Council (EPSRC) £1.7M (£510K To Leeds).

1.23. *Hospital Bioaerosols and Infection Control Workshop* (Co-I) 2014, British Council, £40K. Collaboration with UANL, Mexico (Dr J Morales, Prof C Medinas).

1.24. *EMIT: Evaluating Modes of Influenza Transmission using a Human Challenge Model* (Co-I) 2011-2013, CDC $10.8M (£20K to Leeds). International collaborative programme lead by Prof J Van Tam, Nottingham University

1.25. Integrated hospital ward design for a safe and sustainable patient environment (PI) 2009-2014), £1M, EPSRC Challenging Engineering award.

1.26. *Design and Delivery of Robust Hospitals Environments in a Changing Climate* (Co-I) 2009-2013, EPSRC, £1M. Multi-partner project led by Cambridge University involving four academic partners (Cambridge, Leeds, Loughborough, Open University) and four NHS hospital trusts.

1.27. *Development of UV Air Disinfection Devices (Co-I),* KTP (2007-2010, £120K). Project with Mansfield Pollard Ltd to design and develop a range of air disinfection units.

1.28. Development of Computational Models to Design Upper Room Ultraviolet Germicidal Irradiation Air Disinfection Systems in Hospital Environments (PI) 2009-2012, EPSRC, £256K.

1.29. *Design and Performance of Isolation rooms* (Leeds PI) 2008-2011, Department of Health, £65K.

Publications and Guidance

1.30. I have over 75 publications in peer reviewed journals and over 80 conference papers. The majority of my publications focus on work relating to ventilation, indoor air quality or transmission of infection in the built environment. The accompanying list of publications in Annex A summarises my key peer reviewed journal papers that are relevant to Covid-19 transmission and provides list of my other peer reviewed papers that are relevant to infection transmission and ventilation of the built environment.

1.31. I have contributed to the authorship or provided review of several guidance documents during and prior to the pandemic including for the Chartered Institution of Building Services Engineers (CIBSE), DHSC and NHS. The following table details key documents that may be relevant.

Table 4 – Authorship of guidance documents

2015	ESDU TM 180 Modelling of ventilation for thermal comfort and indoor air quality	Co-author
2015	CIBSE AM11 Building performance modelling	Co-author

2015	CIBSE Guide A Environmental Design.	Author of section in chapter 8 on UV air disinfection
2013	Health Building Note 04-01 Supplement 1 Isolation facilities for infectious patients in acute settings.	Co-author
2021 and 2007	HTM03-01 Specialised ventilation for healthcare buildings.	Co-author. I also reviewed the 2021 update with respect to Covid-19
2021	IMechE Covid-19 Manual for Engineers.	Co-author
2020-2021	CIBSE "Emerging from Lockdown" guidance on ventilation and air cleaning devices	Steering and review

2: List of groups I participated in and the relevant time period:

SAGE and sub-groups that met regularly over a sustained period

2.1. SAGE:14 April 2020 – February 2022

2.2. Environmental and Modelling Group (EMG): 14 April 2020 – May 2022

2.3. EMG Transmission sub-group (TSG): 3 Nov 2020 – May 2022 (Initially Public Health England (PHE) transmission in settings working group (from 3 Nov 2020), then brought under EMG around 1 December 2020)

2.4. Hospital Onset Covid-19 Working Group (HOCWG): 16 April 2020 – 30 June 2020. I was no longer on the circulation list after 30 June 2020 as this group as restructured to HOCI to focus more on operational aspects.

2.5. Social Care Working Group (SCWG): 8 May 2020 – 21 January 2022. This was initially Care Home working group and was restructured to SCWG from 11 September 2020.

Task and Finish groups that were convened on a number of occasions to focus on a particular aspect

2.6. EMG Transmission in the Wider Environment (TWEG): 12 May 2020 – 3 December 2020.

2.7. Children, Schools and Education Task and Finish Working Group (CTF): 23 April 2020 – February 2022.

2.8. Enduring transmission T&F group: 30 March 2021 – April 2022.

Other advice to government departments

2.9. I have interacted directly with a number of government departments relating directly to transmission and mitigation both derived from my research studies (particularly TRACK, NCS PROTECT and air cleaning (Class-ACT & Far-UV) projects) and wider knowledge. This includes by email, through direct one-to-one or small group discussions and through presentations in meetings to explain science. Departments include Department of Education (DfE), DfT, Cabinet Office, No 10, Health Safety Executive (HSE), NHS England, Ministry of Justice (MOJ), UKHealth Security Agency (UKHSA), Department for Culture Media and Sports (DCMS) as well as those set up specially for the pandemic such as Test and Trace Innovation. Interaction has been throughout the whole period of my participation on SAGE (from 14 April 2020) and in some cases I am still responding to queries. In some of these cases there are a small number of ad-hoc interactions, in other cases I have had a sustained interaction over a longer period of time. The later includes some Departments where interactions are also related to research projects (DfE, DfT, HSE, DHSC/UKHSA), and some where I have been involved in providing advice through groups (see paragraph 5.10 and 5.11).

Other advisory groups outside SAGE

2.10. Alongside SAGE and its sub-groups, I have participated in a number of other groups focusing on scientific advice around research evidence and practical implementation led by government agencies and external bodies. Most of these met as task and finish groups focusing on a particular issue over a period of a few weeks or months. I have listed these here (with links where possible to the group or its primary outputs) but I have not commented on detail of their activities in the rest of this statement, except where papers were shared with SAGE. In the timescale for preparing this statement I have not been able to put together dates of attendance at these meetings.

Government or NHS led

2.11. Respiratory evidence / Singing and Wind Instruments – UKHSA (PHE) led task and finish groups convened at several points to focus on key questions. Some of these papers were reported to SAGE via EMG and are included in Annex B.

2.12. NHS Scotland – Short Life Working Group on Healthcare Ventilation

2.13. Scottish government – Short Life Working Group on Ventilation for Covid-19

2.14. Cabinet office, ventilation advisory group

2.15. NHS Scotland, Short life working group on dentistry leading to an SBAR in July 2020.

2.16. DCMS Venues Steering Group

2.17. NHS England/IMechE – working group developing guidance on air cleaning for healthcare

External organisation led

2.18. Royal Academy of Engineering Infection Resilient Environment Expert Group. The phase 1 report (June 2021) for this work was shared with SAGE and is listed in Annex B.

2.19. Academy of Medical Sciences, preparing for a challenging winter expert group 2020-21 and 2021-22. Both reports were shared with SAGE and are listed in Annex B.

2.20. WHO Environment and Engineering Control Expert Advisory Panel (ECAP) leading to a roadmap for ventilation in March 2021

2.21. WHO High level European Expert Group on Covid-19

2.22. IMechE Pandemic Infection Control Solutions Taskforce

2.23. Scottish Dental Clinical Effectiveness Programme (SDCEP) Aerosol Generating Procedures Working Group

2.24. NIHR CRN Aerosol Generating Procedures Research Group

2.25. Royal Society RAMP steering group

3: Overview of involvement in groups between January 2020 and February 2022:

When and how I became a participant

3.1. I received an initial request from the SAGE secretariat on 2 April 2020 to prepare a paper on the scientific evidence for the role of the environment on SARS-CoV-2 transmission for presentation at the SAGE meeting on 14 April 2020. At this meeting I was asked by the Government Chief Scientific Adviser (GCSA) Sir Patrick Vallance to work with Professor Andrew Curran (HSE Chief Scientific Advisor) to set up a new SAGE sub-group on transmission; this became the Environment and Modelling Group which was quickly abbreviated to EMG. EMG was rapidly convened by bringing together an interdisciplinary range of scientists across several disciplines (independent academics plus UKHSA, DSTL, HSE, NHS); this included scientists who were also on NERVTAG, SPI-M, SPI-B and Healthcare to provide connections between EMG and other work. EMG first met on 21 April 2020.

3.2. I joined HOCWG, CTF and SCWG early on to provide connection to EMG. I was involved in establishing TWEG and TSG when it was recognised there were needs relating to transmission that required particular attention and were not directly covered within EMG.

3.3. All other groups were through a direct invitation to participate based on my expertise

The number of meetings I attended and my contributions to those meetings:

SAGE

3.4. I attended 71 meetings from 14 April 2020 onwards. I was present as EMG co-chair to provide expertise on transmission and mitigations and on several occasions to lead the presentation of a paper. I also attended related Science Coordination group meetings and other ad-hoc meetings that were arranged by GCSA/CMO with SAGE participants.

EMG

3.5. I was co-chair and attended 38 of 39 meetings from the initial meeting on 21 April 2020 onwards. I chaired most of these meetings, led or coordinated many of the papers and as one of three co-chairs (Andrew Curran and I from 21 April 2020, Harry Rutter became 3rd co-chair from 9 Nov 2020) provided connection to other sub-groups, strategic direction, and sign off of EMG led papers. I also attended a large number of working group/task and finish group meetings relating to development of papers.

HOCWG

3.6. I attended 3 meetings on 16 April 2020, 23 April 2020 and 7 May 2020. I may also have attended a meeting on 18 June 2020, however I do not recall and do not have a copy of the minutes. I provided an update from EMG in meetings, input discussion relevant to transmission and mitigation, contributed to two joint papers (12 May and 31 May) on measures in healthcare (co-led by EMG).

SCWG

3.7. I don't have good records of my meeting attendance, but I believe that I attended around 15 meetings. Initially I provided a connection to EMG, but I found attendance at meetings difficult due to multiple other commitments, so a second EMG colleague (Dr Gormley) attended some meetings. I provided input on environmental transmission and mitigation, contributed to discussion and to the content of some papers.

TWEG

3.8. I attended 8 out of 9 meetings, providing input on environmental transmission and mitigation, contributed to discussion and to the content of both papers, provided strategic connection to SAGE-EMG and support to sign off of papers. TWEG operated as a sub-group of EMG with papers reviewed by EMG before going to SAGE.

TSG

3.9. I attended 14 out of 16 meetings, provided input on environmental transmission and mitigation, contributed to discussion and to the content of majority of papers, provided strategic connection to SAGE-EMG and support to sign off of

papers. TSG operated as a sub-group of EMG from around 1 Dec 2020 with papers reviewed by EMG before going to SAGE.

CTF

3.10. I do not have a record of the meetings that I attended. I provided input on environmental transmission and mitigation, contributed to discussion, to the content of some papers and led two papers focused on transmission risks and mitigations in Higher Education and Further education.

Enduring Prevalence

3.11. I attended the majority of meetings, but I do not have a record of the meetings that I attended. I provided input on environmental transmission and mitigation, contributed to wider discussion, and contributed to the content of a paper in April 2021.

SPI-B

3.12. I attended a small number of SPI-B meetings during the preparation of some joint papers, however I do not recall the dates of these meetings.

My role in providing research, information and advice

3.13. Across all groups I provided expertise relating to evidence on transmission of the virus and mitigation strategies, predominantly on non-pharmaceutical interventions focusing on the environment and behaviour such as ventilation, distancing, hygiene, masks etc. This involved drawing from my own research experience, published literature worldwide (pre and during pandemic), knowledge from other groups in the UK and ongoing studies worldwide.

3.14. I provided technical expertise on the emission of virus from respiratory sources, the dispersion of virus in different environments, and the factors that influenced exposure to the virus through inhalation, direct exposure to droplets and indirect exposure through contaminated surfaces (fomites). I provided knowledge of the built environment and factors relating to building design and operation, as well as the interface with human behaviour.

3.15. I also provided connecting expertise between a range of expertise to work with others across SAGE sub-groups to consider the complexities, uncertainties and trade-offs associated with different strategies. Much of the information and

advice I and others in EMG provided supported the practical guidance that was issued by government departments to enable both the public and those who led organisations to understand how the virus is transmitted, carry out risk assessments and implement measures in different settings.

3.16. All my involvement with SAGE, sub-groups and other activities with government departments were carried out remotely. All meetings were via online platforms (teams, zoom, google meet), and other interactions via email or phone/messaging. EMG held an in-person meeting in May 2022 as a final review of our activity.

SAGE

3.17. I provided representation of EMG papers and consensus from EMG meetings; input to discussion around all papers and agenda items at meetings; ensuring SAGE was aware of new evidence relating to transmission and mitigations (this was through both EMG papers and highlighting new studies that were important but did not merit a paper); working with other participants to identify evidence gaps to inform sub-group activities and UKRI and NIHR funding priorities.

EMG

3.18. I provided leadership to the group including coordination with EMG secretariat/co-chairs and interaction with Go-Science; leadership and/or contribution to papers including carrying out simple modelling and analysis, review of research literature, drafting and finalising papers; chairing of meetings and coordination of discussion; liaison with other sub-groups including either attending other group meetings to provide environmental input to papers where needed, or arranging for colleagues from EMG to attend; review of membership, EMG strategy and EMG governance.

Other sub-group/task and finish group roles

3.19. I provided representation of EMG and gave specific advice relating to transmission and mitigation as appropriate to the specific questions being considered by that sub-group. In TWEG, TSG and HOCWG meetings I normally gave an update on EMG activities as part of the meeting agenda.

Advice to government Departments

3.20. I provided technical advice on transmission and mitigation that stemmed from SAGE papers, usually providing information to support wider understanding and practical implementation of mitigations highlighted in papers. This was carried out in a number of ways including through online meetings, a small number of written documents (e.g. ventilation advice), email and "teach-in" presentations. I have also provided further support to government committees as detailed in paragraph 5.1

4: Summary of documents to which I contributed for the purposes of advising the groups above:

4.1. Please see Annex B which provides a list of all the SAGE papers which I was directly involved in writing and/or reviewing and sign off. In each case I provide a summary of the paper and information on my level of contribution.

4.2. Annex C provides a summary of "teach-in" and other notable presentations to policy makers. These were presentations and Q&A sessions that typically followed a specific SAGE paper and allowed a more informal overview of the content of the paper and thinking behind it.

4.3. I and others in EMG contributed to documents on research priorities which were shared with UKRI and other research funders. These highlighted key research gaps where there would be benefit in funding studies, and particularly picked out gaps relating to transmission and the environment, and mitigation measures that focused on the environment and behaviour rather than pharmaceutical interventions.

4.4. I also authored, co-authored or commented on a small number of other documents that were shared with policy makers but not published. To my knowledge the documents listed below that I contributed to in writing, however it is possible that there were others that I have not yet identified. In addition I commented verbally or by email on documents that were shared in meetings; I do not have a list of these.

(1) Practical ventilation advice, 4th May 2020. Action from 28th April 2020 EMG paper providing more detailed practical information on ventilation

to mitigate transmission as well as an explanation of the difference between ventilation and air conditioning.

(2) Summary from previous EMG papers on distancing outdoors, 11th May 2021. Provided relating to a question from test and trace. As this was not new evidence it was not a SAGE paper.

(3) Ventilation in Buildings: Health & Net Zero Interactions, 6th July 2021. Contribution to a document from CMO to No. 10 focus is wider than Covid-19 and considers importance of good indoor air quality and ventilation, challenges of net-zero and potential solutions that align to both goals.

(4) Cabinet Office Ventilation Proposals for No 10. This was shared with me on 25th Aug 2021 and I commented on the document (official sensitive).

(5) Omicron NHS Contingency and Air Cleaners, 14th Dec 2021. Summary document prepared by NHS England following a meeting with NHS England/NHS Scotland colleagues regarding the potential for additional airborne control measures.

5: Summary of articles, interviews and/or evidence:

Evidence to government committees

5.1. I have given evidence to three government committees during the pandemic:

(1) Oral evidence to the Science and Technology Committee, 22 May 2020 focused on our understanding of transmission from the evidence to date with quite a significant focus in the questions from the chair around 2m distancing. I gave evidence in the same session as Prof Andrew Curran, EMG co-chair

(2) Oral evidence to the APPG on Coronavirus, 13th July 2021. This focused on measures within schools

(3) Oral evidence on baseline health protection measures to the Scottish Government Covid-19 Recovery Committee, 4th Nov 2021. This focused predominantly on ventilation measures in buildings.

Media engagement in a personal capacity

5.2. I have had significant media engagement in a personal capacity where I have been asked to comment in multiple articles in print, broadcast and online media. A summary of these articles and links to the majority of coverage are provided in Annex D and E. I have also been involved in more significant broadcast media pieces including:

(1) Royal Institution Christmas Lecture, Dec 2021 – overview of the science of transmission and why mitigations measures such as hand hygiene, masks and ventilation are important, aimed at children

(2) BBC Life Scientific, 19th Jan 2021 – in depth interview on my career, plus discussion on the science of transmission and mitigation

(3) BBC Inside Science, 11th June 2020 – interview around the mechanisms of transmission and the mitigation measures that we can apply

(4) BBC Start the Week, 27th Dec 2021 – Discussion on ventilation of buildings

5.3. The vast majority of interviews and comments that I have given focus on explaining the science behind transmission and mitigation and highlight practical steps and the reasons why people can apply measures such as ventilation, air cleaning, masks, distancing etc. Throughout this media activity I have generally avoided commenting on either the work of SAGE or given a view on the UK response to the pandemic.

5.4. I am active on Twitter **Irrelevant &** and have tweeted about the virus transmission and strategies to mitigate since Feb 2020. I have also posted on a small number of occasions on Linked In. As with print and broadcast media the majority of comments focus on explaining the science behind transmission and evidence rather than providing commentary on SAGE or a view on the UK response.

5.5. In a small number of cases I have expressed some frustration on Twitter with government (e.g. when SAGE participants names were announced, following Partygate), provided some high-level explanation about how SAGE works/set right misunderstandings, or commented on the benefits of working

collaboratively with SAGE colleagues. However, I have not commented on the discussions that happen in SAGE or its sub-groups, or given a strong view on how well government has followed advice.

Publications relating to modes of transmission

5.6. A number of my published academic papers and media articles are particularly relevant to the understanding and acceptance of knowledge around modes of transmission and have had global influence. I was one of a group of 36 international scientists who co-authored a number of papers emphasising the importance of recognising airborne transmission. These include the following (some are also in Annex A):

(1) Morawaska L, Tang JW, Bahnfleth W, Bluyssen PM, Boerstra A, Buonanno G, Cao J, Dancer S, Floto A, Franchimon F et al (2020) How can airborne transmission of COVID-19 indoors be minimised? Environment International 142: 105832 https://doi.org/10.1016/j.envint.2020.105832

Opinion piece setting out practical measures for reducing airborne transmission of virus.

(2) Lidia Morawska, Donald K Milton, It Is Time to Address Airborne Transmission of Coronavirus Disease 2019 (COVID-19), Clinical Infectious Diseases, Volume 71, Issue 9, 1 November 2020, Pages 2311–2313, https://doi.org/10.1093/cid/ciaa939

Letter calling for airborne transmission to be recognised which was signed by 239 scientists and created worldwide media and scientific interest. I was one of the group who drafted the letter

(3) Miller SL, Nazaroff WW, Jimenez JL, Boerstra A, Buonanno G, Dancer SJ, Kurnitski J, Marr LC, Morawska L, Noakes C (2021) Transmission of SARS-CoV-2 by inhalation of respiratory aerosol in the Skagit Valley Chorale superspreading event, Indoor Air, 31(2): 314-323 https://doi.org/10.1111/ina.12751

Paper that combines data from a significant superspreading event with an airborne risk modelling approach to quantify emission rate of virus needed to lead to the event and analysis of the effect of ventilation

(4) Morawska L, Allen J, Bahnfleth W, Bluyssen PM, Boerstra A, Buonanno G, Cao J, Dancer SJ, Floto A, Franchimon F, Greenhalgh T, Haworth C, Hogeling J, Isaxon C, Jimenez JL, Kurnitski J, Li Y, Loomans M, Marks G, Marr LC, Mazzarella L, Melikov AK, Miller S, Milton DK, Nazaroff W, Nielsen PV, Noakes C, Peccia J, Prather K, Querol X, Sekhar C, Seppänen O, Tanabe S-I, Tang JW, Tellier R, Tham KW, Wargocki P, Wierzbicka A, Yao M (2021) A paradigm shift to combat indoor respiratory infection, Science 372(6543):689-691 https://doi.org/10.1126/science.abg2025

Opinion piece highlighting the importance of ventilation and air cleaning for combatting respiratory disease transmission and the need for this to be taken far more seriously in building design and operation.

5.7. A number of follow up news articles, including a piece in Al Jeezera which I contributed too, comment on the time it has taken to acknowledge airborne transmission and the apparent global reluctance to do so. These papers and media articles comment on the worldwide response and concerns with the lack of acceptance of airborne transmission for Covid-19, rather than specifically on the UK response.

Presentations at conferences and events

5.8. I have given a very large number of talks relating to transmission and mitigation of Covid-19 and wider views on ventilation and indoor air quality at UK and international meetings. These range from very large international webinar presentations convened by organisations such as the National Academy of Sciences in the USA, multiple scientific conferences, through to talks for schools and literary and philosophical societies. These talks focus on the science of transmission and mitigation and highlight the evidence and approaches that can be taken.

5.9. In some talks I have given some high-level personal reflection on being involved in SAGE, how SAGE works and being in the public eye, but I have not

commented on discussion which happened at SAGE meetings or focused particularly on how well the government has responded to advice. The timescale for this request is such that I have not complied a list of events, however this could be done if it is needed.

Support to government communications

5.10. Alongside media comments in a personal capacity, I was involved in supporting communications from government on some aspects from August 2020. I provided technical support to DHSC/Cabinet Office commissioned teams creating TV, print and online media communications campaigns (e.g. Hands, Face, Space, Fresh Air) to ensure that understanding of transmission and mitigations was correctly represented. This included supporting initial idea development, reviewing story boards and animations as well as scripts and written documents relating to comms, providing advice during filming, reviewing final material. I was also involved in press-releases though written quotes, science media centre, video interviews, and TV/radio/press coverage relating to the communications campaigns.

5.11. I provided advice to several government departments including HSE, Department for Business, Energy and Industrial Strategy (BEIS), DCMS and DfE to ensure that their communications appropriately reflected understanding of transmission and mitigation. This included review of written documents provided by these departments, and recording online videos (for HSE and DFE) to support understanding of ventilation and how to use CO2 monitoring.

6: Views as to whether the work of the above groups in responding to the Covid-19 pandemic succeeded in its aims.

Composition and diversity

6.1. Papers/evidence that were presented at SAGE were developed by several sub-groups as well as organisations such as UKHSA (PHE) and NHS and the devolved nations. At the time I joined SAGE the main sub-groups were SPI-M, SPI-B, Nervtag plus the HOCWG and CTF group.

6.2. EMG became a new group in April 2020 and rapidly became one of the key groups, being sustained throughout the rest of the SAGE COVID activity. Other groups were established over time in response to particular needs. Groups directly established from EMG activity were the TWEG task and finish group (May-Dec 2020), TSG (January 2021 – end), while other groups (SCWG, Vaccines, Ethnicity) were not directly related to EMG.

6.3. The structure of SAGE sub-groups, connectivity of their secretariats, regular SAGE science coordination groups and willingness (and indeed enthusiasm) of participants to collaborate with other sub-groups generally meant that there were very good communications between them.

6.4. When establishing EMG, we recognised that transmission and mitigation is of importance across all of the SAGE activities and therefore deliberately co-opted participants from SPI-M, Nervtag, SPI-B and HOCWG to ensure connectivity. Where it was recognised there were gaps in knowledge we brought in other people, either from SAGE sub-groups or external to the SAGE for a particular paper.

6.5. Diversity of participants was good overall, but it was likely imperfect – the nature of initiating a group with such a rapid timescale (less than one week) means that it was not possible to go through the open recruitment process that would normally happen with a scientific advisory committee. Participants were initially selected based on their knowledge, research area, experience of working in committee environments and to ensure a spread of people across academia, PSREs, NHS and Royal Academy of Engineering. There was a need to balance numbers of people and expertise, as a very large group would have been more challenging to manage. On a number of occasions, we reflected on participants and where it was appropriate, we identified new people to join EMG.

6.6. In the early stages of EMG, we recognised that there were a large number of requests in a very short time period. As a result, we structured EMG into four working groups: Risk assessment and transmission; Design and Behaviour; Engineered systems; Hospital Environments. Between 28 April and 9 June, the main EMG meeting was a subset of the whole group, with the leads of the four working groups, chairs and a small number of other participants. EMG met

weekly and working groups at least once per week, with higher frequency when preparing papers.

6.7. In June 2020, the immediate urgency of EMG requests became slightly lower and we moved to fortnightly meetings with the formal working group structure disbanded and all participants invited to EMG meetings. Following this change, task and finish groups were convened on an ad-hoc basis to work on particular commissions from SAGE secretariat. A group focusing on risk assessment and visualisation met over a more sustained period of time to lead a more in-depth body of work around understanding risk.

6.8. For a small number of EMG papers (theatres, ventilation, air cleaning, CO2 monitoring) we invited a broader range of external expert participants to support the development of the paper. This group completed declarations of interest and were aware of the confidentiality of the activity but did not attend EMG meetings. A list of these participants can be provided if required.

6.9. For many papers, EMG collaborated with people in other sub-groups and on occasion either they attended part of an EMG meeting or EMG participants attended one of their meetings. Several papers were also developed through Task and Finish groups convened from across the sub-groups to deliver the paper. These T&F papers were all managed by SAGE secretariat and were often in response to larger scale questions, for example plans for opening up, which required a more cross-discipline input. As well as delivering the commission, these groups provided a valuable route for SAGE and sub-group participants to get to know each other and share expertise.

6.10. The EMG group overall had a good knowledge of research expertise that related to environmental transmission and I and other participants were aware, through our research and wider activities, of ongoing research relating to Covid-19 in the UK and internationally. While we were not able to keep on top of all of the vast body of research, we were fairly confident that we were aware of the vast majority of relevant work.

6.11. Enabling greater early career participation within EMG was discussed on a few occasions as many participants in the group felt that we could provide a very important insight into responding to an emergency. However, at the same time

we were concerned around the scrutiny experienced by SAGE participants as well as the workload requirements. We never managed to make this happen and reflecting on this now I feel that it was simply that we were hugely overloaded and exhausted, and hence enabling wider opportunities beyond the core remit was beyond the capacity of the group.

Commissioning process

6.12. Requests received through SAGE secretariat were usually managed well and they together with the sub-group secretariat provided an invaluable function in ensuring that commissions were appropriate and relevant. Not all questions directed to sub-groups were appropriate, usually because the questions were too specific to one government department, the scientific evidence had already been provided in previous papers, or the ask was too large a scope for a sub-group to answer in an appropriate timescale.

6.13. Some commissions were derived through discussions within SAGE or sub-groups where participants themselves or GCSA/CMO identified that there was a knowledge gap that needed addressing. In these circumstances a process of agreeing the scope of a commission was carried out between the sub-group chairs, sub-group secretariat, SAGE secretariat and relevant departments to ensure that the paper would focus on aspects of evidence that were policy relevant. While there was rightly sometimes push back on these "self-commissions" due to their policy relevance or concerns over workload, some of the most highly cited papers that were produced by EMG, including papers on ventilation and air cleaning, came about through this process.

6.14. Some requests came directly from government departments, most notably Cabinet Office, and these were usually to comment on documents they had produced based on SAGE evidence rather than develop an evidence paper. Some of these came with almost impossible timescales, for example requests to comment on papers from Covid-O officials' meetings (eg 15/09/2020) with a four-hour turn around for comments (Covid-O was an operational committee in the Cabinet Office). While these were clearly being driven by the need for officials to have information to share with ministers/senior civil servants at Covid-O, these were incredibly hard to deliver, and at times it felt like some in

government forgot that external participants of SAGE had day jobs in a university.

Timescales and resources

6.15. Timescales and resources were a challenge throughout, but to a large extent this was inevitable given the circumstances. When I joined SAGE in mid-April 2020, there had previously been limited consideration of the role of the environment, although transmission modes had been discussed in Nervtag meetings and there were a small number of prior papers that considered the application of environmental and behavioural NPIs.

6.16. On forming EMG we received a large number of commissions, both to address gaps in knowledge and to provide information quickly to support emergence from the first lockdown in spring/summer 2020. EMG contributed to 18 separate commissions (13 as lead) in the first 3 months of its existence, as well as contributing to a huge number of wider discussions with multiple government departments and others around the practicality of real-world mitigation. All papers I was involved with were bespoke (i.e. we were not reporting the results of similar analysis each time) and turnaround time typically varied from around 7 days to 1 month depending on the complexity of the paper and the urgency of the request.

6.17. Timescales and limited resources meant that we had limited capacity to undertake more in-depth systematic reviews of published literature and had to rely on expertise and awareness within sub-groups to be aware of the current evidence. Within EMG we drew on a number of resources. In some cases, participants could draw on some resource from people in their wider team in their organisation, with postdoctoral researchers and PhD students supporting literature review or modelling for some papers. PHE published a weekly digest of papers and pre-prints that were relevant which was a very valuable resource for keeping abreast of the most recent research. We were also able to get a small amount of resource to commission two systematic reviews via the Design and Behaviour working group. In the later stages (2021 onwards) there was also more opportunity to draw on analysis from PHE/JBC as well as research studies which could provide information from outbreak investigations, case

control and cohort studies, transmission modelling and laboratory experiments. However, particularly in the first 6-9 months of EMG the vast majority of evidence gathering and evaluation was carried out directly by the participants. At this stage we were predominantly relying on early-stage investigation reports, initial lab data and pre-pandemic understanding of respiratory transmission and mitigation (drawing on SARS, MERS, influenza, TB and other pathogens). Research was commissioned via UKRI, with EMG feeding into research priorities, but timescales were far too long for the majority of questions.

6.18. Working remotely across multiple organisations brought a number of practical challenges with working collaboratively, particularly around IT. When EMG was created, the HSE secretariat did not have the IT infrastructure within their organisation to either host meetings or provide a shared directory (Sharepoint/Onedrive) to be able to work together on documents. With the urgency of the task, meetings were organised through University of Leeds zoom, and documents shared via my University OneDrive. This enabled a sufficiently secure set up for participants to work on papers together, although some participants could not access documents and therefore for most papers versions were also shared by email. IT provision improved as all organisations adapted to online working, although even towards 2022 we were unable to provide shared documents through a coordinated government-based site.

Managing evidence vs policy interface

6.19. Throughout all of my SAGE activity I was careful to focus on scientific evidence and uncertainty and use this to highlight options and recommendations, but to recognise that decisions are taken by policy makers who have to balance information with a raft of other factors.

6.20. This was an important principle throughout preparing all papers I was involved in. EMG engaged with a very large number of departments. Chief Scientific Advisers' from HSE, BEIS, DCMS, DfT, Department for Environment, Food and Rural Affairs (Defra), Department for Levelling Up, Housing and Communities (DLUHC) and representatives from NHS England and NHS Scotland all regularly attended meetings and actively participated in discussion, and I and

other EMG participants spoke with multiple different Departments. This meant that EMG was able to be very responsive to direct concerns that were coming to those departments and scientific advice was able to more directly support guidance that was given to the public and businesses.

6.21. However, given the close relationship with CSAs, care was taken to ensure the challenges faced by departments were not used to influence scientific advice. We would look at evidence that related to challenges and reflect these challenges in papers, but EMG would not avoid saying something because it could lead to difficult policy choices. Where discussion in meetings inevitably strayed at times into aspects that were more operational, we used this to note potential challenges, barriers and trade-offs (including aspects beyond transmission of covid). This was very beneficial for EMG participants as it provided an insight into the real-world complexity beyond some of the more theoretical or control scientific studies, but we were careful to reflect on these aspects appropriately in papers and to always identify the level of evidence to support statements in papers.

6.22. In some cases we would make direct recommendations, for example that specific guidance should be produced to support understanding. However in many other cases it was recognised that any actions would be part of wider and more complex decision making and hence recommendations would be that the factors outlined in the paper should be used to inform strategy.

Governance of papers:

6.23. As a co-chair of EMG I recognised that it was important that we had an appropriate level of governance with all papers. I worked with the secretariat and my co-chairs to ensure that, as far as timescales allowed, there was opportunity for input from all EMG participants. This was usually through the opportunity for open discussion and feedback from participants in a meeting and/or feedback from participants by email. The final paper was reviewed and signed off by chairs before submission for presentation at SAGE. We paid particular attention to papers which potentially had a greater impact on policy changes, or where there was likely to be greater public and media scrutiny. Following discussion of a paper at a SAGE meeting, there were often small

amendments requested before finalisation. In the majority of cases these were small points of clarification that didn't require additional EMG input and could be signed off by chairs. However if there were more involved questions an updated version would be circulated to EMG participants. On one occasion, after a paper had been released publicly, an NHS Scotland led review group raised some concern about an inaccuracy in the paper. In this case I worked with co-chairs and the secretariat to clarify the text of the paper and release an updated version on the web.

6.24. Being a participant in SAGE was a learning curve, and this included learning how to produce papers that gave clear and concise summaries with an appropriate level of supporting evidence, including confidence in that evidence. I recognised that papers could be used inappropriately if there was any ambiguity in the wording and took as much care as possible to limit this happening. For example, in a letter from Greg Clark MP (chair of the Science and Technology Committee) to Boris Johnson on 29 May 2020 following my oral evidence at his committee on 22 May 2020, a sentence was "cherry picked" out of context from one of the EMG papers to support a call for the reduction of the 2m distancing. At the time of this oral hearing and the EMG paper from 28 April there was very little evidence for aerosol transmission (beyond 2m) although it was starting to emerge, with a stronger focus on transmission beyond 2m in the next EMG paper on transmission (4 June) that followed this committee and the correspondence as a result of it. Following this experience, in subsequent papers we took as much care as we could to limit that someone could easily take a single sentence from the executive summary out of context.

Interactions in groups

6.25. Sub-groups and task and finish groups provided the working space for collating, reviewing and agreeing a consensus around the scientific evidence prior to presentation and discussion at full SAGE meetings. This included whole sub-group meetings which were typically used to discuss the early stages of a commission, to review draft papers and to identify any key evidence or challenges on the horizon. When papers were developed, typically a small working group met to draft papers based on the initial thoughts from the wider group. These would be brought to whole sub-group meetings for discussion

and agreement before final sign off by chairs. Input was also received by email, and where possible documents were shared on a drive accessible by all those involved so that comments could be added to a single document.

6.26. In all the sub-groups and task & finish groups I have participated in, people interacted with respect, courtesy and genuine commitment. There was always very clear respect and open discussion across different disciplines, and there was an atmosphere of "there are no stupid questions" across all groups that I interacted with. This approach made for very easy and open discussion and I think helped people who had particular expertise develop their thinking by understanding better how something could be misinterpreted. While there were a range of views within all the groups that I interacted with, particularly around the strength of evidence, there was rarely significant disagreement between participants and we were always able to reach a consensus that was agreed by the group. Despite the seriousness and urgency of the situation it was a privilege and a pleasure to have been part of SAGE and its sub-groups; I have never before worked in an environment that was so collaborative, so cross-discipline and so welcoming. I feel that the experience of being on SAGE has made me a better scientist with a much better understanding of how multiple different disciplines to work together. As co-chair of EMG I am tremendously proud of the activities and commitment from EMG and wider SAGE participants, and feel privileged to have worked with such a collegiate group of people. I would also like to acknowledge the incredible support from the HSE and Go-Science secretariat teams who supported us throughout everything, often with limited capacity or resources.

6.27. SAGE meetings were well chaired and in every meeting I attended I felt that participants were treated with respect, there was opportunity for people to express their views and that all discussion was allowed. I never felt that my opinion was dismissed or not valued and I never felt that I was not allowed to speak up. While there were a range of views expressed and sometimes differences of opinion, I never felt that we were pressured into adopting a particular viewpoint or that there was any significant conflict or mistrust among SAGE participants. I also felt that the group on several occasions took time to step back, reflect and ask ourselves whether we were experiencing "group

think", especially during times when opinion of other scientists in the UK or worldwide, or public opinion appeared to be different to the views within SAGE.

Release of SAGE papers and minutes

6.28. I was very pleased when the decision was taken to release SAGE papers, and like many other SAGE participants I was very supportive and wished they could have been released earlier. Papers are usually released without author names included and minutes are relatively brief. However, I feel that this was appropriate as highlighting authors or including expansive comments on discussion in minutes would have raised the level of public and media scrutiny looking for divisions and conspiracy, which would have very likely significantly hampered the work of the group.

Media, Safety and Security

6.29. From the time our names were made public in May 2020, SAGE participants regularly received emails and comments from the public and the media, some of which were abusive and in a small number of cases dangerous. I was less targeted than some colleagues, however I had a number of abusive emails and tweets as well as uncomfortable stories in the press. We were supported to manage security and potential threats with regular briefings and responsive contacts in Go-Science where we could raise anything more worrying. Being in the public eye was a new experience and at times was difficult from a wellbeing perspective. Over the course of the pandemic, I have become used to the press attention, and I have also had a lot of positive engagement with the press with many science journalists wanting to understand the science behind transmission and mitigations. However, at the point when SAGE participants names were made public I was particularly concerned about what the media reaction may be. As well as tightening up my own security, this also extended to my family, for example informing my son's school that there could be unwanted press attention. This is a concern for me during the inquiry, and although it is very important that what happened during the pandemic is reviewed in an open and objective manner, I hope that the inquiry team will be sensitive to the fact that as evidence is discussed in the public domain there

will be responses from the media and the public that could be challenging for SAGE participants.

6.30. As an independent academic participant in SAGE I was not bound by any specific rules around talking to the media beyond my commitment to the Nolan principles. However, I always respected the confidentiality and sensitivity of SAGE activities and how this changed at different periods of the pandemic. When talking to the media I never commented on SAGE meetings or details of discussions, and as far as possible stated that I was talking in a personal capacity. At times Patrick Vallance and Chris Whitty asked SAGE participants to be particularly cautious about media engagement or to refrain for short periods when there was something particularly sensitive, and I always respected this. I also made sure that SAGE secretariat and the Go Science press team was aware when I would be giving a media interview or written piece that was more substantial.

Response to advice

6.31. The government response to scientific advice that I was involved in giving was generally good, and a significant proportion of the evidence and recommendations for supporting the public and businesses in understanding and mitigating transmission was reflected in the guidance and "rules" that were set out by government. This included advice that supported recommendations on social distancing, cleaning and hygiene, risk assessments, face coverings, ventilation and interactions in public, domestic and workplace settings. Scientific evidence from EMG and associated papers informed guidance provided by a wide number of departments including HSE, UKHSA, DfE, DfT, DCMS, BEIS and others. Evidence was also acted upon by engineering professional bodies with Chartered Institution of Building Services Engineers (CIBSE), Institution of Mechanical Engineers (IMechE) and Royal Academy of Engineering all using evidence from EMG to underpin their advice and guidance. The transfer of scientific advice into guidance and particularly the accuracy of this was facilitated by close relationships between EMG and government departments and professional bodies.

6.32. There were a number of challenges and exceptions to the evidence supporting guidance which are worth noting:

(1) *Effective dissemination of updated guidance*.

While government departments were generally good at updating guidance as new evidence emerged, the dissemination of this guidance was not always effective. In many cases legacy versions of guidance, particularly relating to risk assessments remained available online alongside new versions which created confusion for businesses. These were eventually replaced in June/July 2021 when there was a significant "tidy up" of the government websites.

However, even following this, large numbers of businesses continued to display out of date risk assessments, suggesting that they were either not aware that guidance had been updated or they had disengaged and were not interested in updating their approach. As a result, by late 2021, large numbers of businesses were not following approaches that were supported by evidence. Many were still implementing significant surface hygiene measures and utilising screens and barriers (both of which the evidence base now suggested to have very minimal benefit), but were not implementing ventilation measures which were likely to be more important.

There is clearly a challenge with ensuring that updated evidence is effectively disseminated to those who need to act on it, and explaining why the guidance has changed.

(2) *Action on inequalities and incentives*.

Non-pharmaceutical interventions for mitigating transmission of Covid-19 include a wide range of measures such as testing, tracing, isolation, work from home, social distancing, hand and surface hygiene, face coverings, ventilation. Some of these rely on individuals taking personal responsibility (distancing, hygiene, face coverings) supported mainly by advice and reminders, while others need structural intervention either through provision of a service (test and trace) or an organisational action

(changes to ventilation, workplaces enabling work from home or self-isolation).

In multiple SAGE papers we highlighted that there were complex trade-offs around implementing and complying with guidance and recommended that incentives (including financial) were considered to support these structural and organisational actions. Although substantial support was put into test and trace, and some limited support was provided to enable people to isolate effectively, there was almost nothing implemented to enable organisations carry out significant mitigation actions around improving building ventilation to reduce exposure to the virus. This very likely had a negative effect on reducing inequalities, with those individuals and businesses with more resources more likely to have the means to take more effective actions to reduce exposure.

(3) *Public information on transmission mechanisms for Covid-19.*

The mechanism for transmission of the virus, and particularly the importance of airborne transmission compared to surfaces/fomites has been an issue of debate worldwide throughout the pandemic. In the early days messaging focused very significantly on washing hands with little acknowledgement that the air could be important. At the time I joined SAGE in April 2020, concern was growing in the scientific community around the role of airborne transmission (I was part of the international group raising concerns) and scientific evidence was emerging that suggested that airborne transmission and hence mitigations relating to ventilation and masks may be important.

Within EMG and other SAGE papers I feel that we remained aware of this emerging evidence and reflected the potential importance of airborne transmission in all of the EMG papers from the very first pre-EMG paper on 14th April. The evidence at this early stage was very uncertain and many of the papers from April-June 2020 placed more emphasis on close range exposure and surfaces over longer-range airborne transmission which can be influenced by building ventilation. In hindsight, I believe that too much emphasis was placed on the role of

surfaces, however the scientific advice given was based on the evidence at the time. As the evidence base grew it became more and more clear that transmission seemed to be dominated by inhalation, with close range exposure and exposure at a distance in a poorly ventilated room being far more significant than transmission through touching contaminated surfaces. This changing evidence is reflected in all EMG papers.

The policy response to this emerging evidence was not uniform and was a source of frustration and concern for me. In some areas of policy, the role of airborne transmission was recognised very quickly and this was reflected in the public guidance. However, initially within UKHSA and even more so in the NHS, there appeared to be a reluctance to acknowledge the importance of airborne transmission beyond activities known as "aerosol generating procedures (AGPs)". On a number of occasions, I raised concerns to senior advisors that the SAGE advice around transmission was not being reflected in the public guidance given by UKHSA and the NHS on their websites. Given that these were likely to be the main place people would visit for advice (particularly NHS when looking for symptoms/testing), it was frustrating that these public information sources were not updated quickly to reflect the changing understanding around transmission.

(4) Infection Prevention and Control in healthcare.

In a similar vein to the above comment, I have raised concerns on a number of occasions that actions within hospital settings to mitigate transmission to protect both patients and staff have been insufficient. During the first wave, evidence was uncertain, however, as the pandemic has progressed, the evidence for airborne transmission has grown stronger and stronger. It would be hard to argue now that there is not a need to take precautions against asymptomatic transmission through aerosols, yet even now there are very high rates of nosocomial transmission with little action take to combat it. Throughout the pandemic, the NHS/IPC cell have maintained their own rapid review service to provide an evidence base, and require a much higher burden

of proof to accept airborne transmission or evidence for use of respirator masks than other settings across the UK. On several occasions I have shared evidence from new studies and received push back that highlights all the limitations of the study. This seems to fail to recognise that every study has limitations, and it is not possible to get rapid randomised control trial evidence for every measure during a pandemic. At times the response appears to default to "do nothing" rather than to put in precautionary measures, although this may reflect the substantial resource challenges involved in applying further mitigations in healthcare settings.

7: Lessons that can be learned

Induction and the role of SAGE

7.1. Joining SAGE and starting a new sub-group was a very rapid and significant learning curve, especially at the outside. This was both learning the role of SAGE, how SAGE interacted with policy makers and the roles of the different subgroups, as well as learning how different government departments function and interact together. Prior to the pandemic I had not had much experience of working with government and had not previously been a member of a scientific advisory committee, and therefore navigating the complexities and nuances of different ways of working in government was a challenge.

7.2. Although the SAGE secretariat, Professor Andrew Curran, the HSE secretariat and many others within SAGE sub-groups and government were hugely helpful and took time to explain things to me, it would have been helpful to have some form of more formal induction with information on structures, who's who, do's and don'ts etc.

7.3. The public, and at times PMs, have also misunderstood the role of SAGE with various commentators suggesting that "scientists had too much power", not recognising the difference between scientific advice and policy making, or not knowing the terms by which SAGE participants were engaged. It would be very helpful to have processes/documents that make this process clearer for the public so that these misunderstandings could be more readily rebutted.

7.4. SAGE participants were not paid for the very substantial time that they dedicated to the response. After the first few months, for independent participants a scheme was set up whereby Universities were provided with some funding to "buy out" time. While this provided a recognition of SAGE participants time, it was nowhere close to the financial value of the time that experts put in; I and I suspect many others worked very long hours at times approaching double out contracted working week. I firmly believe that this was the right approach and that SAGE participants should not be either seconded as government employees or be paid experts; both approaches would limit the ability for academic participants in SAGE to be independent. However, there is a lack of public understanding of that SAGE participants were not paid (in comparison to many other organisations who received very large contracts from government), and that the time and financial value of their input has not been properly acknowledged; even though this will not be paid, I would like to see it valued.

Capacity and capability relating to environmental transmission

7.5. EMG was a new sub-group which had not been considered necessary at the outset of the pandemic or beforehand, yet became one of the most significant groups of SAGE with regard to guidance given to the public and businesses. The group brought together engineering/physics/design knowledge with the more established areas of mathematical modelling of disease, behavioural science, microbiology and health sciences.

7.6. The group had a very small pool of expertise to draw on; pre-pandemic there were a very small number of people in the UK (and indeed worldwide) who specialise in the relationship between the built environment and transmission of infection. Unlike some of the more established sub-groups, EMG had no past history of working together as a group and very limited capability in terms of labs, models and people to draw upon.

7.7. The pandemic sparked a huge interest in research in the area of environmental transmission from people across the world working across a range of engineering, aerosol science, fluid dynamics and related disciplines - these

people have done some tremendous work but were starting from a very low baseline without established collaborations or expertise.

7.8. Over the course of the pandemic EMG proved to be invaluable as the scientific advice it delivered had the closest match to the practical guidance (distancing, masks, ventilation, hygiene etc) that government departments needed to provide to businesses and the public. The limited research capacity in this area was recognised by UKRI and Royal Society both of which provided funding for projects driven by academia and industry in the area of environmental transmission and mitigations. This was also recognised during the formation of the national core studies, where NCS PROTECT was funded to bring together a large group of researchers to address key questions relating to transmission and the practical experience in the real world.

7.9. Despite the importance of EMG during the pandemic, there are currently no confirmed plans for sustaining this expertise under normal times or embedding environmental and engineering considerations into future pandemic risk planning. Funding to support the area was discussed by UKRI and other UK research funders, but with government interest waning in the pandemic this has not been sustained and researchers are now largely back to relying on the same generic funding streams that were available pre-pandemic.

7.10. As a result, many researchers who developed capacity in this area will return back to their pre-pandemic interests. This feels like a risk and a missed opportunity to build capacity in what is an obvious gap. I have a concern that if there is another pandemic in 10, 20, 50 years' time, this area will be back close to square one rather than having developed in a coordinated way with a connection into policy makers.

Engineering expertise in health driven problems

7.11. Similar to the above comment on capacity and capability, the response to a crisis such as an infectious disease is dominated by biomedical, clinical, health and mathematical/data sciences (who clearly play a crucial role). However, many of the responses to deal with understanding and mitigating transmission require significant engineering input. We enabled this within SAGE through EMG and via connections to engineering professional bodies particularly

CIBSE and Royal Academy of Engineering, but this expertise is not normally present in DHSC/UKHSA led responses to infection outbreaks.

7.12. The limitations from the lack of engineering expertise at a sufficiently strategic level were evident a number of times through the response to the pandemic. As an example, Infection prevention and control (IPC) guidance for healthcare is dominated by behaviour driven actions such as hand hygiene, use of PPE, surface cleaning and cohorting of patients with considerable detail in guidance documents on these elements. But aspects around ventilation (or other building systems such as water/wastewater) receive scant attention in IPC documents and are "assumed" to be delivered by estates professionals. Yet the reality in huge numbers of buildings is that measures such as enabling good ventilation have to be delivered directly by healthcare professionals by actions such as opening windows.

7.13. On several occasions I have supported UKHSA and others to draft guidance on ventilation, ranging from the simple guidance document prepared by EMG that informed a UKHSA guidance document through to more specific input to guidance documents for care homes and other healthcare settings. The small number of "in-house" engineering professionals with UKHSA and NHS England and Improvement means that development of guidance is often delayed and relies on outside help (such as me) to get it right. This may also mean that engineering aspects are missed when considering outbreak investigations or where there may be a need for policy responses to support the use of technology. A better consideration of where engineering and design expertise has played an important role during the pandemic, and how to sustain that going forward, would likely be very beneficial for responding more effectively to future infectious diseases.

IT infrastructure and data sharing

7.14. This was a frustration throughout the pandemic, with many participants struggling to access and work on shared documents across different organisations or even within different government departments. Despite this, the use of online meetings transformed the ability for SAGE to bring together

expertise from across the UK and even worldwide, as well as for scientists to collaborate effectively on critical studies.

7.15. Creating simple, secure and cost effective common systems to enable rapid sharing and collaborative working on documents would be really beneficial. This is both something for government to consider with regard to alignment of systems across different departments, but also more widely for providers of systems to consider accessibility of these systems across different organisations with different IT infrastructure. The most accessible shared services (google docs) are rarely considered secure enough for cross organisational working.

Learning and adapting from evidence

7.16. As highlighted above, the message that airborne transmission was important was slow to be heard worldwide and not acted on well in many settings, particularly in healthcare.

7.17. Early days lack of evidence means this is to some extent understandable, although precautionary principle, particularly given other similar diseases such as SARS, could have been applied more readily. Those from a medical/health background often regard evidence-based medicine approaches such as randomised controlled trials or meta-analysis of multiple studies as the gold standard for evidence – this stems from drug trials and similar where these approaches are the most recognised methodologies.

7.18. However, for behavioural environmental interventions this type of evidence is very challenging to collect and there is a large absence of data. Notably this was the case for face coverings and face masks, where there is good mechanistic evidence that they work, but very limited epidemiological evidence that they bring a population scale benefit when applied in practice. Similarly for ventilation interventions, there is substantial evidence from engineering and physics that dilution or cleaning of air reduces exposure to any viral particles within the air, yet there are only a tiny number of studies that even attempt to measure a real-world impact on exposure to a pathogen. This means that there is a real reluctance to apply some measures as there is no evidence that meets the high bar that has been set in other clinical fields. I have a significant concern

that this means we overlook important measures even when there is strong evidence from other sources.

7.19. I would recommend that to overcome this challenge there is both further investments to carry out environmental intervention trials to secure more real-world evidence, and at the same time a recognition of the need to enable a change in mind-set and understanding to enable evidence from other sources (which may be outside the methodological knowledge of those who take decisions) to be more effectively assessed and used when it is robust. This does not mean that weak or anecdotal evidence should be used, however there is a need to recognise that measuring the effect of an environmental or behavioural intervention is challenging and that it yields uncertain data that is harder to interpret than perhaps some more controlled clinical trials.

8: Documents that I hold

8.1. Links to all SAGE papers that I was involved in are provided in Annex B. I also have draft versions and other working documents, spreadsheets and model outputs that relate to some papers but were not shared with policy makers.

8.2. I have minutes, agendas and terms of reference for all EMG meetings, and copies of minutes for the TWEG, TSG and HOCWG meetings that I attended. I also have my declaration of interest forms for SAGE and some other working groups. I do not have copies of minutes and agendas for SCWG or CTF meetings.

8.3. I have presentation slides for most "teach in" sessions listed in Annex C.

8.4. I have documents (some are draft versions) listed in paragraph 4.4

8.5. I have very substantial email correspondence relating to SAGE, sub-groups, interactions with government and interactions with the external groups listed in 2.10 to 2.25. In the timescale for preparing this response I have not had the opportunity to review most of my emails and given the number it is a mammoth task to do so. The vast majority of emails relate to day-to-day working within sub-groups, focusing on discussing and sharing evidence for papers. There are a number of emails that detail correspondence that raises some of the concerns

highlighted above over particular issues between myself, other EMG participants and senior advisors including but not limited to Patrick Vallance, Chris Whitty, Susan Hopkins and Mark Wilcox. I also have email correspondence with multiple civil servants where they have asked for clarifications or additional advice relating to transmission or mitigation measures.

Annex A: Academic Publication Record

The following lists my publications in peer reviewed academic journals that are relevant to my expertise in ventilation and transmission of infection. I also have over 75 conference papers and extended abstracts; this list can be provided if required. I have included a brief description for papers with particular relevance to Covid-19 transmission.

Journal papers published during the pandemic with specific relevance to COVID-19 transmission

A1. Walker MD, Vincent JC, Benson L, Stone CA, Harris G, Ambler RE, Watts P, Slatter T, Lopez-Garcia M, King M-F, Noakes CJ, Thomas RJ (2022) Effect of Relative Humidity on Transfer of Aerosol-Deposited Artificial and Human Saliva from Surfaces to Artificial Finger-Pads, Viruses, 14(5), 104 https://www.mdpi.com/1999-4915/14/5/1048

Technical paper from PROTECT National Core study which measures the influence of environmental conditions on how easy it is to transfer contamination from surfaces to hands. This is relevant for understanding the risk of infection through touching surfaces.

A2. Eadie E, Hiwar W, Fletcher L, Tidswell E, O'Mahoney P, Buonanno M, Welch D, Adamson CS, Brenner DJ, Noakes C, Wood K. (2022) Far-UVC (222 nm) efficiently inactivates an airborne pathogen in a room-sized chamber, Scientific Reports, 12 (1). https://www.nature.com/articles/s41598-022-08462-z

Technical paper from DHSC funded study measuring bioaerosol inactivation in a control chamber demonstrating for the first time that Far UVC could be effective at room scale. The study uses a bacteria rather than the SARS-CoV-2 virus for safety reasons.

A3. Miller D, King M, Nally J, Drodge JR, Reeves GI, Bate AM, Cooper H, Dalrymple U, Hall I, Lopez-Garcia M, Parker ST, Noakes CJ (2022) Modeling the factors that influence exposure to SARS-CoV-2 on a subway train carriage, Indoor Air 32(2) e12976 https://onlinelibrary.wiley.com/doi/full/10.1111/ina.12976

Technical paper from EPSRC funded TRACK study that models the risk of exposure to virus on an underground train. This paper was shared with SAGE and informed DfT in considering mitigation strategies for transport.

A4. Coldrick S, Kelsey A, Ivings MJ, Foat TG, Parker ST, Noakes CJ, Bennett A, Rickard H, Moore G (2022) Modeling and experimental study of dispersion and deposition of respiratory emissions with implications for disease transmission, Indoor Air 32(2) e13000 https://onlinelibrary.wiley.com/doi/full/10.1111/ina.13000

Technical paper from PROTECT National Core Study that presents a validated computational simulation for exhaled respiratory particles. The model was used to inform an EMG paper on screens and barriers and has been used to produce visualizations that were used in “teach in” sessions with government officials.

A5. Peng Z, Rojas ALP, Kropff E, Bahnfleth W, Buonanno G, Dancer SJ, Kurnitski J, Li Y, Loomans MGLC, Marr LC, Morawska L, Nazaroff W, Noakes C, Querol X, Sekhar C, Tellier R, Greenhalgh T, Bourouiba L, Boerstra A, Tang JW, Miller SL, Jimenez JL (2022) Practical Indicators for Risk of Airborne Transmission in Shared Indoor Environments and Their Application to COVID-19 Outbreaks, Environmental Science & Technology 56(2):1125-1137 https://pubs.acs.org/doi/10.1021/acs.est.1c06531

Technical paper with international co-authorship comparing a risk modelling approach to data from large outbreaks. Paper provides some further evidence that observed outbreaks fit models for airborne transmission. My involvement in this study did not have a funding source.

A6. King M, Wilson AM, Weir MH, López-García M, Proctor J[$], Hiwar W[$], Khan A, Fletcher LA, Sleigh PA, Clifton I, Dancer SJ, Wilcox M, Reynolds KA, Noakes CJ (2022) Modeling fomite-mediated SARS-CoV-2 exposure through personal protective equipment doffing in a hospital environment, Indoor Air e12938 https://doi.org/10.1111/ina.12938.

Technical paper from EPSRC funded HECOIRA study that applies a quantitative microbial risk assessment method to modelling risk of exposure to SARS-CoV-2 virus through doffing PPE. Highlights that risks are likely to be very low and analyses several factors that influence risk.

A7. Rutter H, Parker S, Stahl-Timmins W, Noakes C, Smyth A, Macbeth R, Fitzgerald S, Freeman ALJ (2021) Visualising SARS-CoV-2 transmission routes and mitigations, BMJ 375, e065312 https://www.bmj.com/content/375/bmj-2021-065312

A8. Freeman ALJ, Parker S, Noakes C, Fitzgerald S, Smyth A, Macbeth R, Spiegelhalter D, Rutter H (2021) Expert elicitation on the relative importance of possible SARS-CoV-2 transmission routes and the effectiveness of mitigations, BMJ Open 11 (12) e050869 https://bmjopen.bmj.com/content/11/12/e050869

Papers A7 and A8 are linked papers from an expert elicitation process to understand transmission routes. The study used expert opinion based on evidence to derive quantitative estimates for the risk of transmission by different routes, and the effectiveness of mitigation strategies. Paper A8 reports the detailed elicitation process, while A7 reports a summary together with an interactive web-based visualization tool. Study was developed through a risk task and finish group in EMG, funded through the PROTECT National Core Study, and was shared with EMG and SAGE participants.

A9. Salman N, Khan MW, Lim M, Khan A, Kemp AH, Noakes CJ (2021) Use of Multiple Low Cost Carbon Dioxide Sensors to Measure Exhaled Breath

Distribution with Face Mask Type and Wearing Behaviour, Sensors 21 (8) 6204 https://www.mdpi.com/1424-8220/21/18/6204

Technical paper from EPSRC funded HECOIRA study that shows wearing face masks does not change overall CO2 concentrations in air, but can change the distribution suggesting that the mask modifies the exhalation flow pattern.

A10. Burridge HC, Fan S, Jones RL, Noakes CJ, Linden PF (2021) Predictive and retrospective modelling of airborne infection risk using monitored carbon dioxide, Indoor and Built Environment https://journals.sagepub.com/doi/10.1177/1420326X211043564

Technical paper that uses measured CO2 concentrations in a regularly attended room as a proxy for time varying ventilation rate, and uses this to model airborne transmission risk over time. Study was funded by the PROTECT National Core Study.

A11. Wilson AM, Jones RM, Lugo Lerma V, Abney SE, King M-F, Weir MH, Sexton JD, Noakes CJ, Reynolds KA (2021) Respirators, face masks, and their risk reductions via multiple transmission routes for first responders within an ambulance, Journal of Occupational and Environmental Hygiene 18(7):345-360 https://doi.org/10.1080/15459624.2021.1926468

Technical paper from EPSRC funded HECOIRA study that uses QMRA methods to estimate exposure for ambulance staff via air and surface routes. Shows the likely significant benefits from both patients and staff wearing masks, and highlights that respiratory protective masks for staff are more effective

A12. Morawska L, Allen J, Bahnfleth W, Bluyssen PM, Boerstra A, Buonanno G, Cao J, Dancer SJ, Floto A, Franchimon F, Greenhalgh T, Haworth C, Hogeling J, Isaxon C, Jimenez JL, Kurnitski J, Li Y, Loomans M, Marks G, Marr LC, Mazzarella L, Melikov AK, Miller S, Milton DK, Nazaroff W, Nielsen PV, Noakes C, Peccia J, Prather K, Querol X, Sekhar C, Seppänen O, Tanabe S-I, Tang JW,

Tellier R, Tham KW, Wargocki P, Wierzbicka A, Yao M (2021) A paradigm shift to combat indoor respiratory infection, Science 372(6543):689-691 https://doi.org/10.1126/science.abg2025

Opinion piece from the "group of 36" international scientists highlighting the importance of ventilation and air cleaning for combatting respiratory disease transmission and the need for this to be taken far more seriously in building design and operation. My involvement in this study did not have a funding source.

A13. Vouriot CVM, Burridge HC, Noakes CJ, Linden PF (2021) Seasonal variation in airborne infection risk in schools due to changes in ventilation inferred from monitored carbon dioxide, Indoor Air 31(4): 1154-1163 https://doi.org/10.1111/ina.12818

Technical paper that takes CO2 data from school classrooms and uses it with an infection risk model (paper 10) to explore the variation in infection risk with classroom and season. My involvement in this study did not have a funding source.

A14. Miller SL, Nazaroff WW, Jimenez JL, Boerstra A, Buonanno G, Dancer SJ, Kurnitski J, Marr LC, Morawska L, Noakes C (2021) Transmission of SARS-CoV-2 by inhalation of respiratory aerosol in the Skagit Valley Chorale superspreading event, Indoor Air, 31(2): 314-323 https://doi.org/10.1111/ina.12751

Technical paper that combines data from a significant superspreading event with an airborne risk modelling approach to quantify emission rate of virus needed to lead to the event and analysis of the effect of ventilation parameters. This paper has been very highly cited as part of the evidence for airborne transmission of SARS-CoV-2. My involvement in this study did not have a funding source.

A15. Jones B, Sharpe P, Iddon C, Hathway EA, Noakes CJ, Fitzgerald S (2021) Modelling uncertainty in the relative risk of exposure to the SARS-CoV-2 virus by

airborne aerosol transmission in well mixed indoor air, Building and Environment 191:Article number 107617 https://doi.org/10.1016/j.buildenv.2021.107617

Technical paper that describes a transmission risk model for examining exposure to virus in indoor environments. Model is used to evaluate the variation in risk between different settings through the concept of a Relative Exposure Index. This model was used as evidence in the SAGE EMG paper on ventilation. My involvement in this study did not have a funding source.

A16. Wilson AM, Abney SE, King M-F, Weir MH, Lopez Garcia M, Sexton JD, Dancer SJ, Proctor J[$], Noakes CJ, Reynolds KA (2020) COVID-19 and non-traditional mask use: How do various materials compare in reducing the infection risk for mask wearers? *Journal of Hospital Infection* 105:640-642 https://doi.org/10.1016%2Fj.jhin.2020.05.036

Short technical paper from EPSRC funded HECOIRA study using a QMRA modelling approach to evaluate the potential risk of exposure for different mask types, virus emission rates and exposure.

A17. Morawaska L, Tang JW, Bahnfleth W, Bluyssen PM, Boerstra A, Buonanno G, Cao J, Dancer S, Floto A, Franchimon F et al (2020) How can airborne transmission of COVID-19 indoors be minimised? *Environment International* 142: 105832 https://doi.org/10.1016/j.envint.2020.105832

Opinion piece from the group of 36 international scientists setting out practical measures for reducing airborne transmission of virus. My involvement in this study did not have a funding source.

Papers with direct relevance to transmission of pathogens in indoor environments

A18. Hiwar W, King M-F, Shuweihdi F, Fletcher LA, Dancer SJ, Noakes CJ. (2021) What is the relationship between indoor air quality parameters and airborne microorganisms in hospital environments? A systematic review and meta-analysis, Indoor Air https://doi.org/10.1111/ina.12846

A19. Wilson AM, King M, López-García M, Clifton IJ, Proctor J, Reynolds KA, Noakes CJ (2021) Effects of patient room layout on viral accruement on healthcare professionals' hands, Indoor Air in press

A20. King M-F, Wilson AM, Lopez-Garcia M, Proctor J, Peckam DG, Clifton IJ, Dancer SJ, Noakes CJ (2021) Why is mock care not a good proxy for predicting hand contamination during patient care?, Journal of Hospital Infection; 109: 44-51

A21. Mingotti N, Wood R, Noakes C, Woods AW (2020) The mixing of airborne contaminants by the repeated passage of people along a corridor, Journal of Fluid Mechanics 903: A52 25

A22. Nguyen-Van-Tam JS, Killingley B, Enstone J, Hewitt M, Pantelic J, Grantham ML, Bueno de Mesquita PJ, Lambkin-Williams R, Gilbert A, Mann A, Forni J, Noakes CJ, Levine MZ for the EMIT Consortium (2020) Minimal transmission in an influenza A (H3N2) human challenge-transmission model within a controlled exposure environment, PLOS Pathogens doi.org/10.1371/journal.ppat.1008704

A23. Sharpe T, McGill G, Dancer S, King M, Fletcher L, Noakes C (2020) Influence of ventilation use and occupant behaviour on surface microorganisms in contemporary social housing, *Nature Scientific Reports*, 10: 11841

A24. Wilson AM, King M-F, Lopez Garcia M, Weir MH, Sexton JD, Canales RA, Kostov GE, Julian TR, Noakes CJ, Reynolds KA (2020) Evaluating a transfer gradient assumption in a fomite-mediated microbial transmission model using an experimental and Bayesian approach *Journal of the Royal Society Interface* 17(167):Article number 20200121

A25. Bueno de Mesquita PJ, Noakes CJ, Milton DK (2020) Quantitative aerobiologic analysis of an influenza human challenge-transmission trial, *Indoor Air*: 30(6): 1189-1198

A26. King MF, Lopez Garcia M, Atedoghu KP, Zhang N, Wilson AM, Weterings M, Hiwar W[$], Dancer SJ, Noakes CJ, Fletcher LA (2020) Bacterial transfer to

fingertips during sequential surface contacts with and without gloves, *Indoor Air*, 30(5):993-1004

A27. Lopez Garcia M, King MF, Noakes CJ (2019) A multi-compartment SIS stochastic model with zonal ventilation for the spread of nosocomial infections: detection, outbreak management and infection control, *Risk Analysis*, 39(8): 1825-1842 https://doi.org/10.1111/risa.13300

A28. Smith J, Adams CA, King MF, Noakes CJ, Robertson C, Dancer SJ (2018) Is there a relationship between airborne and surface microbes in the critical care environment? *Journal of Hospital Infection*, 100(3):e123-e129 https://doi.org/10.1016/j.jhin.2018.04.003

A29. King M-F, Camargo-Valero MA, Matamoros-Veloza A, Sleigh PA, Noakes CJ (2017), An Effective Surrogate Tracer Technique for S. aureus Bioaerosols in a Mechanically Ventilated Hospital Room Replica Using Dilute Aqueous Lithium Chloride, *Atmosphere*, 8(12), 238; doi:10.3390/atmos8120238

A30. King MF, Noakes CJ, Sleigh PA, Bale S, Waters L (2016) Relationship between healthcare worker surface contacts, care type and hand hygiene: an observational study in a single-bed hospital ward *Journal of Hospital Infection* 94(1):48-51

A31. Tang JW, Wilson P, Shetty N, Noakes CJ (2015) Aerosol-Transmitted Infections—a New Consideration for Public Health and Infection Control Teams, *Current Treatment Options in Infectious Diseases* 7(3): 176-201

A32. King MF, Noakes CJ, Sleigh PA (2015) Modelling environmental contamination in hospital single and four-bed rooms, *Indoor Air: international journal of indoor air quality and climate* 25(6): 694-707

A33. Li Y, Tang J, Noakes C, Hodgson M (2015) Engineering control of respiratory infection and low energy design of healthcare facilities. *Science and Technology for the Built Environment* 21(1):25-34 (invited paper for special issue)

A34. Noakes CJ, Khan MAI, Gilkeson CA (2015) Modelling Infection Risk and Energy Use of Upper-Room UVGI Systems in Multi-Room Environments. *Science and Technology for the Built Environment* 21(1):99-111 (invited paper for special issue)

A35. Capetillo A, Noakes CJ, Sleigh PA (2015) CFD Analysis to Assess Performance Variability of In-Duct UV-C Systems. *Science and Technology for the Built Environment* 21(1):45-53 (invited paper for special issue)

A36. Short CA; Noakes CJ; Gilkeson CA; Fair A (2014) Functional recovery of a resilient hospital type.*Building Research & Information*, vol. 42, pp.657-684

A37. Gilkeson CA, Noakes CJ, Khan MAI (2014) CFD Modelling and Optimisation of an Upper-Room UVGI System in a Naturally Ventilated Hospital Ward. *Indoor and Built Envrionment* vol. 23, pp.449-466. 2014 (invited paper for UKIEG special issue)

A38. Gilkeson CA, Camargo-Valero MA, Pickin LE, Noakes CJ (2013) Measurement of Ventilation and Airborne Infection Risk in Large Naturally Ventilated Hospital Wards *Building and Environment,* 65:35-48

A39. Gilkeson CA, Noakes CJ (2013) Application of CFD Simulation to Predicting Upper-Room UVGI Effectiveness *Photochemistry and Photobiology,* 89(4):799-810 (invited following UVGI Fogarty conference)

A40. King M-F, Noakes CJ, Sleigh PA, Camargo-Valero MA (2013) Bioaerosol deposition in single and two-bed hospital rooms: A numerical and experimental study. *Building and Environment,* 59:436-447

A41. Hathway EA, Noakes CJ, Fletcher LA, Sleigh PA, Clifton I, Elliott MW (2013) The role of nursing activities on the bioaerosol production in hospital wards. *Indoor and Built Environment,* 22 (2): **410-421**

A42. Khan MAI, Noakes CJ, Toropov VV (2012) Development of a numerical optimization approach to ventilation system design to control airborne contaminant dispersion and occupant comfort *Building Simulation: An International Journal*, 5(1); 39-50 (invited paper for special issue)

A43. Noakes CJ, Sleigh PA, Khan A, (2012) Appraising Healthcare ventilation from combined infection control and energy perspectives. *HVAC&R Research,* 18(4); 658-670 (invited paper following ASHRAE IAQ 2010 conference)

A44. Gormley M, Swaffield JA, Sleigh PA, Noakes CJ (2012) An Assessment of and response to potential cross-contamination routes due to defective appliance water trap seals in building drainage systems. *BSERT,* 33(2);203-222

A45. Hathway EA, Noakes CJ, Sleigh PA, Fletcher LA (2011) CFD simulation of airborne pathogen transport due to human activities. *Building and Environment,* 46; 2500-2511

A46. Tang JW, Noakes CJ, Nielsen PV, Eames I, Nicolle A, Li Y, Settles GS (2010) Observing and quantifying airflows in the infection control of aerosol- and airborne-transmitted diseases: an overview of approaches. *J Hosp Infect 29 Dec 2010*

A47. Shepherd SJ, Beggs CB, Smith CF, Kerr KG, Noakes CJ, Sleigh PA (2010) Effect of negative air ions on the potential for bacterial contamination of plastic medical equipment. *BMC Infect Dis 10:92 2010*

A48. Noakes CJ, Sleigh PA (2009) Mathematical models for assessing the role of airflow on the risk of airborne infection in hospital wards. *Journal of the Royal Society Interface*. 6, S791-S800 (Invited paper for a special issue)

A49. Escombe AR, Moore DAJ, Gilman RH, Navincopa M, Ticona E, Mitchell B, Noakes CJ, Martínez C, Sheen P, Ramirez R, QuinoW, Gonzalez A, Friedland JS, Evans CA (2009) Upper-room ultraviolet light and negative air ionization to prevent tuberculosis transmission, *PLOS medicine* 6(3); e1000043

A50. Escombe AR, Moore DAJ, Gilman RH, Pan W, Navincopa M, Ticona E, Martinez C, Caviedes L, Sheen P, Gonzalez A, Noakes CJ, Friedland JS, Evans CA (2008) The Infectiousness of Tuberculosis Patients Coinfected with HIV, *PLOS Medicine* 5(9); 1387-1397

A51. Fletcher L.A., Noakes C.J., Sleigh P.A., Beggs C.B., Shepherd S.J. (2008) Air ion behaviour in ventilated rooms, *Indoor and Built Environment* 17(2), pp.173-182

A52. Beggs CB, Kerr KG, Noakes CJ, Hathway EA, Sleigh PA (2008) The ventilation of multi-bed hospital wards: review and analysis, *American Journal of Infection Control* 36(4) 250-259

A53. Fletcher, L.A.; Gaunt, L.F.; Beggs, C.B.; Shepherd, S.J.; Sleigh, P.A.; Noakes, C.J.; Kerr, K.G. (2007) Bactericidal action of positive and negative ions in air. *BMC Microbiology*, 7(1), pp.32

A54. Escombe, A.R.; Oeser, C.; Gilman, R.H.; Navincopa, M.; Ticona, E.; Martinez, C.; Caviedes, L.; Sheen, P.; Gonzalez, A.; Noakes, C.J.; Moore, D.A.J.;

Friedland, J.S.; Evans, C.A. (2007) The Detection of Airborne Transmission of Tuberculosis from HIV-Infected Patients, Using an In Vivo Air Sampling Model. *Clinical Infectious Diseases*, 44(10), pp.1349–1357.

A55. Beggs, C.B.; Noakes, C.J.; Shepherd, S.J.; Kerr, K.G.; Sleigh, P.A.; Banfield, K. (2006) The influence of nurse cohorting on hand hygiene effectiveness. *American Journal of Infection Control*, 34(10), pp.621-626.

A56. Noakes, C.J., Beggs, C.B., Sleigh, P.A., Kerr, K.G. (2006) Modelling the Transmission of Airborne Infections in Enclosed Spaces. *Epidemiology and Infection*, 134(5), 1082-1091

A57. Beggs, C.B., Noakes, C.J., Sleigh, P.A., Fletcher, L.A., Kerr, K.G. (2006) Methodology for determining the susceptibility of airborne microorganisms to irradiation by an upper-room UVGI system. *Journal of Aerosol Science*, 37(7), 885-902.

A58. Noakes, C.J., Sleigh, P.A., Fletcher, L.A., Beggs, C.B. (2006) Use of CFD modelling in optimising the design of upper-room UVGI disinfection systems for ventilated rooms. *Indoor and Built Environment*, 15(1), 347-356.

A59. Noakes, C.J., Sleigh, P.A., Escombe, A.R., Beggs, C.B. (2006) Use of CFD Analysis in Modifying a TB Ward in Lima, Peru. *Indoor and Built Environment*, 15(1), 41-47.

A60. Noakes, C.J., Beggs, C.B. and Sleigh, P.A. (2004) Modelling the Performance of Upper Room Ultraviolet Germicidal Irradiation Devices in Ventilated Rooms: Comparison of Analytical and CFD Methods, *Indoor and Built Environment,* 13(6), 477-488

A61. Noakes, C.J., Fletcher, L.A., Beggs, C.B., Sleigh, P.A. and Kerr, K.G. (2004) Development of a numerical model to simulate the biological inactivation of airborne microorganisms in the presence of UV light, *Journal of Aerosol Science,* 35(4), 489-507

A62. Noakes, C.J., Beggs, C.B. and Sleigh, P.A. (2004) Evaluating Upper Room UVGI Systems, *ASHRAE IAQ Applications,* Fall (Invited paper)

A63. Beggs, C.B., Noakes, C.J., Sleigh, P.A., Fletcher, L.A. and Siddiqi, K. (2003) The transmission of tuberculosis in confined spaces: an analytical study of

alternative epidemiological models. *International Journal of Tuberculosis and Lung Disease*, 7(11), 1015-1026

Published journal papers with relevance to understanding the built environment

A64. Salman N, Khan A, Kemp AH, Noakes CJ (2022) Indoor Temperature Forecast based on the Lattice Boltzmann method and Data Assimilation, Building and Environment 210: 108654

A65. Gough HL, King M-F, Nathan P, Grimmond CSB, Robins A, Noakes CJ, Luo Z, Barlow JF (2019) Influence of neighbouring structures on building façade pressures: comparison between full-scale, wind-tunnel, CFD and practitioner guidelines *Journal of Wind Engineering and Industrial Aerodynamics* 189:22-33

A66. Snow S, Boyson A, Paas KHW, Gough H, King M-F, Barlow J, Noakes CJ, schraefel m (2019) Exploring the physiological, neurophysiological and cognitive performance effects of elevated carbon dioxide concentrations indoors *Building and Environment* 156: 243-252

A67. Ibanga IE, Fletcher LA, Noakes CJ, King MF, Steinberg D (2018) Pilot-scale biofiltration at a materials recovery facility: The impact on bioaerosol control *Waste Management,* 80:154-167

A68. Gough HL, Luo Z, Halios CH, King MF, Noakes CJ, Grimmond CSB, Barlow JF, Hoxey R, Quinn AD (2018) Field measurement of natural ventilation rate in an idealised full-scale building located in a staggered urban array: comparison between tracer gas and pressure-based methods, *Building and Environment*, accepted

A69. Montoya-Pachongo C, Douterelo I, Noakes C, Camargo-Valero MA, Sleigh A, Escobar-Rivera J-C, Torres-Lozada P (2018) Field assessment of bacterial communities and total trihalomethanes: implications for drinking water networks, *Science of the Total Environment* 616-617: 345-354

A70. King M-F, Khan A, Delbosc N, Gough HL, Halios C, Barlow JF, Noakes CJ (2017) Modelling urban airflow and natural ventilation using a GPU-based lattice-Boltzmann method, *Building and Environment,* 125(15),273-284

A71. King M-F, Gough HL, Halios C, Barlow JF, Robertson A, Hoxey A, Noakes CJ (2017) Investigating the influence of neighbouring structures on natural ventilation potential of a full-scale cubical building using time-dependent CFD, *Journal of Wind Engineering and Industrial Aerodynamics* 169:265-279

A72. Khan MAI, Delbosc N, Noakes CJ, Summers JL (2015) Real-time flow simulation of indoor environments using lattice Boltzmann method, *Building Simulation* 8(4): 405-414, Winner of best paper award 2015

A73. Delbosc N, Khan MAI, Summers JL, Noakes CJ (2014) Real-Time Indoor Air Flow Simulation Using the Lattice Boltzmann Method on Graphics Processing Unit. *Computers and Mathematics with Applications* 67(2):462-475 (invited following conference presentation)

A74. Carslaw N, Hathway A, Fletcher L, Hamilton J, Ingham T, Noakes C (2013) Chemical versus biological contamination indoors: Trade-offs versus win-win opportunities for improving indoor air quality. *Indoor Air* 23(3):173-174 (Editorial)

Annex B: Summary of relevant SAGE papers

The following details all the papers that were presented at SAGE that I was involved with developing. In each case I have indicated my role as lead or co-lead, significant input or minor input. I have also indicated the papers which I was involved in review/sign off, usually in my capacity as EMG co-chair.

	Paper	Summary	Lead/ Co L	Sig input	Minor input	Review / sign off
	EMG, TWEG or TSG lead/co-lead papers					
1	Evidence of environmental dispersion for different mechanisms, and the risks and potential mitigations/measures of control within different environments from what we know about COVID-19, 14th April 2020	Pre-EMG paper led by University of Leeds. Paper summarises the scientific literature on transmission of SARS-CoV-2 drawing on pre-pandemic understanding of respiratory disease transmission routes and emerging evidence from early studies (many pre-print at the time) on presence of virus in the environment and mechanisms of transmission. Paper also considers modelling approaches to understand transmission.	x			x
2	Environmental Influence on Transmission, 28th April 2020	First output from EMG which considers responses to a range of questions posed around transmission of the virus. Paper includes emerging evidence and pre-pandemic understanding relating to 2m	x			x

		distancing, surfaces and ventilation. Paper concludes that short range transmission is highest risk within 2m, current evidence indicates more virus on surfaces than in air samples so this route may be important, ventilation is a recommended precautionary measure.				
3	Risk Estimation to inform risk assessment, 7th May 2020 (note paper 4 is updated version of this)	Initial framework approach for considering risk assessments for mitigating transmission of SARS-CoV-2 across all environments where people interact. This paper was not approved by SAGE and was updated revised 1 week later	x			x
4	Principles of understanding of transmission routes to inform risk assessment and mitigation strategies, 14 May 2020	Updated version of paper 3, note that there are actually two versions of this paper on the web and it is the updated version that is final. Recommends the use of a "hierarchy of control" to identify points for mitigation and that risk reduction needs to use a "mitigate, monitor, modify" approach. Paper also sets out a framework for quantitative assessments and highlights the factors that influence transmission and the data needed to support this.	x			x
5	EMG: Survival of SARS-CoV-2 in the environment, 11 May 2020	Brief note summarising data shared confidentially by researchers in the USA showing that in lab settings the virus is stable in air and on surfaces for long time periods, and that decay rates increase with temperature, humidity and exposure to high UV	x		-	x

		(outdoors). Evidence to support that outdoor environments are a low risk for transmission.				
6	Possible additional interventions to address hospital transmission risks of SARS-CoV-2, 12 May 2020	Paper jointly with HOCWG reviewing evidence for transmission in healthcare and recommendations for mitigation. This includes actions around surface cleaning, segregation of patients, managing early stage infections/asymptomatic cases, enabling good ventilation in admission/waiting areas, managing cleaning and water traps in bathrooms, aerosolization of virus during PPE doffing, masking, ventilation and testing for HCW to mitigate their spread, hand hygiene including limiting use of air driers.		x		x
7	EMG: Transmission and Control of SARS-CoV-2 on Public Transport, 18 May 2020	Summarises evidence of risk on public transport drawing on emerging research, pre-pandemic knowledge and understanding of risk factors. Highlights potential for increased risk of transmission for workers and passengers, indicates mitigation strategies including distancing, face coverings, cleaning touch sites, ventilation and hand hygiene. Indicates the possibility for UV decontamination.	x			x

8	EMG: Evidence for transmission of SARS-CoV-2 on ground public transport and potential effectiveness of mitigation measures, 18 May 2020	Evidence paper that supports paper 7.		x		x
9	EMG: Summary of disinfection technologies for microbial control, 18 May 2020	Summarises evidence for a range of disinfection technologies. UV and fumigation approaches may be viable for decontamination but not daily disinfection. Upper room UV has good evidence for occupied spaces, portable (filter/UV devices) will only benefit if the airflow is sufficient - may be useful in poorly ventilated rooms. Far UV emerging tech, others have some evidence but need more research. All approaches have technical, training considerations and we don't consider cost-effectiveness.		x		x
10	EMG: Application of UV disinfection, visible light, local air filtration and fumigation technologies to microbial control, 19 May 2020	Evidence paper that supports paper 9.		x		x
11	SARS-CoV-2 in the hospital environment and risk of COVID-19 nosocomial transmission, 31	Evidence summary from EMG and HOCWG. Highlights that extending use of face coverings in hospitals for staff and the public may be beneficial. Also highlights ongoing issues with asymptomatic			x	x

	May 2020	transmission, nosocomial cases and higher rates among healthcare workers.				
12	Transmission of SARS-CoV-2 and Mitigating Measures - update, 4 June 2020	Updated evidence on transmission and mitigation drawing on greater certainty of evidence that emerged over the previous few months. Highlights importance of close and prolonged contact in indoor environments, crowded spaces, physical distancing (and need for limiting duration of exposure and/or face coverings where this can't be achieved), and that mitigation measures should consider all transmission routes. Paper considers a wide range of mitigation measures with a summary of understanding.	x			x
13	TWEG: Evidence of wider environmental transmission of SARS-CoV-2, 12 June 2020	Considers transmission in the wider environment, beyond buildings. Outdoor transmission is considered to be low risk unless people are at close proximity, transmission from outdoor surfaces is likely to be low or v low, public toilets could be a risk point, evidence from waste water discharge, recreational water, drinking water and food are all considered negligible or v low.		x		x
14	NERVTAG/EMG: Hand hygiene to limit SARS-CoV-2 transmission,	Evidence from studies (pre-pandemic) that suggests hand hygiene can reduce transmission of respiratory infections by ~16%. Highlights need for availability of		x		x

	https://www.gov.uk/government/publications/nervtagemg-hand-hygiene-to-limit-sars-cov-2-transmission-2-july-20202 July 2020	hand hygiene. Evidence for SARS-CoV-2 drawn from data on surface survival, virus on hands of infected people.				
15	EMG: COVID-19 - Theatres, concert halls and other performance spaces, 12 July 2020	Paper exploring theatre type spaces to support discussions around opening up of venues. Highlights importance of ventilation, safe recommissioning if buildings have been out of use, considering risks in different spaces including overcrowding, application of good hygiene alongside ventilation measures.			x	x
16	EMG: Measurement of effectiveness of risk mitigation measures in reducing transmission, 16 July 2020	Paper exploring the potential to develop a "covid secure" measure for public and workplace environments. Highlights the uncertainty and challenges with defining such measures and the data/modelling that would be needed to develop such an approach. Highlights that covid security could be defined within a setting but would be influenced by multiple factors. Measuring at community, regional or national level is very challenging.	x			x
17	NERVTAG/EMG: Role of aerosol transmission in COVID-19, 22 July 2020	Paper summarising growing evidence for aerosol transmission of SARS-CoV-2. Notes that WHO has acknowledged the role of airborne transmission and	x			x

		paper indicates the likely importance for superspreading events. Importance of ventilation and face coverings/masks are highlighted.				
18	PHE/EMG: Aerosol and droplet generation from singing, wind instruments and performance activities, 13 August 2020	Provides evidence from international literature and two recently conducted research studies to measure aerosol and droplet generation during singing and wind instrument playing. Highlights that social distancing can mitigate large droplet exposure, but that as singing can generate substantially more aerosol than normal respiratory activities, mitigations around ventilation and occupancy in venues are likely to be important.		x		x
19	SPI-B/EMG: COVID-19 housing impacts, 10 September 2020	Highlights potential risk factors for transmission in home environments including housing factors (household size, density of occupants, poor quality housing and poor ventilation) and household related factors (shared spaces, occupational and social connectivity, vulnerable people, social deprivation). Potential mitigations focus on guidance, communications and support, including financial			x	x
20	SPI-B/EMG: COVID-19 housing impacts - evidence review, 10 September 2020	Evidence review which supports paper 20, focuses on social and behavioural aspects			x	

21	EMG: Processing methods to facilitate the re-use of personal protective equipment (PPE), 8 September 2020	Paper summarising the current understanding about the potential for PPE re-use. There are methods involving thermal, chemical and UV disinfection that can work, reuse of PPE that is designed for single use should be a last resort (especially when it is RPE), behavioural aspects need to be considered especially if PPE may be worn by someone else, there is little data on washing of cloth face masks.			x	x
22	NERVTAG/EMG: Duration of wearing of face coverings, 15 September 2020	Paper considering how long face coverings can be safely worn. Highlights that reduction in risk of transmission is likely to outweigh any concerns over contamination of face coverings, contamination may increase with duration but good hand hygiene can mitigate this, regular changing of face coverings and good hygiene can help mitigate any minor skin irritation issues, there is limited evidence on decreased performance of face coverings with duration of use, and tolerability is likely to be the main barrier to wearing for extended periods which needs to be considered in guidance.	x			x

23	EMG: Role of Ventilation in Controlling SARS-CoV-2 Transmission SAGE-EMG, 30 September, 2020	Summarises evidence for the importance of ventilation, the impact on aerosols and how it can be used as part of a package of control measures. Ventilation is most important in multi-occupant spaces, where there are activities that generate more aerosol and in settings with more extreme environmental conditions (e.g. food processing). Highlights importance of considering other factors (noise, comfort, energy etc), potential to use CO2 monitoring, need to consider behavioural aspects and importance of engineering input to assess and improve ventilation. Recommends specific ventilation rates, need for guidance, need for for financial/technical support, need for additional analysis and research to understand spaces and whether air cleaning devices are effective.	x			x
24	EMG: Simple summary of ventilation actions to mitigate the risk of COVID-19, 1 October 2020	Summary document in lay language that accompanies paper 22	x			x
25	NERVTAG/EMG SARS-COV-2: Transmission Routes and Environments, 22 October 2020	Update on transmission routes and risk factors. Highlights importance of close range, airborne and surface transmission, proximity and duration of exposure, survival of virus, interaction of risk factors in work social and residential spaces, importance of		x		x

		super spreading events, viral load over time, household exposure, structural inequalities				
26	EMG: Potential application of air cleaning devices and personal decontamination to manage transmission of COVID-19, 4 November 2020	Outlines types of air cleaning devices and personal decontamination technologies and evidence for the different technologies. Recommends that filter or UVC devices are likely to be most effective, evidence for other technologies is weak and some can cause harm, there is no evidence for personal decontamination and it may be harmful, air cleaners may be useful in poorly ventilated spaces, consideration around the type of space, design of device, noise, comfort need to be considered, behavioural data is absent but may be important, there are gaps in regulation and research. Recommendations are research, guidance (manufacturers and consumers), standards and innovation funding.	x			x
27	EMG/SPI-B: Mitigating risks of SARS-CoV-2 transmission associated with household social interactions, 26 November 2020	Sets out principles of mitigating transmission during social interactions, prepared in the context of celebrations such as Christmas, Diwali, Eid, Hannukah etc. Indicates that: interactions increase risk which is larger with more people and inter-generational, outdoor/online interactions are safest, homes may have higher risks due to familiarity, there are mitigations that can be applied, mitigations		x		x

		are likely to be more effective when agreed with people involved, physical environment may restrict mitigations, equality and fairness need to be at the heart of guidance.				
28	TWEG: Environmental monitoring of viral presence, infectivity and transmission of SARS-CoV-2, 3 December 2020	Outlines latest evidence around monitoring SARS-CoV-2 in the environment, including molecular and culture methods, relationship between RNA and infectious virus, application in risk assessment, need for robust sampling design due to heterogeneity in viral contamination.			x	x
29	EMG/SPI-B/TG: Mitigations to reduce transmission of the new variant SARS-CoV-2 virus, 22 December 2020	Update on mitigations in the light of the alpha variant (B.1.1.7). Highlights that mitigation measures remain the same but higher transmissibility requires a need to step up rigour around all routes. This includes measures around social distancing, test and trace, isolation, outbreak identification, local or national restrictions, adding face coverings to 2m distancing and to more environments, stepping up ventilation. Communications and support are recommended.	x			x
30	EMG: Application of physical distancing and fabric face coverings in mitigating the B117 variant SARS-CoV-2 virus in public, workplace and	Update on physical distancing and face coverings in the light of alpha variant. Reemphasises importance of measures, explains mechanisms of why they work. Highlights need to strengthen guidance on wearing of effective face coverings and	x			x

	community, 13 January 2021 - GOV.UK (www.gov.uk)	consideration that they may need to be applied in more places. Reiterates message on equality and access.				
31	EMG/SPI-B/SPI-M: Reducing within- and between-household transmission in light of new variant SARS-CoV-2, 14 January 2021	Update on evidence relating to household transmission with consideration for the alpha variant. Reiterates the importance of housing for transmission, that mitigation measures need to be more rigorous, and that communications and support are needed. Includes practical table of measures		x		x
32	EMG: COVID-19 risk by occupation and workplace, 11 February 2021	Transmission group paper considering evidence from data on cases by occupational sector. Highlights that age is the biggest risk factor, environmental and human factors are both important, socioeconomic factors can amplify risks, it is activities in a workplace rather than the sector that are important, some occupations have higher risks, requiring more people to come to a workplace, lack of sick pay and higher degree of proximity are risk factors, interventions should follow hierarchy of control		x		x

33	HOCI and EMG: Masks for healthcare workers to mitigate airborne transmission of SARS-CoV-2, 25 March 2021	Summary of evidence around application of masks in healthcare. Highlights wide range of risks across different trusts, risks are in clinical and social spaces, application of hierarchy of control, variability in application of control measures, need for partnerships between IPC and H&S teams, need for greater consideration of aerosol risks in risk assessment and IPC strategies, extended use of RPE may be needed for patient care in some situation, application of RPE needs training and management.		x		
34	EMG Transmission Group: COVID-19 transmission in prison settings, 25 March 2021	Summary of evidence on transmission in prisons with a focus on social and epidemiological evidence and consideration for vaccine roll out and reducing prevalence.			x	
35	EMG and DCMS: Science framework for opening up group events, 16 March 2021	Science framework to support the robust collection of evidence alongside the opening up of events. Considers design of pilots and best practice for events research programme.			x	x

36	EMG Transmission Group: Insights on transmission of COVID-19 with a focus on the hospitality, retail and leisure sector, 8 April 2021	Summary of evidence from outbreaks, contact tracing, case control studies and international literature. Highlights that transmission is associated to proximity, duration and frequency of contact + crowded and poorly ventilated spaces, contribution to population risks depends on likelihood of transmission in the setting and frequency of visits, social contacts remain low but have increase, many sectors are connected together, hospitality appears to have an increased risk compared to leisure and retail, private events and celebrations have highest SAR but case control studies don't show increased odds, shopping is reported exposure but case-control doesn't show increased odds, staff tend to have higher risks, requiring people to attend work or staff attending when sick increases risks, mitigation measures are important for staff and customers.		x		x
37	EMG, SPI-M and SPI-B: Considerations in implementing long-term 'baseline' NPIs, 22 April 2021	Considers the need to maintain baseline measures during and beyond opening up roadmap. Highlights that removing measures will increase transmission, baseline measures are not likely to prevent a wave, transmission will likely increase in autumn and winter, lifting restrictions could lead to conditions for super spreader events, Paper includes tables on effectiveness of different NPIs	?			x

38	EMG and SPI-B: Application of CO2 monitoring as an approach to managing ventilation to mitigate SARS-CoV-2 transmission, 27 May 2021	Summary of evidence around using CO2 monitors. Highlights that they can be used to assess and actively manage ventilation, can enable a balance between ventilation, comfort and energy use, application is straightforward but there is a need for good guidance and consideration of behavioural aspects.	x			x
39	EMG: Role of screens and barriers in mitigating COVID-19 transmission, 1 July 2021	Follow up requested from paper 37 and shared with GCSA/CMO but not presented at SAGE. Highlights limited evidence on effectiveness at reducing transmission, screens are likely to reduce droplet exposure when people are face to face at less than 2m, but have no effect beyond 2m, they are unlikely to reduce exposure to virus in aerosols and in some cases could increase risks through blocking airflows, screens could act as social distancing reminders, screens are likely to be environment specific and when applied in a risk assessment need to consider the activity and the transmission routes.	x			x
40	EMG/TG/SPI-B: COVID-19 Transmission in Hotels and MQFs, 9th Sept 2021	Summary of evidence for transmission in hotels and MQFs from published literature and other data. Highlights transmission could happen in a range of different spaces in a hotel, evidence for association of overnight stays with increased transmission risk, risk assessment and mitigations for different		x		x

		transmission routes are needed. Also includes some evidence for room-to-room transmission which is probably through airborne routes.				
41	EMG and NERVTAG: Update on transmission and environmental and behavioural mitigation strategies, including in the context of Delta, 13 October 2021	Highlights that higher transmissibility requires greater mitigation, that prior infection or vaccination will not be as effective against delta and that vaccinated people with delta could be as infectious as an unvaccinated. There is no fundamental difference in transmission, however there may be more aerosol than with earlier variants which could increase airborne at close proximity and in shared air.	x			x
42	SPI-B, SPI-M and EMG: Considerations for potential impact of Plan B measures, 13 October 2021 (includes EMG consensus on face coverings shared with cabinet office 28th Sept 2021)	Overview of potential impact including that measures most likely to work in combination, working from home will have the biggest effect, certification could help but there is limited evidence and inequalities need to be considered, face coverings remain effective and better material, fit and wearing is recommended.		x		x
43	EMG and SPI-B: Non-Pharmaceutical Interventions (NPIs) in the context of Omicron, 15 December 2021	Highlights growth advantage of omicron, potential for higher secondary attack rates, likely higher transmissibility. Measures remain as previously but may need to be more rigorous and higher		x		x

		transmissibility further increases airborne potential, testing prior to events and gatherings is desirable to mitigate asymptomatic spread				
44	EMG Transmission Subgroup: Consensus statement on SARS-CoV-2 transmission risk at festivals, 23 December 2021	Summary from evidence at festivals and other large events (including from ERP). Highlights potential risk factors and mitigation approaches			x	x
	Support or leadership to papers from other SAGE working groups:					
45	SCWG: Care homes analysis, 12 May 2020	Summary of evidence around routes of transmission, trends in transmission, approaches to testing, approaches to reducing risk, research recommendations. Includes a detailed data summary			x	
46	Managing infection risk in high contact occupations, 15 June 2020	Highlights potential challenges in environments with high social contacts and potential strategies to reduce risk particularly through communication.			x	
47	TFC: Risks associated with the reopening of education settings in September, 8 July 2020	Highlights that evidence suggests a low risk to children's health, school opening in other countries has not had a major impact on transmission, measures are needed such as ventilation, layout design for distancing and cleaning of surfaces, mitigations need to consider staff as their risks are higher, limited evidence to support face coverings at		x		

		this stage, surveillance important with plans for reactive action, consideration of approaches to reduce connectivity of networks through segmentation, consideration of pinch points such as transport or start times, need for clear communications				
48	NERVTAG: Assessment of transmission of COVID-19 through musical events, 16 July 2020	Summary of evidence around singing and wind instruments. Highlights potential increased risk due to aerosol generation when singing and lack of any evidence for wind instruments. Singing especially in large groups may be more risky. More research is needed.			x	
49	Principles for managing SARS-CoV-2 transmission associated with further education, 3 September 2020	Cross-SAGE summary of evidence relating to risks in higher education. Highlights connectivity between organisations, need for test & trace approaches, need for isolation support, hierarchy of risk for safe provision, need to consider wider physical and mental health, communication and co-production of guidance.	x			x
50	Principles for managing SARS-CoV-2 transmission associated with higher education, 3 September 2020	Companion paper to paper 49 focusing on higher education. In addition to issues highlighted for FE, HE also has additional risks associated with international cohorts and accommodation.	x			x

51	Summary of the effectiveness and harms of different non-pharmaceutical interventions, 21 September 2020	Cross-SAGE paper on potential NPIs for dealing with an autumn wave. Highlights potential consequences of a wave and inequalities of impacts. Indicates measures including circuit breaker, work from home, restricting interactions between households, closure of settings, online teaching in HE/FE. Indicates that all measures will have associated impacts on health and wellbeing. Measures should not be contradictory and clear comms is essential.			x	
52	NERVTAG: Seasonality and its impact on COVID-19, 22 October 2020	Summary of behavioural and environmental factors that may impact on transmission more in winter months. Indicates spending time indoors, different mixing patterns in autumn/winter, potential risks of co-infection, small impact of outdoor conditions on viral survival.			x	
53	Key evidence and advice on celebrations and observances during COVID-19, 5 November 2020	Highlights risks associated with celebrations and observances including potential for increasing population level transmission, need for adherence to guidance, need to look at different elements of an event, need for co-development of alternatives, need to be aware of differential treatment of groups, recommendation for specific guidance for transmission homes, need for early comms where alternatives are needed.		x		

54	PHE: Factors contributing to risk of SARS-CoV2 transmission in various settings, 26 November 2020	Initial paper from TSG before it came under EMG. Summarises approaches to understanding transmission, complexity of factors, current consensus around transmission associated with contacts, viral load, frequency and risk in a setting, household risks, additional risks with social deprivation, occupational exposure, social exposure, transport exposure, gaps in knowledge		x		
55	TFC: COVID-19 in higher education settings, 10 February 2021	Update on evidence around HE settings including epidemiological data from a number of sources. Highlights higher risks in residential, minimal evidence for transmission in well managed learning environments, mitigations appear to be successful, generally lower risk of severe disease, impacts on disruption to learning, lower wellbeing and mental health.			x	
56	Cross organisation study: Risk factors associated with places of enduring prevalence and potential approaches to monitor changes in this local prevalence, 22 April 2021	Highlights that some areas of the UK experience higher and sustained levels of prevalence. Factors include deprivation and workplaces which coalesce risk. Highlights modelling could support, focus on workplace interventions, support to local public health teams, co-production of local interventions, disconnect between national and local comms, lack of financial support and precarious employment, need to minimise stigma, need for longer term			x	

		studies.				
57	SPI-B: Sustaining behaviours to reduce SARS-CoV-2 transmission, 30 April 2021	Summary of approaches to sustain behaviours including understanding of phenomena and risks, approaches to successful risk management, strategies to make behaviours normal, co-production, equality, multi-layered approaches			x	
58	SCWG: What are the appropriate mitigations to deploy in care homes in the context of the post vaccination risk landscape?, 26 May 2021	Summary around evidence for mitigations. Considers the hazard of the environment, evidence to support vaccine impact, caution in easing restrictions, approach based on baseline, defend, outbreak to step up/down measures.			x	
59	SPI-B: Social and behavioural impacts for lifting remaining restrictions, 10 February 2022	Highlights need to mitigate economic and social harms to those who are vulnerable, challenges with removing access to testing, potential to improve sick pay, consequences of removing isolation requirements, need to promote protective behaviours that should be sustained, comms and messaging, support from organisations such as workplaces.			x	

	Papers from other external working groups shared with SAGE					
60	Academy of Medical Sciences: COVID-19: Preparing for a challenging winter 2020/21, 7 July 2020	Highlights risk of a large winter outbreak, disruption to health and social care systems, backlog of non-covid care, possible flu outbreak. Priority interventions focus on minimising community transmission and impact, organising health and social care settings maximise IPC and enable routine care, improving surveillance, minimising influenza risk		x		
61	BEIS CSA Team: Potential application of glycol-based sprays to manage transmission of SARS-CoV-2, 13 November 2020	Note on use of spray biocides in shared spaces including space decontamination, human decontamination, continuous application. Concludes a lack of evidence for effectiveness and absence of good data on other health impacts hence risk-benefit can't be established without considerable further work.		x		
62	Academy of Medical Sciences: COVID-19 preparing for the future – Looking ahead to winter 2021, 2022 and beyond, 15 July 2021	Summarises challenges for winter ahead including resurgence of respiratory infections (including covid), wider health and wellbeing impacts of the pandemic, continued disruption to health and social care delivery. Recommends maximising vaccination, supporting ability to isolate, boosting NHS capacity, clear guidance on environmental and behavioural measures.		x		

63	RAEng: Infection Resilient Environments – Buildings that keep us healthy and safe, 19 July 2021	First phase of a piece of work pulling together expert and stakeholder views. Recommends immediate actions around comms, guidance and incentives, and highlights long term strategic challenge to improve buildings		x		x
64	Academics: Modeling the factors that influence exposure to SARS-CoV-2 on a subway train carriage, 22 July 2021 (journal paper published Feb 2022)	Academic paper that develops a risk model showing how different factors could influence exposure to virus on public transport. Shared with SAGE for interest. Paper used by DfT - see Noakes publication list.	x			x
65	UKHSA: Face coverings and COVID-19 – statement from an expert panel, 14 October 2021	Evidence summary which concludes: airborne transmission beyond 2m is possible, high viral load and symptoms increase transmission, ventilation should be part of the measures, some variants have increased transmissibility which could be viral load or dose-response, measures remain the same for new variants, all types of face coverings can be effective to some extent, good cloth masks can be similar to surgical masks, N95 may be more effective for protection, fit and training are important, insufficient evidence for double masking in healthcare.		x		

Annex C: List of Teach-In Presentations

SAGE teach-ins

Date	Topic	Presenters
21-Jul-20	Science around transmission and mitigation	Cath Noakes, Andrew Curran, Lucy Yardley
05-Nov-20	Celebrations and Observances, supporting SAGE paper from 5th Nov 2020	Tom Rodden, Cath Noakes, Brooke Rogers
01-Apr-21	Social distancing for Cabinet Office Task Force	Cath Noakes, Andrew Curran, Lucy Yardley
20-May-21	Social distancing and baseline NPIs - follow on from review on lifting restrictions as part of the roadmap	Cath Noakes, Stephen Reicher, Andrew Curran
11-Jun-21	Ventilation and CO2 monitoring, supporting SAGE paper from 27th May 2021	Cath Noakes, Tim Sharpe, Lucy Yardley

Other gov teach-in sessions

30-Jul-21	Covid-19 Preparing for the future, Royal Academy of Engineering Infection Resilient Environments work	Cath Noakes, Peter Guthrie, Hywel Davies, Nick Starkey

Annex D: Media interactions Jan 2020-June 2021

Professor Cath Noakes – 2020 Press cuttings mentions

December:

BBC Leeds: 17th December
BBC Leeds • 17th Dec, 2020 • Broadcast

Professor Catherine Noakes (Civil Engineering) appeared on the Breakfast Show to talk about Christmas and provide some advice for those planning on meeting up with loved ones.

'Is it safe? How was it approved so fast? Will it stop Covid spreading?': Leeds scientists answer 18 key vaccine questions
Yorkshire Evening Post• 15th Dec, 2020 • News

"The Local Democracy Reporting Service spoke to a panel of Covid-19 experts at the University of Leeds to help answer some of the questions you might have around the vaccine and the future of the Coronavirus pandemic." Professor Cath Noakes (Civil Engineering), Dr Stephen Griffin (LIMR) and Professors Nicola Stonehouse and Mark Harris (both Molecular and Cellular Biology) answer readers' questions.

BBC Radio 4: 13th December
BBC Radio 4 • 13th Dec, 2020 • Broadcast

Professor Catherine Noakes (Civil Engineering) discusses the importance of ventilation in slowing the spread of Covid-19, particularly for those planning to spend time together over Christmas.

New campaign on Covid-19 home safety
Asian Standard • 8th Dec, 2020 • news

Professor Cath Noakes (ENG - Civil Engineering) describes the need for good ventilation inside closed spaces as a way of reducing the risks of COVID-19 spread.

Heart Yorkshire: 5th December
Heart Yorkshire • 5th Dec, 2020 • Broadcast

Professor Cath Noakes (Civil Engineering) provides some tips on how to reduce risks of COVID-19 transmission when meeting family and friends. (Clip available on request)

November:

How to avoid Covid at Christmas
BBC • 24th Nov, 2020 • News

Professor Cath Noakes (Civil Engineering) featured in reports on the main BBC TV bulletins examining the risks of relaxing COVID-19 restrictions over the Christmas holiday.

Hull still tops country's infection rates - with caution urged as they fall in Bradford
ITV• 20th Nov, 2020 • news

Professor Cath Noakes (Civil Engineering) spoke to Calendar about how people can try to protect themselves from infection over the festive period. Coverage also continues of a new government film she advised on that encouraged people to ventilate indoor spaces over winter.
Also in:
The Times (print)
Metro

Look North (Yorkshire): 18th November
BBC 1 Yorkshire and North Midlands • 18th Nov, 2020 • Broadcast

Professor Catherine Noakes (Civil Engineering) appeared in a number of places discussing the science behind government's latest campaign, featuring Dr Amir Khan (LIHS - Honorary), which aims to encourage us to keep indoor spaces well ventilated this winter to help limit the spread of Covid-19. Various broadcast coverage clips are available on request.
Also in:
The Times

The Mirror

Daily Telegraph
BBC Hereford and Worcester
BBC Leeds
MSN
LBC News
Yorkshire Evening Post (Print - PDF available on request)

Open windows for 'short, sharp bursts' to cut Covid transmission, Government to advise
The Daily Telegraph• 18th Nov, 2020 • News

Widespread coverage of the launch of a new government campaign, which involved Professor Cath Noakes (Civil Engineering), that encourages the opening of windows regularly to ventilate indoor spaces this winter. She is also quoted in an article reacting to a British Medical Association (BMA) report calling for tough restrictions to continue in a bid to prevent the NHS being overwhelmed after lockdown.
Also in:
Daily Mail
Yorkshire Evening Post
The National
Yorkshire Post(print)
LBC (clip available on request)
BBC Radio Leeds (clip available on request)
The Guardian(on BMA report)
Yahoo(on BMA report)
MSN(on BMA report)

October:

The face mask test: which are the best at limiting the spread of Covid?
The Guardian • 30th Oct, 2020 • News

Professor Cath Noakes (Civil Engineering) comments on the article that aims to find the best face mask.

Project TRACK launched to understand the risks of COVID-19 public transport transmission26 October 2020
Zenopa• 26th Oct, 2020 • News

Some coverage for a new study called Project Transport Risk Assessment for Covid Knowledge (TRACK) led by Professor Cath Noakes (Civil Engineering), aiming to understand the risks of covid-19 public transport transmission as well as to identify the best measures to manage it.

Wash your mask daily: the ultimate guide to face coverings
The Guardian • 26th Oct, 2020

Professor Cath Noakes (Civil Engineering) is mentioned in the article commenting on the friction and humidity associated with prolonged mask-wearing.

Major study to evaluate COVID-19 risk on public transport
The Engineer • 22nd Oct, 2020 • news

Ongoing coverage of Project TRACK (Transport Risk Assessment for Covid Knowledge), led by Professor Cath Noakes (Civil Engineering), which aims to establish the risk of Covid-19 transmission on buses and trains.
Also in:
Heart Yorkshire news bulletins (clip available on request.)
Mirage News
University News

BBC Radio Leeds: 21st October
BBC Leeds • 21st Oct, 2020 • Broadcast

Coverage in local radio news bulletins of a new project to be led by Professor Cath Noakes (Civil Engineering) that aims to understand the risks of Covid-19 transmission on public transport and to identify the best control measures. Clip available on request.
Also in:
Railway Gazette

University of Leeds researchers and former Pro-Chancellor recognised in Queen's Birthday Honours List 2020
Yorkshire Evening Post • 12th Oct, 2020 • news

Widespread coverage of the recipients of the Queen's Birthday Honours, which included Professor Cath Noakes (Civil Engineering), Professor Sheena Radford (Molecular and Cellular Biology), former Pro-Chancellor Dr Linda Pollard, and Professor Jason Lowe (Earth and Environment).
Also in:
Yorkshire Evening Post (NHS and Community heroes)
Yorkshire Post
The Sun
Daily Mail
Metro
Evening Standard
University News

The most common ways we're wearing face masks incorrectly
The Guardian• 2nd Oct, 2020 • news
Professor Cath Noakes (Civil Engineering) contributes to this article on the various ways masks are not worn correctly.

September:

Further restrictions needed to halt Covid spreading in UK, scientists warn
Financial Times• 23rd Sep, 2020 • News

Quotes from Professor Cath Noakes (Civil Engineering) about the latest steps taken to reduce the transmission of the virus are in the FT.

Also in print.

BBC Radio 1 Newsbeat: 9th September
BBC Radio 1 • 10th Sep, 2020 • Broadcast

Professor Cath Noakes (Civil Engineering) appears at 3:30 to talk about new lockdown rules for England and answer listeners' questions.

The best (and worst) Covid posters
Financial Times • 7th Sep, 2020 • news

An article highlighting the importance of clear communication, particularly on matters such as public health. Dr Catherine Stones (Design) is quoted. Sign in/subscription required.
Also in:
The I (Print. PDF available on request)

August:

This method could be crucial in protecting against COVID-19 in the fall
Gazeta Bankowa • 27th Aug, 2020 • News

Additional international coverage of a recent BBC News piece quoting Professor Cath Noakes (Civil Engineering), which recommends a selection of ways to help minimise the risk of spreading Covid-19 as the nights being to draw in and people spend more time indoors. In Polish.
Also in:
24 Horas (Chile. In Spanish)
MSN Mexico (In Spanish)
United News of Bangladesh

Five ways to avoid catching coronavirus indoors
BBC News • 27th Aug, 2020 • News

A piece highlighting the importance of ventilation in limiting the spread of Covid-19 as autumn starts to approach and people begin to spend more time indoors. Professor Cath Noakes (Civil Engineering) is quoted.

RAEng announces winners of President's Special Awards for Pandemic Service
Engineer Online • 17th Aug, 2020 • News

Further coverage of the new that Professor Cath Noakes (Civil Engineering) has received a top award from the Royal Academy of Engineering for work which has had "widespread and significant impact" in tackling the spread of coronavirus.

Meet the Leeds professor at the forefront of advising the government on coronavirus
Yorkshire Post • 17th Aug, 2020 • News

Coverage of news that Professor Cath Noakes (Civil Engineering) has received a top award from the Royal Academy of Engineering for work which has had "widespread and significant impact" in tackling the spread of coronavirus.

University news story

Also in: Leeds Live and in print.

July:

Covid-19 Q&A: UK experts discuss how their lives have changed
The Guardian • 25th Jul, 2020 • News

Professor Catherine Noakes (Civil Engineering) features in a Guardian piece that asks scientific experts how the pandemic has changed their daily lives.

Does coronavirus spread in the air and how do we stay safe?
The Guardian • 14th Jul, 2020
A piece exploring the growing concerns over potential airborne transmission of coronavirus. Professor Catherine Noakes' (Civil Engineering) contribution to a recent open letter to the WHO over concerns of aerosol transmission is mentioned.
Also in: University news

Growing evidence of airborne transmission of coronavirus
The Times • 8th Jul, 2020 • News

Further coverage of the commentary published by 239 experts that say steps should be taken to reduce the airborne spread of coronavirus and the risk this creates for people getting infected by breathing in the microscopic particles. The experts include Professor Cath Noakes (Civil Engineering) who is a member of SAGE and quoted throughout the piece.

Risk of airborne coronavirus spread being underplayed, say researchers
New Scientist • 7th Jul, 2020 • News

A commentary has been published by 239 experts that say steps should be taken to reduce the airborne spread of coronavirus and the risk this creates for people getting infected by breathing in the microscopic particles. The experts include Professor Cath Noakes (Civil Engineering) who is a member of SAGE and quoted throughout the piece.

Global experts warn of COVID-19 airborne threat
Yahoo News UK • 6th Jul, 2020 • News

Coverage of an international group of 239 scientists who urge, as countries ease their lockdowns, authorities need to recognise that coronavirus can spread through the air far beyond the two meters. Quotes from Professor Cath Noakes (Civil Engineering) inform the piece.

Six times the UK Government changed its mind on coronavirus rules
Daily Mail • 30th Jun, 2020 • News

Quotes from Professor Catherine Noakes (Civil Engineering) feature in a Daily Mail article examining the UK Government's changing policies towards coronavirus.

June:
Use of face masks and hygiene will reduce risks say scientists
Yorkshire Evening Post • 26th Jun, 2020 • Print
Professor Catherine Noakes (Civili Engineering) is quoted in this piece about how covid-19 infection risk can be mitigated as lockdown measures continue to be relaxed. PDF available on request.

SAFETY FIRST Talk more quietly and 7 other steps to protect against coronavirus as 2m rule is relaxed to 1m
The Sun • 23rd Jun, 2020 • News
Professor Cath Noakes (Civil Engineering) is quoted in this piece about the government's latest social distancing guidance and tips to help minimise risks.

Also in:
Daily Telegraph (Print - PDF available on request)

What to expect from review into 2-metre physical distancing rule in England
The Guardian • 21st Jun, 2020

Professor Catherine Noakes (Civil Engineering) is mentioned in this piece on the scientific advice given to government as part of its review into the 2-metre social distancing rule.

BBC Radio 4: Inside Science, 11th June
BBC Radio 4 • 11th Jun, 2020 • Broadcast

Professor Cath Noakes (Civil Engineering) was interviewed on the BBC Inside Science programme where she discussed how engineering is being used to understand and help mitigate the transmission of the coronavirus in buildings and on transport systems.

Engineers preventing second wave of Covid-19 'have opportunity to tackle climate and other wider challenges'
Institution of Mechanical Engineers • 5th Jun, 2020
"With increasing focus on measures to prevent a second wave of the coronavirus – such as improved ventilation systems and antiviral surfaces – the engineering community also has the chance to look ahead and creatively tackle other issues such as climate change and wider accessibility". Professor Catherine Noakes features, and appears in a Daily Mail piece on social distancing.
Also in: Daily Mail (Print - PDF available on request)

Standing back-to-back and outdoor service: How Leeds pubs could change to control spread of coronavirus
Yorkshire Evening Post • 4th Jun, 2020
Professor Catherine Noakes (Civil Engineering) features in this article examining ways pubs could start to serve customers while adhering to social distancing guidelines. She also appears in The i in a piece looking at one expert's call for a 'more nuanced' approach to the two-metre rule, as well as a New Civil Engineer article on the difficulties faced in ensuring future buildings an infrastructure are resilient to disease.
Also in:
i News
New Civil Engineer

May:

Pubs and restaurants could open next month as he orders review of 6ft rule
Metro • 28th May, 2020 • News
Professor Catherine Noakes' (Civil Engineering) recent comments to the Science and Technology Select Committee are quoted in this article on a review of social distancing measures.
Also in:
Leeds Live

Two metre rule could be relaxed and is under frequent review raising hopes more pubs and restaurants will be able to reopen as lockdown eases
Daily Mail • 23rd May, 2020 • news
Coverage of Friday's Commons' Science and Technology Select Committee, at which Professor Cath Noakes (Civil Engineering) gave evidence.
Also in:
The Telegraph

SAGE: The experts advising govt on coronavirus response
Sky News • 4th May, 2020 • News
Widespread coverage of yesterday's publication of 50 SAGE committee members, which include two University academics, Professor Cath Noakes (Civil Engineering) and Professor Mark Wilcox (LIMR), who are advising the government's response to coronavirus.

Professor Cath Noakes – 2021 Press cuttings mentions (January-June)

January:

BBC Radio 4 : 1st January, 13:18 PM GMT
BBC Radio 4 • 1st Jan, 2021 • Broadcast

Professor Cath Noakes (Civil Engineering) talks about face coverings and what scientists learnt about the transmission of COVID-19 and the role of face masks.

Talking can spread Covid as much as coughing, says research
The Guardian • 20th Jan, 2021 • News

Professor Cath Noakes (Civil Engineering) comments on the study conducted by researchers at Cambridge. Professor Noakes says that the study is based on assumptions with results representing the worst-case scenarios.

COVID Spread More Indoors by Talking Than Coughing, Study Suggests
Newsweek • 20th Jan, 2021 • News

Additional coverage that mentions Professor Cath Noakes (Civil Engineering) commenting on the study conducted by researchers at Cambridge.

Rethink needed after pandemic
Yorkshire Evening Post • 31st Jan, 2021 • News

Professor Cath Noakes (Civil Engineering) reflects on the last 12 months. According to Professor Noakes, advances had been made, but there is still a lot to learn about the virus, including its transmission.

February:

BBC Radio 4: Today
BBC Radio 4 • 9th Feb, 2021 • Broadcast

Professor Cath Noakes (Civil Engineering) talks about masks following news that only 'Category 1' masks, rather than homemade cloth alternatives, will be acceptable in French schools for pupils over the age of 6 and all staff. Interview starts at approximately 54 minutes. The interview was also quoted in the Daily Mail in a piece examining the debate around the effectiveness of wearing two masks at once.
Also in:
Daily Mail

Covid link to poor air supply a major concern for AC planning
RAC • 11th Feb, 2021 • news

"Air movement expert Professor Catherine Noakes (Civil Engineering) urges caution around the use of AC systems in poorly-ventilated enclosed spaces in order to limit Covid risks" in this interview with Refrigeration and Air Conditioning Magazine.

March:

'Success isn't about individuals, it's about what they achieve together'
Financial Times • 6th Mar, 2021 • Print

Professor Cath Noakes (Civil Engineering) is interviewed "on teamwork, solving problems and her mysterious disappearing garage."

SHOULD TEENAGE PUPILS HAVE TO TO WEAR MASKS IN CLASS?
Daily Mail • 7th Mar, 2021 • Print

Professor Noakes is also quoted, along with Dr Stephen Griffin (LIMR), in this piece exploring expert opinions behind whether or not young people should wear face coverings in schools.

University of Leeds joins £550m research programme to help shape fightback from COVID lockdown
Yorkshire Evening Post • 23rd Mar, 2021 • News

Report on the efforts of the region's researchers and businesses towards "coming up with creative ways to beat COVID-19 and its effects in pieces of work funded by UK Research & Innovation (UKRI)." Professor Cath Noakes (Civil Engineering) comments on a study to understand the risks of COVID-19 transmission on public transport.
Also in:
The Yorkshire Press

'Just say no' - psychologists offer advice on how to avoid breaking lockdown rules
Manchester Evening News • 31st Mar, 2021

Professor Cath Noakes (Civil Engineering) discusses the importance of staying outdoors when meeting friends or family outdoors.

Also in:
BBC Radio Leeds (clip available on request)
ITV News

April:

The 'outdated' social-distancing measures like temperature checks that aren't just annoying - they won't protect you
Daily Mail • 7th Apr, 2021

A report on how the science around the transmission of Covid-19 has changed, and how it could lead to revisions of existing social distancing guidance. Professor Cath Noakes (Civil Engineering) comments on the importance of fresh air and good ventilation. She was also quoted in various news bulletins on Greatest Hits Radio.

Also on:
Greatest Hits Radio (clip available on request)

BBC Cumbria: 14th April
BBC Cumbria • 14th Apr, 2021 • Broadcast

Professor Cath Noakes (Civil Engineering) appears on a range of local BBC stations talking about different ventilation options, including opening window and the importance of making sure that there is a flow of fresh air in buildings. (Clip available on request)

May:

Coronavirus: Expert urges caution over hugs as lockdown eases
BBC News • 9th May, 2021 • News

In the face of restrictions easing, the BBC consults scientific experts on their opinions. Professor Cath Noakes (Civil Engineering) who sits on the UK Government's SAGE group discusses the need for caution when hugging people from outside of your household after Monday 17 May.
Professor Noakes' comments are also carried by local BBC radio across the UK and in the Daily Express

People in England will soon be allowed to officially hug and kiss again.
The New York Times • 10th May, 2021 • Blog

Comments by Professor Cath Noakes (Civil Engineering) are carried in the NYT's COVID-19 liveblog.

BBC Radio 5 Live: 11th May, 08:09 AM
BBC Radio 5 Live • 11th May, 2021 • Broadcast

Professor Noakes (Civil Engineering) also appears on Radio 5 Live Breakfast to discuss the importance of ventilation as the country reopens.

The return of hugging? I'm not sure I'll ever be ready
Yahoo News UK • 11th May, 2021 • News

Comments from Professor Noakes (Civil Engineering) on the relaxing of restrictions are also carried in Yahoo News UK.

Also in: The Sun (print), ITV News and Daily Mail

Calls for post-Covid 'revolution' in ventilation
BBC News • 14th May, 2021 • News

A new report from 40 academics including Professor Cath Noakes (Civil Engineering) has been published and calls for tighter regulations to control air quality in buildings – as a way of reducing the spread of COVID-19 and other illnesses.
University news story

Also covered in: The Independent (also in print), The Times and Science Codex

Professor Noakes also appeared on BBC Radio Leeds this morning to discuss the new report. (From 2h10m)

Don't be too hasty to hug! Psychologist warns that many people have mentally' opted out' of physical contact during the pandemic and that embracing people is now a 'social minefield'
Daily Mail • 13th May, 2021 • News

Comments from Professor Noakes are also carried in the Daily Mail as they examine the national apprehension around lifting restrictions on physical contact next week.

Covid: How should I protect myself now?
BBC News • 16th May, 2021 • News

Comments and advice from Professor Cath Noakes (Civil Engineering) appear across the media in light of the easing of restrictions from today. With indoor mixing now a possibility, Professor Noakes advises caution and stresses the necessity of good ventilation.

Professor Noakes' comments are also carried in the Guardian and on BBC Radio Leeds yesterday. (From 27m 50s)

Study calls for new air quality regulations in buildings
The Engineer • 17th May, 2021 • news

Further coverage of a new report from 40 academics including Professor Noakes (Civil Engineering) has been published and calls for tighter regulations to control air quality in buildings – as a way of reducing the spread of COVID-19 and other illnesses.

Why opening windows is as important as Hands, Face, Space: Leading experts

argue fresh air is crucial in battle to stop Covid spreading
Daily Mail • 17th May, 2021 • News

Further coverage of a new report from 40 academics including Professor Cath Noakes (Civil Engineering) has been published and calls for tighter regulations to control air quality in buildings – as a way of reducing the spread of COVID-19 and other illnesses.
Also in print.

BBC News: 17th May, 17:10 PM GMT
BBC News 24 • 17th May, 2021 • Broadcast

Professor Noakes also appeared on BBC News, speaking in a personal capacity, about the easing of lockdown restrictions yesterday.

Public reminded to let in fresh air when meeting others indoors to reduce the spread of COVID-19
GOV UK • 18th May, 2021 • News

Comments from Professor Cath Noakes (Civil Engineering) about the importance of good ventilation when mixing indoors appear in a GOV UK report.

In the office or dining out - how clean is the air you breathe?
The Times • 24th May, 2021 • News

Professor Cath Noakes (Civil Engineering) is interviewed in the Times about the increased focus on ventilation and clean air in the midst of the pandemic.

Also in print.

June:

Clearing the air—how to protect people from airborne transmission of the coronavirus
The Economist • 3rd Jun, 2021 • news

Professor Cath Noakes (Civil Engineering) is featured in the Babbage podcast from the Economist magazine which examines the role of ventilation in buildings as a way of reducing the risks of COVID-19 spreading between occupants. She is also quoted in coverage of a report she co-authored last month calling for indoor air quality to be monitored to the same standards as food and water.
Also in:
The Irish News

‘Safe havens’ can help the recovery and save lives

Modern Building Services • 7th Jun, 2021
Report quotes Professor Cath Noakes (School of Civil Engineering) who describes measures building engineers can take to ensure cleaner air circulates in buildings.

Why good ventilation and air quality in our buildings will be important in the post-Covid world
Yorkshire Post • 17th Jun, 2021 • Print

"Writing in the journal Science recently, dozens of the world’s leading experts in how diseases spread called for improvements to the air in buildings" Professor Cath Noakes (Civil Engineering), on of the report's authors, is interviewed about the importance of ventilation, and what we can learn from the ongoing pandemic to be better prepared in the future. Print - PDF on request.

High-profile cases signal rise in Covid-19 ahead of lockdown easing
The Guardian • 28th Jun, 2021 • News

Piece on reports of famous people getting infected, and whether it could be due to lockdown fatigue, the infections Delta variant, or relaxation of guidelines. Professor Cath Noakes (Civil Engineering) is quoted.

Annex E: Media Interactions June 2021 – Aug 2022

Headline	Publication	Date	Media type	Link	Language
Now is the time to get indoor air quality provision right	Modern Building Services	20/07/2022	Online	https://article.signal-ai.com/117f3028-58d8-3743-847a-a89b3f4ba32c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
IMechE hosts 'Emerging from a pandemic: engineering solutions to enable us to live with COVID-19' event at UK Parliament	Impact News Service	16/07/2022	Online	https://article.signal-ai.com/783896cf-24a4-3e90-86bc-82edb92f5afb?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
HCE 2022 update	Hospital Hub - HubPublishing.co.uk	29/06/2022	Online	https://article.signal-ai.com/23d48b65-bfcc-31d1-8fc5-584544ee5991?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
HCE 2022 update	hubpublishing.co.uk	29/06/2022	Online	https://article.signal-ai.com/c1b8a357-2c6f-37e5-b741-f8c9682c8152?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coexistence with COVID-19/Virus Rethinking Construction	HiNet	22/06/2022	Online	https://article.signal-ai.com/a010aeaf-2900-36e9-a652-2e177af6d4fc?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Chinese

Coexistence with COVID-19/Virus Rethinking Architectural Design! Royal College of Engineering: Improving ventilation can prevent transmission of 50% of pathogens	Match生活網 (Life network)	22/06/2022	Online	https://article.signal-ai.com/04cfc6b6-14d1-3020-bfb8-3ed283b663a9?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Chinese
Coexistence with COVID-19/Virus Rethinking Architectural Design! Royal College of Engineering: Improving ventilation can prevent transmission of 50% of pathogens	Tw News Yahoo	22/06/2022	Online	https://article.signal-ai.com/0b220e03-4b63-3b4c-ac79-23e73f3f2e25?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Chinese
How upgrading buildings could dramatically boost the economy and health	India Engineering News	20/06/2022	Online	https://article.signal-ai.com/b31b6a70-35ac-303f-a5ce-f555f9ed304f?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Clean Air Day to highlight important role of building ventilation	Facilities Management Journal	16/06/2022	Online	https://article.signal-ai.com/4b37043d-becc-36cc-8b8b-ba2e50548db7?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
University of Leeds: Improve air quality inside buildings - leading engineers	India Education Diary	16/06/2022	Online	https://article.signal-ai.com/45d011fa-3ce1-3d89-b623-3b907b11d1f8?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How upgrading buildings might help the economy and the environment tremendously	List 23	14/06/2022	Online	https://article.signal-ai.com/9406e05b-8343-3fc2-b1ef-1326d628513a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

How upgrading buildings could dramatically boost the economy and health	Interesting Engineering	14/06/2022	Online	https://article.signal-ai.com/b6478669-d7b1-3371-9de8-b24241cbaf1c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Better disease control in public buildings 'could save UK billions a year' | Health	Goad News	13/06/2022	Online	https://article.signal-ai.com/d6913589-f8c9-3682-ae93-74aed1894e76?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year'	The Guardian	13/06/2022	Online	https://article.signal-ai.com/0510bc13-9e95-331b-9b7b-929c877456ba?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year'	Yahoo! UK and Ireland	13/06/2022	Online	https://article.signal-ai.com/267e6e22-d9d8-3384-b061-78b92d05aedc?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year' | Health	Tech Register	13/06/2022	Online	https://article.signal-ai.com/84d874c8-ca8c-3738-9f0f-5ed462c34c7e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year'	Yahoo! Canada	13/06/2022	Online	https://article.signal-ai.com/be0a9fee-a430-3b08-a341-704bd059c545?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Improved disease control in public buildings 'could save UK billions a year'	Business Fast	13/06/2022	Online	https://article.signal-ai.com/14b481f0-2afc-3bd6-8ad6-471ab165c85b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year' | Health	JNews.uk	14/06/2022	Online	https://article.signal-ai.com/45edef45-9c3a-34b4-bfd5-185c2bb76a23?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year'	Yahoo Canada Sports	13/06/2022	Online	https://article.signal-ai.com/57e3e53f-74bd-36b8-a64a-8ce12b49c79e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year' | Health	World Face	13/06/2022	Online	https://article.signal-ai.com/5c76cb04-4dd9-3871-a422-81d4e6181042?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year' | Health	Internewscast	13/06/2022	Online	https://article.signal-ai.com/6dceb900-3ff3-3e8b-a779-6d57f1158bc6?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year'	Yahoo! Style UK	13/06/2022	Online	https://article.signal-ai.com/76da5d78-5584-34fc-95ff-d80c1918a6d2?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Improved disease control in public buildings 'could save UK billions a year'	Yahoo News UK	14/06/2022	Online	https://article.signal-ai.com/78b5eaeb-3ace-335f-a742-353cc28821a8?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year' | Health	247 News Around The World	13/06/2022	Online	https://article.signal-ai.com/7d43898e-9766-3aca-8ff4-6005007ccd28?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year'	NewsBreak	13/06/2022	Online	https://article.signal-ai.com/8a5f04d4-ddaa-370d-af93-85524644194f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year' | Health	News Finale	13/06/2022	Online	https://article.signal-ai.com/a10f0e51-15eb-3f44-89f0-d78065ccfc45?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year' | Health	Swifttelecast	13/06/2022	Online	https://article.signal-ai.com/a24322fa-f122-3822-a9f7-c44d5d015984?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year' | Health	Bestinau	13/06/2022	Online	https://article.signal-ai.com/b83f0b8f-d92a-3169-a089-ac0f8f185d6f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Improved disease control in public buildings 'could save UK billions a year'	Allusanewshub	13/06/2022	Online	https://article.signal-ai.com/cb614ce5-48ef-3652-bd67-66e9e2d0d296?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improved disease control in public buildings 'could save UK billions a year'	Wiredfocus	14/06/2022	Online	https://article.signal-ai.com/fc4f825c-033b-3385-b839-15fb93410685?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improve air quality inside buildings - leading engineers	University of Leeds	13/06/2022	Online	https://article.signal-ai.com/096f0e3b-d7cc-34f3-855e-348f252c932e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improve air quality inside buildings - leading engineers	Mirage News	13/06/2022	Online	https://article.signal-ai.com/254b3785-39f7-3e6a-b56e-5ee79364bca2?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Clean Air Day to stress role of building ventilation	Building Services and Environmental Engineer	10/06/2022	Online	https://article.signal-ai.com/04cd8b7f-215c-317e-b921-2f6d20abacd0?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Clean Air Day to stress role of building ventilation	Specification Online	10/06/2022	Online	https://article.signal-ai.com/70353b6b-14f5-347a-a77b-7241cb19b7e1?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Clean Air Day to stress role of building ventilation	Heatingandventilating.net	10/06/2022	Online	https://article.signal-ai.com/75b2b21f-ac52-3cb5-a161-ef6b42e3ee4f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Clean Air Day to stress role of building ventilation	Heating And Ventilating	10/06/2022	Online	https://article.signal-ai.com/3fa815e4-bd01-3c6e-b91e-ea0a7fa48bcd?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Clean Air Day to stress role of building ventilation	FM Business Daily	10/06/2022	Online	https://article.signal-ai.com/cee9365d-01fb-3ca8-a19e-9cbf233f48e2?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Clean Air Day To Stress Role Of Building Ventilation	Facilities Management Uk Magazine	09/06/2022	Online	https://article.signal-ai.com/99f3c617-315b-31f0-8ac6-7751af51993a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
University of Leeds: Open and shut case - the benefits of good ventilation in schools	India Education Diary	26/05/2022	Online	https://article.signal-ai.com/c963d1f5-a657-3c65-932f-46c6d891acc5?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Open and shut case - the benefits of good ventilation in schools	University of Leeds	25/05/2022	Online	https://article.signal-ai.com/2d04ab20-c315-30fa-98b0-fa16bcf79b08?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Open and shut case - benefits of good ventilation in schools	Mirage News	25/05/2022	Online	https://article.signal-ai.com/3fc4d345-cf03-305e-99fd-c9e07a1bd85d?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Attendance focus shows why good ventilation in schools still matters	TES.com	25/05/2022	Online	https://article.signal-ai.com/47c99390-e3b1-3f2a-a78d-41c80ebc6d7e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Opinion: Indoor air quality and the Building Safety Act	Air Quality News	19/05/2022	Online	https://article.signal-ai.com/1623bf10-ff28-37b0-9dfe-58626d363b14?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
MBS attends the BESA launch of 'safe havens' blueprint for air quality	Modern Building Services	17/05/2022	Online	https://article.signal-ai.com/d6fbe363-8527-3230-a570-0da77ca576ff?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Honorary CIBSE Fellowship for ventilation expert	Health Estate Journal	16/05/2022	Online	https://article.signal-ai.com/5e6851c6-fc00-318a-9ec6-2fd42a6cd319?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Construction sustainability trends: Architecture top term on Twitter Q1 2022	Design Build Network	13/05/2022	Online	https://article.signal-ai.com/12cac906-5340-3519-b95f-6cfff38be9a1?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Construction sustainability trends: Architecture top term on Twitter Q1 2022	MarketLine	13/05/2022	Online		English
Engineering research recognised by REF 2021	University of Leeds	12/05/2022	Online	https://article.signal-ai.com/fce36cce-e716-3b5d-a5c9-c7bdbf80872c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Guide to safe havens	Climate Control News	29/04/2022	Online	https://article.signal-ai.com/5dec4b3a-2c21-3e24-83f4-dd0c0931e23e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA launches 'safe havens' blueprint guide for indoor air quality	HA MAG	20/04/2022	Online	https://article.signal-ai.com/8ab83e85-ca0e-3fe4-8875-8a0169711e71?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Government urged to think again over air quality targets	FM Business Daily	19/04/2022	Online	https://article.signal-ai.com/ac9791aa-023a-3981-a756-fe811c471e20?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Government urged to think again over air quality targets	Specification Online	19/04/2022	Online	https://article.signal-ai.com/4bff77ae-58a4-3bbb-9a6b-8dc7324ddc76?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Government must be 'more ambitious' on air quality	Facilitatemagazine	15/04/2022	Online	https://article.signal-ai.com/ef789a64-b745-32f8-9640-28cc8460a7b1?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-	English

				39a0-4c04-98da-d927231e9700&origin=csv	
Government urged to think again over air quality targets	Heating And Ventilating	14/04/2022	Online	https://article.signal-ai.com/85abf5c5-732c-3419-9173-533b033a1ea7?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Government urged to think again over air quality targets	Heatingandventilating.net	14/04/2022	Online	https://article.signal-ai.com/259728b7-e7a4-3d0c-8f23-d162948d1a3d?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA launches 'safe havens' blueprint for air quality	FM Business Daily	10/04/2022	Online	https://article.signal-ai.com/77343250-fbe3-3f04-be39-fc5555a5631f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Creating building IAQ “safe havens”	Cooling Post	09/04/2022	Online	https://article.signal-ai.com/1fe81c8a-4592-3d1d-927d-9decaa58a9da?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Professor Cath Noakes contributes to guide for indoor air quality	University of Leeds	09/04/2022	Online	https://article.signal-ai.com/8298c9f6-a00e-3b65-80e5-dde2fb9b54b3?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA launches guides to air quality	Facilitatemagazine	08/04/2022	Online	https://article.signal-ai.com/58c9b730-642f-337b-bd77-be86474b9365?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-	English

				d927231e9700&origin=csv	
BESA Launches 'Safe Havens' Blueprint Guide For Indoor Air Quality	FSM-Online.co.uk	08/04/2022	Online	https://article.signal-ai.com/2764e436-7250-3f7a-8422-3586a90b2d01?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA launches 'safe havens' blueprint for air quality	Specification Online	08/04/2022	Online	https://article.signal-ai.com/43495c49-d67f-3f26-ac24-eec4b5ee3ee9?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA launches 'safe havens' blueprint for indoor air quality	Facilities Management Journal	08/04/2022	Online	https://article.signal-ai.com/59bbb455-fd84-3450-abb7-07165228ab9c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA launches 'safe havens' blueprint guide for indoor air quality	Refurb Projects	08/04/2022	Online	https://article.signal-ai.com/6845eb19-df22-38d9-8f5b-5d8eac9aa46b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA launches 'safe havens' blueprint guide for indoor air quality	LABMOnline.com	08/04/2022	Online	https://article.signal-ai.com/742a3aa1-d6ab-3223-8573-c2f206aa24ae?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA launches 'safe havens' blueprint guide for indoor air quality	Building Services and Environmental Engineer	08/04/2022	Online	https://article.signal-ai.com/f109fbdb-45ec-3143-977a-bdcb7b04a382?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

BESA Launches 'Safe Havens' Blueprint Guide For Indoor Air Quality	Football & Stadium Management Magazine	08/04/2022	Online	https://article.signal-ai.com/db263df0-9f61-3548-8b10-f2f1f2e08ed1?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
U.K. Building Engineers Launch 'Safe Havens'Blueprint for IAQ	Hpac.com	08/04/2022	Online	https://article.signal-ai.com/861844ac-8307-3707-b8bc-147e1c0e8620?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
U.K. Building Engineers Launch 'Safe Havens'Blueprint for IAQ	Hpac.com	08/04/2022	Online	https://article.signal-ai.com/69d07c0d-2298-3292-aeaf-fcba99c4fa42?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA launches 'safe havens' blueprint guide for indoor air quality	Premises & Facilities Management Magazine	07/04/2022	Online	https://article.signal-ai.com/079bcba3-9f5d-339f-b4b9-b04bd118617d?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA launches 'safe havens' blueprint guide for indoor air quality	Heatingandventilating.net	07/04/2022	Online	https://article.signal-ai.com/36c5f140-ed0d-3110-b36f-88c95373055f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA launches 'safe havens' blueprint guide for indoor air quality	AV Technology - Installation	07/04/2022	Online	https://article.signal-ai.com/d08e1e61-93b7-32be-bf46-9e151d1c2a55?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

BESA completes 'safe havens' guides	ACR Journal	07/04/2022	Online	https://article.signal-ai.com/f977046e-238e-38b4-9049-8009c14508fc?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA completes 'safe havens'guides	ACR Journal	07/04/2022	Online	https://article.signal-ai.com/7f40edee-91af-3d88-a284-af0fe2e2cf18?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK?	News Kingpin	16/03/2022	Online	https://article.signal-ai.com/7c1b3776-ffc9-3bf6-b565-2f4fc4c9eb34?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How worrisome is the growing number of coronavirus infections in the UK? | covid	ExBulletin	16/03/2022	Online	https://article.signal-ai.com/f78e77a2-5985-3108-afca-c19a783ec559?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in a UK?	Report News Today	16/03/2022	Online	https://article.signal-ai.com/a2f1ff28-0946-32fd-88c0-c02874ff6cd5?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK?	Pehal News	15/03/2022	Online	https://article.signal-ai.com/7427e532-7aa4-387c-990c-1d6b7c76a5eb?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

How concerning is it that Covid infections are rising in the UK?	The Guardian	15/03/2022	Online	https://article.signal-ai.com/39225129-745b-309b-a167-ed93bb0eb5a3?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK?	Yahoo! UK and Ireland	15/03/2022	Online	https://article.signal-ai.com/2298fc27-a5e4-36dd-8175-86169a3b6f7c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK?	MSN New Zealand	15/03/2022	Online	https://article.signal-ai.com/838d1bfd-313e-3fa1-8088-5ff854f08c40?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK? | Coronavirus	Tech Register	15/03/2022	Online	https://article.signal-ai.com/3aa3b44b-ece4-35e0-9e60-0d5b5c841011?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK?	BusinessFast.co.uk	15/03/2022	Online	https://article.signal-ai.com/5f2d0279-620f-3d1d-8859-1233dacef0ca?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK?	Business Mayor	15/03/2022	Online	https://article.signal-ai.com/b7519b8c-f03a-3de1-a176-1cea3bcad0c6?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

How concerning is it that Covid infections are rising in the UK?	Allusanewshub	15/03/2022	Online	https://article.signal-ai.com/05c072ef-7fd7-333c-b1ec-042c171c64e9?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK? | Coronavirus	Swifttelecast	15/03/2022	Online	https://article.signal-ai.com/34c68bbd-1948-3c9d-93ad-b7bac71ea5cd?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK?	Yahoo News UK	16/03/2022	Online	https://article.signal-ai.com/459273e1-29d8-31e8-b840-7fdef131a437?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK? | Coronavirus	My Droll	15/03/2022	Online	https://article.signal-ai.com/4b8422ad-2ec8-3a20-9988-7b9becd945b2?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK? | Coronavirus	TittlePress	15/03/2022	Online	https://article.signal-ai.com/512e1f58-4eb5-394c-addd-5f1d101646be?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK? | Coronavirus	Verve Times	15/03/2022	Online	https://article.signal-ai.com/5693dba0-ed51-39f3-bcf6-230d84a640f3?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

How concerning is it that Covid infections are rising in the UK?	BusinessTelegraph.co.uk	15/03/2022	Online	https://article.signal-ai.com/c160a60d-ecf2-36e5-a0fc-6b947fec548f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK? | Coronavirus	247 News Around The World	15/03/2022	Online	https://article.signal-ai.com/d79e8ca8-490e-3914-b313-29d668c46219?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK?	Wiredfocus	15/03/2022	Online	https://article.signal-ai.com/e883a4c2-4d72-3d5f-8a70-1f90a5231027?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How concerning is it that Covid infections are rising in the UK?	NewsBreak	15/03/2022	Online	https://article.signal-ai.com/54ef132c-a649-3294-8cee-d2fc894a0a67?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ventilation lessons are good for child health	Education Business	08/03/2022	Online	https://article.signal-ai.com/f53cf8fa-f5ff-355f-8e5a-f59b88e43a4e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
The 'hidden' science critical to economic success	X99News	05/03/2022	Online	https://article.signal-ai.com/a392cbec-41f0-394f-bc4d-9f61fa7a2c84?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Ventilation rates must not be sacrificed for energy efficiency	Building Services and Environmental Engineer	22/02/2022	Online	https://article.signal-ai.com/05900db9-3307-3a6e-84b4-bd57f475fcfd?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ventilation rates must not be sacrificed for energy efficiency	Heatingandventilating.net	22/02/2022	Online	https://article.signal-ai.com/09214565-857c-3ba8-95f5-9f9ec4fcf041?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
'Completely ridiculous' Sadiq Khan under fire over Covid decision	Daily Express	22/02/2022	Online	https://article.signal-ai.com/015163bf-006a-34b5-b62a-e46fa4ebe85e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
'Completely ridiculous' Sadiq Khan under fire over Covid decision	NYTimesPost.com	22/02/2022	Online	https://article.signal-ai.com/8c9e8baa-6213-33a5-b598-dc731b242009?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Education Update	Westminster Hall debates	22/02/2022	Online	https://article.signal-ai.com/7dfecf87-0b6a-3c86-a9cb-8d8ed33f326a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ventilation rates must not be sacrificed for energy efficiency	Facilities Management Journal	18/02/2022	Online	https://article.signal-ai.com/bba62b91-f1dd-386c-af70-9788f5e3530d?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Ventilation rates must not be sacrificed for energy efficiency	Specification Online	18/02/2022	Online	https://article.signal-ai.com/6ea0f053-0db1-336c-8091-799d1559c9a4?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ventilation rates must not be sacrificed for energy efficiency	ACR News	18/02/2022	Online	https://article.signal-ai.com/905d24a3-7bf5-38e4-8f84-1d2090d6263f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ventilation rates must not be sacrificed for energy efficiency	Facilities Management Journal	18/02/2022	Online	https://article.signal-ai.com/dcbdf618-76a1-3a4f-8227-e247791add18?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
“Ventilation rates must not be sacrificed for energy efficiency,” says BESA	FM Business Daily	17/02/2022	Online	https://article.signal-ai.com/a1001713-763d-3b45-8449-a013277d2acc?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Low risk of COVID spread on Underground rail, further supported by mitigations	EGlobal Travel Media	14/02/2022	Online	https://article.signal-ai.com/2989a0d3-5e4b-3158-ab36-18e74613773b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Down the tube: Is the Underground 'Covid safe'?	European Hospital	14/02/2022	Online	https://article.signal-ai.com/3d63d4bf-415d-3f74-b873-190e4558c8dc?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

COVID-19 Spread on Underground Rail is of Low Risk	Techilive	10/02/2022	Online	https://article.signal-ai.com/0a3d39af-6873-3339-a1f5-e9fbda69defa?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
This is the probability of contracting Covid-19 on a Subway trip	Eje Central	10/02/2022	Online	https://article.signal-ai.com/18ddb34c-1fb2-3215-afac-70e61b08757f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish
Computer model predicts low risk of contracting COVID-19 underground	NewsBeezer	09/02/2022	Online	https://article.signal-ai.com/a3063956-87fd-37d5-b0f1-d46c94d9cfb8?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What is the risk of getting covid in the subway?	Televisa.com	09/02/2022	Online	https://article.signal-ai.com/ec178460-09db-3d5a-b315-9c3dff88e30f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish
Optimising building ventilation	Facilities Management Journal	09/02/2022	Online	https://article.signal-ai.com/91092a82-3236-38f1-9fd5-62db69b1be0e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What is the risk of getting Covid-19 on the subway?	Granada Digital	09/02/2022	Online	https://article.signal-ai.com/ae313b33-9bbf-303f-8fcd-6720561bd217?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish

University of Leeds : Low risk of COVID-19 spread on Underground rail	M2 Communications	09/02/2022	Online		English
University of Leeds: Low risk of COVID-19 spread on Underground rail	India Education Diary	09/02/2022	Online	https://article.signal-ai.com/62521383-e623-3fdf-91ed-cae861256bef?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
University of Leeds : Low risk of COVID-19 spread on Underground rail	ENP Newswire	09/02/2022	Online		English
_ The London Underground was not a Covid super-spreader due to masks and ventilated carriages	Fluierul.ro	09/02/2022	Online	https://article.signal-ai.com/4b2470c0-10d3-3d46-baba-62a807f079a5?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Romanian
COVID: Is there a high risk of contagion in the Metro? Study reveals that no	Grupo Formula	09/02/2022	Online	https://article.signal-ai.com/1e71dbff-40fa-3f8e-9089-e3ee8536e6ef?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish
London: 'Low risk' of catching Covid on Tube if people wear masks'	Quick Telecast	08/02/2022	Online	https://article.signal-ai.com/8f86761b-4177-32ac-affe-a77988443375?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid cases down again in Southwark and across London	Heromag	08/02/2022	Online	https://article.signal-ai.com/d61ed872-9d4c-31fb-8aa1-e70091613c57?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-	English

				d927231e9700&origin=csv	
Covid cases down again in Southwark and across London	JNews.uk	08/02/2022	Online	https://article.signal-ai.com/1ca33e94-f8c6-3030-95c8-8f9ee0c15ee9?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid cases down again in Southwark and across London	Southwark News	08/02/2022	Online	https://article.signal-ai.com/6ed08825-cd03-3675-b399-236cf74c177b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid cases down again in Southwark and across London	Uggcozy	08/02/2022	Online	https://article.signal-ai.com/a2dcc7d7-8b57-3aa6-b3e2-af18029c11a0?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid cases down again in Southwark and across London	Woodzog	08/02/2022	Online	https://article.signal-ai.com/b36428d4-5415-348b-bece-cfa16ddeeb8e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
COVID-19 Spread on Underground Rail is of Low Risk	MedIndia	08/02/2022	Online	https://article.signal-ai.com/d2f56783-06b5-34b7-be75-c2d59d1b7a21?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
'Low risk' of catching Covid on Tube if people actually wear masks	Metro	08/02/2022	Online	https://article.signal-ai.com/d3d3673c-a047-322a-a89b-984331fd293c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

London: 'Low risk' of catching Covid on Tube if people wear masks'	Pedfire	08/02/2022	Online	https://article.signal-ai.com/d7d0b312-087b-3b07-9116-aaaa4075278a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
London: 'Low risk' of catching Covid on Tube if people wear masks'	Globalcirculate	08/02/2022	Online	https://article.signal-ai.com/5ca89464-2c0d-396c-9c84-7c10b2d9983f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Computer model predicts low risk of catching COVID-19 on underground	Health Europa	08/02/2022	Online	https://article.signal-ai.com/a88997fb-1aa2-367f-8b15-9c64787c3382?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Computer model predicts low risk of catching COVID-19 on underground	Nestia	08/02/2022	Online	https://article.signal-ai.com/8471eb9c-2791-3ba0-bad3-3e66e40ac885?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Public Health Commission considers shortening quarantines to 3-5 days	La Razón Spain	08/02/2022	Online	https://article.signal-ai.com/da56ba9a-d4ca-374f-90a7-3189606eb335?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish
What is the risk of getting Covid-19 on the subway?	Infosalus	08/02/2022	Online	https://article.signal-ai.com/3c190d37-2ff9-3360-b83d-40a663aed0f5?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish

Risks of coronavirus infection in the subway	TeleMadrid	08/02/2022	Online	https://article.signal-ai.com/06a742cd-4ad8-303d-90e5-0892f11da777?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish
What is the risk of spreading COVID during a subway trip? A model responds	MSN Mexico	08/02/2022	Online	https://article.signal-ai.com/369ef386-0dfe-3b76-852a-930dc97e7744?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish
What is the risk of getting Covid-19 on the subway?	Infosalus	08/02/2022	Blog	https://article.signal-ai.com/af1e8112-f021-390d-916b-529c24b3fa09?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish
The risk of spread of covid that exists in the metro is revealed	Ideal Digital	08/02/2022	Online	https://article.signal-ai.com/09961c08-9ddc-3464-a34d-6de2ea7d7f9f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish
What is the risk of getting Covid-19 on the subway?	Dario Dia	08/02/2022	Online	https://article.signal-ai.com/29c0ca9a-6f10-3240-8675-507e5d03d603?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish
A study concludes that there is low risk of spread of Covid in the subway	Diario Sur	08/02/2022	Online	https://article.signal-ai.com/5fa965f9-9879-30dc-b070-5a085799540e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish

Study says there is low risk of spread of Covid in the subway	PressDigital	08/02/2022	Online	https://article.signal-ai.com/c57cb615-bd76-3f73-88a6-842a8302d023?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish
The London Underground was not a Covid super-spreader due to masks and ventilated wagons	JNews.uk	08/02/2022	Online	https://article.signal-ai.com/5361a4a0-357b-39a6-a1ab-611116de0968?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
UK built models show a low risk of COVID spread on Underground rail	SuperComputing	08/02/2022	Online	https://article.signal-ai.com/1542cfa4-7a2c-39d9-93a5-a380b05a496a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Modelling shows how mitigation reduces COVID risk for rail passengers	Phone Week	08/02/2022	Online	https://article.signal-ai.com/19898594-1b91-308e-bc29-1a6d8020c5f2?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Low risk of COVID-19 spread on Underground rail	University of Leeds	08/02/2022	Online	https://article.signal-ai.com/3f24e7da-2395-3120-8525-1d4f2ef0e05b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Low risk of COVID spread on Underground rail, further supported by mitigations	Newstex Blogs Medical Xpress	08/02/2022	Blog		English
Modelling shows how mitigation reduces COVID risk for rail passengers	BusinessFast.co.uk	08/02/2022	Online	https://article.signal-ai.com/5b8b7890-b517-3114-b466-79e912640baf?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-	English

				39a0-4c04-98da-d927231e9700&origin=csv	
Low risk of COVID spread on Underground rail, further supported by mitigations	EurekAlert!	08/02/2022	Online	https://article.signal-ai.com/6f7c0466-9131-3a72-99eb-085eece24142?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Low risk of COVID spread on Underground rail, further supported by mitigations	TodayUK News	08/02/2022	Online	https://article.signal-ai.com/7eb8e835-e113-395a-818c-64c3e7018e26?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Modelling shows how mitigation reduces COVID risk for rail passengers	The Engineer Online	08/02/2022	Online	https://article.signal-ai.com/c05e208c-f9ca-3800-9592-d895304e22df?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Low risk of COVID spread on Underground rail, further supported by mitigations	Newswise	09/02/2022	Online	https://article.signal-ai.com/0058def1-7a81-3ab3-a545-3d17e710296d?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Low risk of COVID spread on Underground rail, further supported by mitigations	Mirage News	08/02/2022	Online	https://article.signal-ai.com/09d5ff6a-d625-3ce4-80cc-fcd9ddc82ee9?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Low risk of COVID spread on Underground rail, further supported by mitigations	Newsotime	08/02/2022	Online	https://article.signal-ai.com/4beb89d9-c029-3053-b45e-a2cac88a4813?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-	English

				d927231e9700&origin=csv	
Low risk of COVID spread on Underground rail, further supported by mitigations	Medical Xpress	08/02/2022	Online	https://article.signal-ai.com/5b30a723-84c0-3d86-af40-6f446aa9915c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Low risk of COVID spread on Underground rail, further supported by mitigations	My Asian Marketplace	08/02/2022	Online	https://article.signal-ai.com/5bdbef35-887c-37b7-9db1-5bfc2cc5975b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Low risk of COVID spread on Underground rail, further supported by mitigations	Newswise: Latest News	09/02/2022	Online	https://article.signal-ai.com/5c6e4d5e-eb4e-3702-8016-5a4c49508a3a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Low risk of COVID spread on Underground rail, further supported by mitigations	Psychology News - Psychiatry News, Health News, Psychology, Health	08/02/2022	Online	https://article.signal-ai.com/925c1480-7019-3f26-851f-58862838d23e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Low risk of COVID spread on Underground rail, further supported by mitigations	Scienmag	08/02/2022	Online	https://article.signal-ai.com/c9e010be-8d45-3d2b-a215-480544a8d828?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Low Risk of Covid Spread on Underground	Global Health	08/02/2022	Online	https://article.signal-ai.com/dd8a69d3-8aad-30e4-8d6b-	English

Rail, Further Supported by Mitigations	News Wire			5a6ccd053325?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	
Low risk of COVID spread on Underground rail, further supported by mitigations	Newswise: Latest News	09/02/2022	Blog	https://article.signal-ai.com/5e3406f3-a26e-3659-a4a4-3a59f68015e6?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
London Underground wasn't a Covid super-spreader because of masks and ...	Mogaz news en	08/02/2022	Online	https://article.signal-ai.com/3c354576-648f-34fb-b45a-5568217bbdc7?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
London Underground wasn't a Covid super-spreader because of masks and ventilated carriages	Daily Mail	08/02/2022	Online	https://article.signal-ai.com/31028e30-9c26-3ccb-a39d-7a678376fc1f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
London Underground wasn't a Covid super-spreader, study finds	MSN New Zealand	08/02/2022	Online	https://article.signal-ai.com/58d2b889-1a20-3dac-a2bc-e8b615204555?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
London Underground wasn't a Covid super-spreader, study finds	MSN UK	08/02/2022	Online	https://article.signal-ai.com/d7ef3fc5-50bc-3603-aaf2-70c71a6ddac4?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
London Underground wasn't a Covid super-spreader because of masks and ventilated	Woodzog	08/02/2022	Online	https://article.signal-ai.com/2afa48a1-226f-3734-873f-aad95a90a871?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-	English

carriages				39a0-4c04-98da-d927231e9700&origin=csv	
London Underground wasn't a Covid super-spreader because of masks and ventilated carriages	X99News	08/02/2022	Online	https://article.signal-ai.com/3c5c3a08-5f7f-393e-8ef1-8b1c07f6d4ef?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
London Underground wasn't a Covid super-spreader because of masks and ventilated carriages	Uggcozy	08/02/2022	Online	https://article.signal-ai.com/52d4cd6a-7201-3e63-b290-0760411f45a5?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
London Underground wasn't a Covid super-spreader because of masks and ventilated carriages, study finds	This Is Money (UK)	08/02/2022	Online	https://article.signal-ai.com/5d6b3963-7d3e-39a1-baf3-ce41abd52b5c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
London Underground wasn't a Covid super-spreader, study finds	MSN Australia	08/02/2022	Online	https://article.signal-ai.com/6b0a9678-5539-3929-859d-a7fc3e3c3918?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
London Underground wasn't a Covid super-spreader because of masks and ventilated carriages	Newsfeeds	08/02/2022	Online	https://article.signal-ai.com/7c524589-31e5-33f1-b3a4-2c72a7e2ff98?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
London Underground wasn't a Covid super-spreader, study finds	Hot World Report	08/02/2022	Online	https://article.signal-ai.com/988384f1-f0c6-3419-9251-788a0d4294fa?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-	English

				d927231e9700&origin=csv	
London Underground wasn't a Covid super-spreader because of masks and ventilated carriages	Internewscast	08/02/2022	Online	https://article.signal-ai.com/fdcae7af-4060-335c-b5ed-5dc36515f8bc?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Transport systems low risk for spreading Covid, London Underground data shows	The National (United Arab Emirates)	08/02/2022	Online	https://article.signal-ai.com/9f0cf259-7332-3ae1-a79c-f670b8034a63?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
New Data Suggest There is a Low Risk of COVID on London Tube	Medscape	08/02/2022	Online	https://article.signal-ai.com/22db9e6d-f83c-3c57-a51a-43218d676b28?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
GUV no magic bullet, says Noakes	CIBSE Journal	03/02/2022	Online	https://article.signal-ai.com/89c080ad-f918-3965-864b-94a1d6d5fc1e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
University of Leeds: 'Effective, but not the silver bullet' - air cleaning devices in schools	India Education Diary	03/02/2022	Online	https://article.signal-ai.com/19dd08ed-c07b-3c4f-a261-69381faca833?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
ESFA Update further education: 2 February 2022	Impact News Service	02/02/2022	Online		English
Air cleaning devices in schools are 'effective,	Air Quality	01/02/2022	Online	https://article.signal-ai.com/3afd07a7-c780-3acb-bf1a-	English

but not the silver bullet'	News			b387a8051d60?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	
'Effective, but not the silver bullet' - air cleaning devices in schools	University of Leeds	31/01/2022	Online	https://article.signal-ai.com/79957126-fcb9-31dd-8a06-e3900f29777e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
'Effective but not the silver bullet' - advice to heads considering air cleaning devices in schools	FEnews.co.uk	27/01/2022	Online	https://article.signal-ai.com/ab1278d9-fdf7-38b4-92e9-88ead811725e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid-19 2022: the marathon begins	Yorkshire Bylines	26/01/2022	Online	https://article.signal-ai.com/2df803ab-c6da-3280-b043-9d63ae8e990d?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Whitty urges businesses to invest in ventilation	Modern Building Services	25/01/2022	Online	https://article.signal-ai.com/5f5f6010-307b-3e7c-9a7a-dcc2a8696e1c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid live: Czech Republic scraps mandatory jabs as daily cases hit new high; record cases in Bulgaria	TopologyPro One	19/01/2022	Online	https://article.signal-ai.com/afa4eb6c-ed42-356b-87a8-f1e007bd1f44?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid live: face masks and working from home advice to be scrapped in England;	Phuket Times	19/01/2022	Online	https://article.signal-ai.com/9cb48a58-9bf8-3901-8491-249f66af8d52?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-	English

Germany reports record cases				39a0-4c04-98da-d927231e9700&origin=csv	
Covid live: face masks and working from home advice to be scrapped in England as UK reports 108,069 cases	MSN UK	20/01/2022	Online	https://article.signal-ai.com/a5ffcc09-0bae-353d-8c90-501466b5dc72?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid live: face masks and working from home advice to be scrapped in England; Germany reports record cases	MSN Ireland	19/01/2022	Online	https://article.signal-ai.com/088f2488-b448-3192-a8f2-b924a85bfaf6?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BBC Leeds : 16th January, 13:00 PM GMT	BBC Leeds	16/01/2022	Broadcast	https://article.signal-ai.com/45bb6cb9-fefd-34b0-9301-509c723930ec?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BBC Leeds : 16th January, 12:00 PM GMT	BBC Leeds	16/01/2022	Broadcast	https://article.signal-ai.com/767d5e7a-215e-3ac8-aca1-5cb7659e55aa?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BBC Leeds : 16th January, 10:00 AM GMT	BBC Leeds	16/01/2022	Broadcast	https://article.signal-ai.com/f5a2a3be-9d05-3fde-9fba-dbf5da049036?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BBC Leeds : 16th January, 09:00 AM GMT	BBC Leeds	16/01/2022	Broadcast	https://article.signal-ai.com/a8a0ae8f-1e84-3dec-9fb0-dc24a9a85d3b?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-	English

				d927231e9700&origin=csv	
BBC Leeds : 16th January, 07:00 AM GMT	BBC Leeds	16/01/2022	Broadcast	https://article.signal-ai.com/9cb33d32-092d-311a-a8d8-d89c20373469?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
The new crown virus does not live long? The study exposed that the contagion power of 2 conditions has dropped by 90%.	China Times	12/01/2022	Online	https://article.signal-ai.com/dcc1219d-4e01-3788-998e-efd510ddcf87?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Chinese
Open classroom windows between lessons so kids don't get too cold, says DfE	Schools Week.co.uk	11/01/2022	Online	https://article.signal-ai.com/b2bf7fd9-afb2-3e38-bc3e-011d8ced19ce?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How to Specify Hospital Storage Solutions	Public Sector Build Journal	05/01/2022	Online	https://article.signal-ai.com/d823d9e0-dc92-3fc9-9daf-c34a0a5edee1?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
The Importance of Exceeding Ventilation Standards in Modular Healthcare Buildings	Public Sector Build Journal	05/01/2022	Online	https://article.signal-ai.com/263be395-0a54-32a5-a1ea-4cee560fe41d?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Is UV-C the Answer for Tackling Airborne Infection in Buildings?	TwinFM	05/01/2022	Online	https://article.signal-ai.com/133db33a-019e-3467-975a-2b3e0088eaed?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Prioritising air quality	HousingMMOnline	04/01/2022	Online	https://article.signal-ai.com/60f02ed9-76f2-334a-9d70-5e89044db6e6?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Prioritising air quality	Net Mag Media	04/01/2022	Online	https://article.signal-ai.com/9a94952d-976a-388d-8ce2-7d582511e648?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Prioritising air quality	netMAGmedia Ltd	04/01/2022	Online	https://article.signal-ai.com/b04ddaf1-1c04-397a-8210-971302c528f8?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Royal Institution Christmas Lectures : 30th December, 03:20 AM GMT	BBC Four	30/12/2021	Broadcast	https://article.signal-ai.com/9ed49f5b-287d-3cf0-9e49-2d815f6587a3?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Royal Institution Christmas Lectures : 30th December, 02:45 AM GMT	BBC Four	30/12/2021	Broadcast	https://article.signal-ai.com/f25d9163-0764-3aea-be66-0bf2e83bafa9?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Royal Institution Christmas Lectures : 29th December, 20:35 PM GMT	BBC Four	29/12/2021	Broadcast	https://article.signal-ai.com/05222d87-b9a5-385d-9185-c53295de863e?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Royal Institution Christmas Lectures : 29th December, 20:00 PM GMT	BBC Four	29/12/2021	Broadcast	https://article.signal-ai.com/ec7ff4e1-64b8-3734-af97-e7f259b94dbc?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
TV | RI Christmas Lectures - 'How Covid changed science forever' with Professor Jonathan Van-Tam	Love Ballymena	29/12/2021	Online	https://article.signal-ai.com/55a3871e-0f77-31ba-9320-232683ad6c61?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Inspiring the next generation of engineers to tackle pandemics	Impact News Service	24/12/2021	Online		English
90,629 new daily cases recorded; Scotland cancels Hogmanay street parties	Nouvelles Du Monde	21/12/2021	Online	https://article.signal-ai.com/e953a8b4-ac04-3a82-960d-d535ee4f3a02?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	French
UK Covid live: Ministers 'take a close look at the data' before deciding on circuit breaker for England, Minister says | Politics	SeattleMeditation.org	21/12/2021	Online	https://article.signal-ai.com/5e6c358f-e376-3d25-afdc-c8ca4a35dc8a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
UK Covid reside: ministers 'closely looking at the data' before deciding on circuit breaker for England, says minister | Politics	News Chant	21/12/2021	Online	https://article.signal-ai.com/2259d1c9-1493-30a8-84fb-3464b004cb75?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
UK Covid live: Ministers 'take a close look at the data' before deciding on circuit breaker	TittlePress	21/12/2021	Online	https://article.signal-ai.com/470595bc-513a-3750-9a2e-e12d6d2a3226?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-	English

for England, Minister says | Politics				39a0-4c04-98da-d927231e9700&origin=csv	
UK Covid Live: Ministers are scrutinizing data before deciding on UK circuit breaker, minister says | politics	ExBulletin	21/12/2021	Online	https://article.signal-ai.com/7c0d3d45-dddf-3f7e-94eb-6bafdbd7f7bd?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
UK Covid live: ministers 'closely looking at the data' before deciding on circuit breaker for England, says minister	NewsGroove Uk	21/12/2021	Online	https://article.signal-ai.com/30e5ccba-93ff-364c-9949-e762e0852eab?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
UK Covid live: ministers 'closely looking at the data' before deciding on circuit breaker for England, says minister	BusinessFast.co.uk	21/12/2021	Online	https://article.signal-ai.com/b422543c-f50a-3f65-a98f-830a0e8b8a87?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
UK Covid live: ministers 'closely looking at the data' before deciding on circuit breaker for England, says minister | Politics	Aw-journal	21/12/2021	Online	https://article.signal-ai.com/783663dc-d3b9-34a6-ade8-3a087b8c7e46?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
UK Covid live: Ministers 'look closely at the data' before deciding on circuit breaker for England, says minister | Politics	Digichat.info	21/12/2021	Online	https://article.signal-ai.com/63b1c7e4-9991-312f-a49d-b8c775ce36df?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
COVID-19 'has reshaped science forever'; Professor Cath Noakes with a member of the audience doing an experiment	ENP Newswire	21/12/2021	Online		English

UK Covid live: 90,629 new daily cases recorded as PM says not enough evidence for new curbs	MSN UK	21/12/2021	Online	https://article.signal-ai.com/d7c9d2f1-a795-3ff4-8e60-658d5eef80a3?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
UK Covid live: 90,629 new daily cases recorded as PM says not enough evidence for new curbs	MSN Ireland	21/12/2021	Online	https://article.signal-ai.com/687f2297-45d2-393c-9683-a05cfb1e365f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
UK records 90,629 new daily cases as PM says not enough evidence for new curbs - as it happened	NewsBreak	21/12/2021	Online	https://article.signal-ai.com/2fcde506-429e-3d96-9de9-ab7732045ed5?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
UK Covid live: 90,629 new daily cases recorded; Scotland cancels Hogmanay street parties	MSN Australia	21/12/2021	Online	https://article.signal-ai.com/6becdc5a-a162-36ab-aa4b-e3cfef72f61f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
UK Covid live: 90,629 new daily cases recorded as PM says not enough evidence for new curbs	Msn International Edition	21/12/2021	Online	https://article.signal-ai.com/f34574b4-8964-3103-85bb-a54de1e14bd1?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
UK records 90,629 new daily cases as PM says not enough evidence for new curbs - as it happened	The Guardian	21/12/2021	Online		English
What Covid rules are being considered to	Public News UK	21/12/2021	Online	https://article.signal-ai.com/e7b832f5-4917-3b93-a58e-684d3fc3d7b7?v=web&u=194b50e5-1cf0-	English

tackle Omicron in England? | Coronavirus				486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	
COVID-19 'has reshaped science forever'	University of Leeds	20/12/2021	Online	https://article.signal-ai.com/4e241e29-fc11-3b3a-b277-1296d87e4a7a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid 'has reshaped science forever'	Mirage News	20/12/2021	Online	https://article.signal-ai.com/ab919f97-a204-371a-9779-1128bb92269d?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to fight Omicron in England? | Coronavirus	TittlePress	20/12/2021	Online	https://article.signal-ai.com/995b00f9-a41d-393c-8d0b-cd0a504deca7?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England?	Pehal News	20/12/2021	Online	https://article.signal-ai.com/664dac56-f7b6-3782-ac64-906e7248a28d?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to fight Omicron in England? | Coronavirus	News Net Daily	20/12/2021	Online	https://article.signal-ai.com/cbcf051c-5d31-3c3d-8520-613347d756dd?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Why This Key Maintenance Issue is Becoming a Huge Concern for Businesses in 2022	The London Economic	20/12/2021	Online	https://article.signal-ai.com/c96a20f6-56ee-3bc0-96fe-15bb7ebb6d43?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-	English

				d927231e9700&origin=csv	
What Covid rules are being considered to tackle Omicron in England?	The Guardian	20/12/2021	Online	https://article.signal-ai.com/33701f42-3f2a-3a66-9386-70f28dea82fd?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England?	MSN New Zealand	20/12/2021	Online	https://article.signal-ai.com/482579aa-0c5e-3e8d-8076-2b8bad93c9ca?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England?	Yahoo! UK and Ireland	20/12/2021	Online	https://article.signal-ai.com/82ec7d3b-4d83-3ce2-9bf6-bb354e788b94?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England?	Yahoo! Canada	20/12/2021	Online	https://article.signal-ai.com/497d1cb8-4069-35ec-b030-18a9a1f5fadd?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England?	Big World Tale	20/12/2021	Online	https://article.signal-ai.com/8765bd81-6e72-3a40-87fa-a7a323145762?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England?	MSN Ireland	20/12/2021	Online	https://article.signal-ai.com/92fc96e5-af42-3392-9880-b8f44f84d548?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

What Covid rules are being considered to tackle Omicron in England?	ExecReview.com	20/12/2021	Online	https://article.signal-ai.com/a9f7e8c0-0eb2-3d6b-8ad1-df9b90c021e3?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England? | Coronavirus	247 News Around The World	20/12/2021	Online	https://article.signal-ai.com/0e000773-a620-3b27-a680-a7335b441af7?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England?	BusinessFast.co.uk	20/12/2021	Online	https://article.signal-ai.com/1be93ffe-5acf-3eff-b700-682fe611d4ba?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England?	Yahoo News UK	20/12/2021	Online	https://article.signal-ai.com/4dae452a-16d9-3dba-ab97-29fbf626b966?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England?	Allusanewshub	20/12/2021	Online	https://article.signal-ai.com/698fa8d5-f743-3489-903a-6593d850bbb3?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England?	MSN UK	20/12/2021	Online	https://article.signal-ai.com/b72ab426-7642-3619-84f3-46d0a9ffbac5?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

What Covid rules are being considered to tackle Omicron in England?	NewsBreak	20/12/2021	Online	https://article.signal-ai.com/d42c1d84-06bd-310e-90a6-37eb8a7be198?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England?	Yahoo Canada Sports	20/12/2021	Online	https://article.signal-ai.com/d89a1fe1-da8d-3263-be8e-8df3b104eb5a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
What Covid rules are being considered to tackle Omicron in England?	Msn International Edition	20/12/2021	Online	https://article.signal-ai.com/f30831b3-a55b-315f-b016-3ec71a1f46ce?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
COVID-19 'has reshaped science forever'	University of Leeds	20/12/2021	Online	https://article.signal-ai.com/ffb81567-27f0-3195-ae81-71784ec61d72?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Give them some life-saving presents this Christmas	Cumberland & Westmorland Herald	17/12/2021	Online	https://article.signal-ai.com/e4aa0f9b-c8f4-3c1c-b1a4-9bc2c104f930?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
The gifts that will save lives this Christmas	Newark Advertiser	17/12/2021	Online	https://article.signal-ai.com/05c79b34-ee37-3245-854a-b8d4500da9d8?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

The gifts that will save lives this Christmas Sponsored Editorial	Cambridge Independent	17/12/2021	Online	https://article.signal-ai.com/27e42fe7-ae32-3f96-aa5e-b63cebfc8349?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
The gifts that will save lives this Christmas	Diss Express	17/12/2021	Online	https://article.signal-ai.com/3c7d7ba6-bb21-3bfc-9254-3c37a407efeb?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
The gifts that will save lives this Christmas The gifts that will save lives this Christmas Sponsored Editorial	Lynn News	17/12/2021	Online	https://article.signal-ai.com/85e73727-d7b4-3f23-acaf-354b79c7058b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
The gifts that will save lives this Christmas	Fenland Citizen	17/12/2021	Online	https://article.signal-ai.com/86f898be-2b9a-3fc2-90fb-ca9973bef61b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Beat Covid-19 with these life-saving Christmas presents	NewburyToday.co.uk	17/12/2021	Online	https://article.signal-ai.com/9343459a-a38d-3b35-b7c9-cba9c6009e25?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Going viral: How Covid changed science forever	Laboratory News	14/12/2021	Online	https://article.signal-ai.com/7f5cfd61-c742-32f0-911a-24925a57340f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

'No excuse' for poorly ventilated buildings	CIBSE Journal	03/12/2021	Online	https://article.signal-ai.com/72da392c-20df-3770-887d-c016e3d47869?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BBC Leeds : 2nd December, 12:55 PM GMT	BBC Leeds	02/12/2021	Broadcast	https://article.signal-ai.com/2c916f97-2c16-3ad4-b330-25d68d76205e?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Visualising your COVID-19 risk	University of Leeds	02/12/2021	Online	https://article.signal-ai.com/657d6436-a061-3179-8e93-5d9c7882f847?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Visualising your COVID-19 risk	University of Leeds	30/11/2021	Online	https://article.signal-ai.com/7ca2e299-3280-3d06-a8fc-bd7f52aae9b7?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Regional News and Weather : 29th November, 17:05 PM GMT	ITV 1 Yorkshire West	29/11/2021	Broadcast	https://article.signal-ai.com/369b9aff-e0e5-3e1e-b271-51f26b68228c?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Next 3 weeks crucial in fight against 'new kid on the block' Omicron variant, JVT warns	The-Sun.com US	29/11/2021	Online	https://article.signal-ai.com/472af363-cea4-36b7-9012-056c5ea7c52b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Next 3 weeks crucial in fight against 'new kid on the block' Omicron variant, JVT warns	TWNews.co.uk	29/11/2021	Online	https://article.signal-ai.com/6248adde-eca8-3f62-a410-ca5c0e6d6351?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Whitty urges businesses to invest in ventilation	Heatingandventilating.net	26/11/2021	Online	https://article.signal-ai.com/d053ad91-bfd3-33ee-9a3f-4e50fa69c8c1?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improve building ventilation now to avert health emergencies, urges Whitty	Facilitate Magazine	26/11/2021	Online	https://article.signal-ai.com/49419af0-caa7-38ce-832a-a5bffd5eaa32?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improve building ventilation now to avert health emergencies, urges Whitty	Facilitatemagazine	26/11/2021	Online	https://article.signal-ai.com/a1e3c17e-9d33-3434-9595-dcbf06540fa5?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Whitty Urges Businesses To Invest In Ventilation	FSM-Online.co.uk	25/11/2021	Online	https://article.signal-ai.com/ca054ef7-85ff-3c37-9ce6-d1d021143195?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Football & Stadium Management (FSM) is a print magazine and digital news resource for those involved with sports stadia, facilities, pitch and turf care.	Football & Stadium Management Magazine	25/11/2021	Online	https://article.signal-ai.com/2d4efbb3-2c39-3edd-843f-c5f06ca1e476?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

BESA Conference takes up COP26 challenge	Heatingandventilating.net	18/11/2021	Online	https://article.signal-ai.com/ab6a30fc-7c6e-3f8e-9f6b-fa1c1b170474?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
No excuse for poorly ventilated buildings	Building Design & Construction	18/11/2021	Online	https://article.signal-ai.com/255023e6-b4b3-3d57-9c20-a654b5f6cb01?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA conference shows 'real grounds for hope'	Project Scotland Magazine	16/11/2021	Online	https://article.signal-ai.com/98730cb3-43c5-310e-b8a4-54d0c7b9b55b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA Conference takes up COP26 challenge	ACR News	16/11/2021	Online	https://article.signal-ai.com/b9a4d6bd-fc6f-39f9-b394-dcc4134fc2cc?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA Conference Takes Up COP26 Challenge	FSM-Online.co.uk	16/11/2021	Online	https://article.signal-ai.com/c0d1e27f-a877-3840-8fae-21c6c7f629fa?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA Conference Takes Up COP26 Challenge	Football & Stadium Management Magazine	16/11/2021	Online	https://article.signal-ai.com/ab15fe0b-64b7-338d-bdc5-e2af0f62d83a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

16th November: Coronavirus News Updates	Marketing Stockport	16/11/2021	Online	https://article.signal-ai.com/f010aaae-0131-3d68-bcef-bf50df0a3049?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA: no excuse for poorly ventilated buildings	JARN	09/11/2021	Online	https://article.signal-ai.com/edfaf7d0-de87-32e1-aff1-0ffde2f6767e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA: no excuse for poorly ventilated buildings	JARN	09/11/2021	Online	https://article.signal-ai.com/9ed8c516-840c-30fb-a891-c66f964f0aac?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BESA National Conference 2021 - Highlights	TwinFM	09/11/2021	Online	https://article.signal-ai.com/ce21c00e-8fff-37a0-a9dd-7e0bafda6173?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Government adviser calls for ventilation improvements in buildings	Facilitate Magazine	09/11/2021	Online	https://article.signal-ai.com/501e7acc-83be-30cd-a380-fdf90da2a625?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Government adviser calls for ventilation improvements in buildings	Facilitatemagazine	09/11/2021	Online	https://article.signal-ai.com/0a5bb20f-caa5-3423-a440-f1224614d6eb?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

No excuse for poorly ventilated buildings	Specification Online	09/11/2021	Online	https://article.signal-ai.com/f343a3b6-00e1-3778-aa56-89f4a696503e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Government advisor calls for improved building ventilation	PBCToday.co.uk	08/11/2021	Online	https://article.signal-ai.com/03df2cf0-5a0f-3742-86c0-c91515d65ee0?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
No excuse for poorly ventilated buildings	Building Services and Environmental Engineer	08/11/2021	Online	https://article.signal-ai.com/2828fca3-6f9e-3773-9437-17d65cccf5bc?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
No Excuse For Poorly Ventilated Buildings	FSM-Online.co.uk	08/11/2021	Online	https://article.signal-ai.com/74550586-6f64-3055-be7b-1e81cd134c6a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
No excuse for poorly ventilated buildings	Heatingandventilating.net	08/11/2021	Online	https://article.signal-ai.com/da5a8360-11df-3948-8756-3f85c3d3db47?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
SAGE specialist urges UK-wide culture change over value of 'good' ventilation	H&V News	04/11/2021	Online	https://article.signal-ai.com/f85eb47d-e0eb-344a-bba8-a47cb09666f2?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Expert backs ventilation code of conduct in response to Covid-19	H&V News	04/11/2021	Online	https://article.signal-ai.com/7f96ad1f-a0d0-3b0f-9ccc-ab9b5622bd2c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
CNN skewered Boris Johnson for not wearing a mask and it's how all these interviews should be done	The Poke	03/11/2021	Blog	https://article.signal-ai.com/870af912-b8b4-3560-bbf2-d4eebc836ec9?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus UK: Names of 50 SAGE committee scientists revealed	Sound Health and Lasting Wealth	15/10/2021	Online	https://article.signal-ai.com/aeb13fcd-8a6b-3360-b065-094f2f768477?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Indoor air quality needs addressing to prevent virus spread	Air Quality News	13/10/2021	Online	https://article.signal-ai.com/25f65cfd-a801-3f58-a6cb-2294d74fa80f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
EnviroVent | Addressing IAQ to prevent virus spread	LABMOnline.com	12/10/2021	Online	https://article.signal-ai.com/6a07cc97-4b76-352f-b30b-eda4c299009c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Mitigating Airborne Infection Risk	Cooling India	12/10/2021	Online	https://article.signal-ai.com/855e5657-460e-31ab-9f2f-2fa0f7aec04f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Boris hails another step towards freedom from coronavirus lockdown	Duk news	06/10/2021	Online	https://article.signal-ai.com/a0b02bee-24b3-320f-b421-92ad8736e929?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How Covid-19 masks influence the psychology of facial attractiveness, according to science	NewsBreak	30/09/2021	Online	https://article.signal-ai.com/3dec929f-0fba-3c71-9408-6ed757703d72?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
University of Leeds: Top honour for engineering's 'best of the best'	India Education Diary	27/09/2021	Online	https://article.signal-ai.com/faa720bc-9ddc-3fe0-9f29-6e14221448af?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid-19: how effective are face masks, really?	Player.fm	23/09/2021	Online	https://article.signal-ai.com/d54f04bf-3274-30ae-bdd2-3486a8d75407?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid-19: how effective are face masks, really? | Science	Tech Register	23/09/2021	Online	https://article.signal-ai.com/ce030b86-cd3a-384e-8e83-f06004c37beb?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid-19: how effective are face masks, really?	The Guardian	23/09/2021	Online	https://article.signal-ai.com/731625ba-0d07-39c1-8e2c-3b7129f7e1f7?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Covid-19: how effective are face masks, really?	BusinessFast.co.uk	23/09/2021	Online	https://article.signal-ai.com/c11b3750-9c12-33a8-8e30-939de4c45cbd?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid-19: how effective are face masks, really? - podcast	NewsBreak	23/09/2021	Online	https://article.signal-ai.com/9abd1639-723a-3acb-8d47-add847183d56?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid-19: how effective are face masks, really?	Daily Advent	23/09/2021	Online	https://article.signal-ai.com/6f3526fe-f749-3d32-a48a-9e70b6db3b3c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
University of Leeds academic joins Royal Academy of Engineering for her work in controlling COVID in buildings	Yorkshire Evening Post	23/09/2021	Online	https://article.signal-ai.com/2ef0bba6-9360-3eb3-82df-eea766f6bde9?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
University of Leeds academic joins Royal Academy of Engineering for her work in controlling COVID in buildings	Yorkshire Evening Post	23/09/2021	Print		English
University of Leeds academic joins Royal Academy of Engineering for her work in controlling COVID in buildings	JPI Media UK	23/09/2021	Online		English
University of Leeds: Top honour for engineering's 'best of the best'	ENP Newswire	23/09/2021	Online		English

Top honour for engineering's 'best of the best'	University of Leeds	22/09/2021	Online	https://article.signal-ai.com/b752bc83-d75e-35e1-b324-83419ff3f2d0?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Top honour for engineering's 'best of the best'	University of Leeds	22/09/2021	Online	https://article.signal-ai.com/2156149b-bcb4-3867-a5d7-3d826e825a1e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
University of Leeds: The 'hidden'science critical to economic success	HT Syndication	20/09/2021	Online	https://article.signal-ai.com/b1b955e3-7609-30b6-9e42-fae470a7a891?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
University of Leeds: The 'hidden' science critical to economic success	India Education Diary	20/09/2021	Online	https://article.signal-ai.com/6d9d2d30-9b42-3034-b6df-2a7bbc36710e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
University of Leeds: The 'hidden' science critical to economic success	India Education Diary	20/09/2021	Online		English
It gives us a better understanding of how the coronavirus works. Polka among the most influential people of "Time"	MSN Polska	16/09/2021	Online	https://article.signal-ai.com/b5c30e60-71cd-3803-b17c-efcd1342bbcb?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Polish
University of Leeds: The 'hidden' science critical to economic success	ENP Newswire	16/09/2021	Online		English

The 'hidden' science critical to economic success	University of Leeds	15/09/2021	Online	https://article.signal-ai.com/4eb8e5fc-4746-318c-bd84-f691d86a747f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
'hidden' science critical to economic success	Mirage News	15/09/2021	Online	https://article.signal-ai.com/bfb12987-ea3d-30eb-88ab-fffb9a4b30b8?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Why do so many vaccinated Britons still feel too frightened to leave home?	Duk news	02/09/2021	Online	https://article.signal-ai.com/ae31a71d-bd55-3485-adf8-c4786f357705?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Upward trend: ventilating buildings to minimise Covid-19 risk	CIBSE Journal	02/09/2021	Online	https://article.signal-ai.com/a6ec0e2b-2740-39c4-ae67-1dd46254481e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid-19: why CO2 sensors will be essential for re-entry	Science et Avenir	31/08/2021	Online	https://article.signal-ai.com/c0138842-420f-38d5-bb59-af903eaa4d85?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	French
Covid-19: why CO2 sensors will be essential for re-entry	Sciences et Avenir.fr	31/08/2021	Online	https://article.signal-ai.com/d567b81a-e277-3357-acd2-5b0fbe9e667b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	French

Don't hug too much, keep them short and wear a MASK, cautious SAGE scientist warns	Duk news	25/08/2021	Online	https://article.signal-ai.com/45aa69b8-2689-3bfc-bba6-66cbd374df12?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How to properly ventilate classrooms and workplaces	Internazionale it	24/08/2021	Online	https://article.signal-ai.com/bea24440-e929-3d76-bcf2-126a9115e56b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Italian
Update Technology: the Management of Ventilation in the Middle of a Pandemic	Kompasiana	24/08/2021	Online	https://article.signal-ai.com/a27bf87a-9018-30ac-8b8c-b2d48c69a9cb?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Indonesian
Update Technology: the Management of Ventilation in the Middle of the Pendemi	Kompasiana	24/08/2021	Online	https://article.signal-ai.com/e9781e38-c1df-3694-b73e-e02054fa7334?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Indonesian
We need a new sanitary revolution to take place	Postimees	22/08/2021	Online	https://article.signal-ai.com/2807adbf-a10c-35e0-9e37-dec561952202?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Estonian
Boris Johnson will confirm hugs from Monday at 5pm briefing	Duk news	22/08/2021	Online	https://article.signal-ai.com/7986daaf-9bfa-3079-b424-2f4776edee93?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Leading scientists say they remain puzzled about how and why COVID spreads	123ru.net	20/08/2021	Online	https://article.signal-ai.com/301ef931-b2d7-35ce-8e54-7e9e1cce64ec?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Spanish
Covid-19: Five ways to avoid catching the virus indoors	Head Topics UK	20/08/2021	Online	https://article.signal-ai.com/a642869f-b8b1-3ba6-8166-a98097862dcb?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Covid-19: Five ways to avoid catching the virus indoors	Head Topics	20/08/2021	Online	https://article.signal-ai.com/732bb337-8bce-3058-b8dd-dcb27ebe6a7e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ventilation can make schools and offices safe from covid-19 - but how?	IDea HUNTR	19/08/2021	Online	https://article.signal-ai.com/db412e91-ce70-3048-b219-a33a5ffa61ac?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ventilation can make schools and offices safe from covid-19 - but how?	New Scientist	19/08/2021	Online	https://article.signal-ai.com/33f4c47c-e171-36e0-b558-e3c820674e2d?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
'Out-dated' social distancing measures will not protect you from Covid-19	Duk news	14/08/2021	Online	https://article.signal-ai.com/4126b507-43ee-38fd-8e90-d84b7d79d410?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Top scientists remain puzzled over how and why Covid spreads	Yahoo! Singapore News	08/08/2021	Online	https://article.signal-ai.com/7bf9f493-70ae-377e-bb7b-5600b5a9a131?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Why teenage pupils should wear masks in class	Duk news	08/08/2021	Online	https://article.signal-ai.com/a69fc4e7-812d-3162-a740-b271ae9a5c8f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Is there really something wicked in the air?; Theory that Covid spreads via airborne transmission is only one part of the picture, scientists believe	The Sunday Telegraph	08/08/2021	Print		English
Covid 19 coronavirus: Top scientists remain puzzled over how and why the virus spreads	New Zealand Herald	08/08/2021	Online	https://article.signal-ai.com/bcad9f47-ac1a-395e-b263-87ed7c8d0591?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Top scientists remain puzzled over how and why Covid spreads	News Chant	07/08/2021	Online	https://article.signal-ai.com/0a08356c-cdc6-36d7-90c5-c7cddecf36f2?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Top scientists remain puzzled over how and why Covid spreads	MSN UK	07/08/2021	Online	https://article.signal-ai.com/5c5f7f6a-9755-3e23-b120-a99554b9fcae?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Top scientists remain puzzled over how and why Covid spreads	Yahoo! UK and Ireland	07/08/2021	Online	https://article.signal-ai.com/a06ea9f2-91c5-3960-b753-065d9c038703?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Top scientists remain puzzled over how and why Covid spreads	The Daily Telegraph	07/08/2021	Online	https://article.signal-ai.com/fa0c9277-4bbf-31d5-98f3-9bd715cd3fdd?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Top scientists remain puzzled over how and why Covid spreads	Vietnam Explorer News Channel	07/08/2021	Online	https://article.signal-ai.com/32e77999-dc63-3094-92ef-7ce6c7e80be7?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Top scientists remain puzzled over how and why Covid spreads	MSN Health Singapore	07/08/2021	Online	https://article.signal-ai.com/474d0f11-304f-3301-80c7-7b432f557f3e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Top scientists remain puzzled over how and why Covid spreads	MSN New Zealand	07/08/2021	Online	https://article.signal-ai.com/4c3e8d3c-ecda-3b0c-8dba-37b3c1f10d92?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Top scientists remain puzzled over how and why Covid spreads	MSN Singapore	07/08/2021	Online	https://article.signal-ai.com/7a9eedef-d1b9-3d49-8baa-e4877a0c9680?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Top scientists remain puzzled over how and why Covid spreads	MSN.com Malay	07/08/2021	Online	https://article.signal-ai.com/a5ed0dad-0ba1-3ddb-b789-29863e4e60e8?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Top scientists remain puzzled over how and why Covid spreads	Yahoo News UK	08/08/2021	Online	https://article.signal-ai.com/f30465d9-9492-3111-9704-d2691a1fd018?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BBC Leeds : 5th August, 06:25 AM GMT	BBC Leeds	05/08/2021	Broadcast	https://article.signal-ai.com/1a3df055-790c-3b61-9ae2-a3c42a030220?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BBC Leeds : 5th August, 06:20 AM GMT	BBC Leeds	05/08/2021	Broadcast	https://article.signal-ai.com/c4e5943e-811b-3f74-8ba5-225078fe10de?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
How do cooking and cleaning impact the air quality in our homes?	Futurum Careers	04/08/2021	Online	https://article.signal-ai.com/31416332-8044-37f6-aed5-a7e40457d003?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus latest news: All classrooms should be 'audited' to check ventilation before schools return, Sage member suggests	MSN UK	04/08/2021	Online	https://article.signal-ai.com/d7a0d2b7-d08f-304f-a804-e4a43119d64f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Coronavirus latest news: All classrooms should be 'audited' to check ventilation before schools return, Sage member suggests	Ampgoo	04/08/2021	Online	https://article.signal-ai.com/4b3aa211-1c0f-300a-b1a8-79428f1b1049?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus latest news: All classrooms should be 'audited' to check ventilation before schools return, Sage member suggests	Yahoo! News USA	04/08/2021	Online	https://article.signal-ai.com/ec7726b8-bf0b-3a1e-bc44-e91c450b31c2?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
BBC Radio 4 : 4th August, 06:30 AM GMT	BBC Radio 4	04/08/2021	Broadcast	https://article.signal-ai.com/e4f77a3f-9d78-32e6-ad77-2ab1f67cbf3c?v=app&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Vaccines for 12-year-olds under review, JCVI says	The Daily Telegraph	04/08/2021	Online		English
Coronavirus latest news: Vaccines for 12-year-olds under review, JCVI say	Yahoo! UK and Ireland	03/08/2021	Online	https://article.signal-ai.com/16a75b45-7e02-3b2e-9e23-03e4acc47655?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus latest news: Vaccines for 12-year-olds under review, JCVI say	Yahoo News UK	04/08/2021	Online	https://article.signal-ai.com/d5dde845-322c-3b81-bcbc-3399c28bc441?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Techno Trenz	Techno Trenz	02/08/2021	Online	https://article.signal-ai.com/173b6701-1812-34d2-868c-79bb9a29e95c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-	English

				39a0-4c04-98da-d927231e9700&origin=csv	
Network Rail tests showing no traces of Covid only 'a snapshot in time', expert says	Knowledia News (UK)	02/08/2021	Online	https://article.signal-ai.com/49c4dc98-36f3-3667-a895-96465c98a9ce?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
briefings	Science Media Centre	02/08/2021	Online	https://article.signal-ai.com/010f512d-93ed-3808-93d3-0e8f9808507f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
MIL-OSI United Kingdom: expert reaction to report on detecting SARS-CoV-2 in railway stations, commissioned by Network Rail	ForeignAffairs.co.nz	02/08/2021	Online	https://article.signal-ai.com/22ae65cb-06f3-3c50-8b89-94a1efc4f360?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Network Rail tests showing no traces of Covid in stations and trains only 'a snapshot in time', expert says	The I	02/08/2021	Online	https://article.signal-ai.com/e1f880c4-af19-3aef-843b-d10e7a559bef?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
US Covid expert Anthony Fauci calls for double-masking to slash the spread of coronavirus	Duk news	31/07/2021	Online	https://article.signal-ai.com/75ef0bd8-b4f8-32d3-a3d9-6ad85867dbd0?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Engineering the new normal: Technical Symposium highlights	CIBSE Journal	29/07/2021	Online	https://article.signal-ai.com/24afd3d2-2e1f-31df-b2c6-06d8701ef8f7?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-	English

				d927231e9700&origin=csv	
Covid: Ex-nurse ranted about 'hanging doctors & nurses' in protest speech - Twitter fought back	The London Economic	26/07/2021	Online	https://article.signal-ai.com/6f3fa19b-ddaf-3f09-b4cb-12331d36a5ce?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ex-nurse ranted about 'hanging doctors and nurses' in Trafalgar Square speech - here's how Twitter responded	Indy100.com	25/07/2021	Online		English
Ex-nurse ranted about 'hanging doctors and nurses' in Trafalgar Square speech - here's how Twitter responded	MSN Ireland	25/07/2021	Online	https://article.signal-ai.com/8c177ac9-73ea-39b7-bb8d-6d792154d272?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Double-jabbed Britons arriving back from France must quarantine for 10 days	TodayHeadline	19/07/2021	Online	https://article.signal-ai.com/d867b744-1042-34ba-9f54-fe00c0b850a8?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Double-jabbed Britons arriving back from France must quarantine for 10 days	The Girl Sun	19/07/2021	Online	https://article.signal-ai.com/90c9e4e4-50f5-3689-9f96-40af3bb6ec01?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Double-jabbed Britons arriving back from France must quarantine for 10 days	Amed Post	19/07/2021	Online	https://article.signal-ai.com/be96c1a6-0d41-377a-8ee7-74d6312b1285?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Boris U-turns and will NOT use trial testing scheme to avoid quarantine after being contacted by test and trace over meeting with Covid-infected Sajid Javid amid fury at attempt to sidestep isolation rules forced on hundreds of thousands of 'pinged' Brits	Daily Mail	18/07/2021	Online		English
Covid cases rise 68% in a week to 54,674 - but deaths stay low at 41: Experts warn infections will stay high for MONTHS after passing 100k in two weeks - and a new lockdown may be needed by September	Daily Mail	17/07/2021	Online		English
Pollution-busting new clean air strategy plan for Leeds	Yorkshire Evening Post	17/07/2021	Print		English
Covid cases rise 68% in a week to 54,674 - but deaths stay low at 41	Daily Mail	17/07/2021	Online	https://article.signal-ai.com/75b35556-10d0-344f-aef7-ce7e55eb290e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Freedomroo - UK coronavirus cases will stay high for MONTHS until autumn, say SAGE	AustralianNews Review	17/07/2021	Online	https://article.signal-ai.com/03b7c2d8-0604-30a5-bd47-ed7e68303e3c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
LEADING SCIENTISTS JOIN THE APP REVOLT	Daily Mail	17/07/2021	Print		English
Coronavirus UK: Holidaymakers' fury as	Mogaz news en	17/07/2021	Online	https://article.signal-ai.com/f8301e96-0763-33e5-bb21-256191368782?v=web&u=194b50e5-1cf0-	English

families are forced to cancel trips to ...				486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	
'It's horrendous': Holidaymakers' fury as families are forced to cancel trips to France after last minute reversal of amber list rule change which means double-jabbed Britons will STILL have to quarantine from Monday	Daily Mail	17/07/2021	Online	https://article.signal-ai.com/1a35dc54-7a44-3202-acc2-c93ac5f30bae?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus UK: Holidaymakers' fury as families are forced to cancel trips to France	Express Informer	17/07/2021	Online	https://article.signal-ai.com/6e9a1908-31b1-3057-8a26-ad9bd24a60f3?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus UK: Holidaymakers' fury as families are forced to cancel trips to France	NewsColony.com	17/07/2021	Online	https://article.signal-ai.com/84f7e5ac-7c1c-3f7f-9b99-0557c3335be6?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Its horrendous: Holidaymakers fury as families cancel French trips	Big World Tale	17/07/2021	Online	https://article.signal-ai.com/9cbac3d1-4bd1-3854-928f-324964fa18d3?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus UK: Holidaymakers' fury as families are forced to cancel trips to France	UAENews.ekumkum.com	17/07/2021	Online	https://article.signal-ai.com/162f4595-7419-3f8e-85f0-bf0b8af980fa?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus UK: Holidaymakers' fury as families are forced to cancel trips to France	UKTimeNews.com	17/07/2021	Online	https://article.signal-ai.com/17ba513f-3725-34aa-a1f0-6e5a408688ca?v=web&u=194b50e5-1cf0-	English

				486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	
Coronavirus UK: Holidaymakers' fury as families are forced to cancel trips to France	Swiftheadline	17/07/2021	Online	https://article.signal-ai.com/1b6d1042-6b9c-35d8-a10c-8218cae6a7f7?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus UK: Holidaymakers' fury as families are forced to cancel trips to France	Eminetra.co.uk	17/07/2021	Online	https://article.signal-ai.com/20d418e7-424d-3eea-9d9a-5f9cdb7e3b6f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
France to require non-fully vaccinated Brits to show negative Covid test taken within 24 hours	AustralianNews Review	17/07/2021	Online	https://article.signal-ai.com/2db57285-5da1-33f1-8fa3-f4c0640df814?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus UK: Holidaymakers' fury as families are forced to cancel trips to France	Express Digest	17/07/2021	Online	https://article.signal-ai.com/434a333d-196c-3581-b75f-341909fb8d9e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus UK: Holidaymakers' fury as families are forced to cancel trips to France	Salten	17/07/2021	Online	https://article.signal-ai.com/4966245f-0185-3b1c-954c-36244a4c6a4c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
France to require non-fully vaccinated Brits to show negative Covid test taken within 24 hours	France Breaking News	17/07/2021	Online	https://article.signal-ai.com/521b065d-d69a-3ee4-ab60-bc6281777135?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-	English

				d927231e9700&origin=csv	
France to require non-fully vaccinated Brits to show negative Covid test taken within 24 hours	Newsfeeds	17/07/2021	Online	https://article.signal-ai.com/71157b44-e830-3a50-848e-3838b7175348?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus UK: Holidaymakers' fury as families are forced to cancel trips to France	newsdome.co.za	17/07/2021	Online	https://article.signal-ai.com/742597a7-56c7-3e50-b876-764f3d1bc66f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
'It's horrendous': Holidaymakers' fury as families are forced to cancel trips to France after last minute reversal of amber list rule change which means double-jabbed Britons will STILL have to quarantine from Monday RELATED ARTICLES Share this article RELATED ARTICLES Share this article	This Is Money (UK)	17/07/2021	Online	https://article.signal-ai.com/812d29c5-d293-3a7f-b1d8-25f74394bc2b?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus UK: Holidaymakers' fury as families are forced to cancel trips to France	The Bharat Express News	17/07/2021	Online	https://article.signal-ai.com/89e7a3e2-4007-3164-a4ae-5cb01cfc37a8?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
France to require non-fully vaccinated Brits to show negative Covid test taken within 24 hours	The Nation (USA)	17/07/2021	Online	https://article.signal-ai.com/93245138-1bb4-310a-901a-e7c04f4bf531?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Coronavirus UK: Holidaymakers' fury as	Duk news	17/07/2021	Online	https://article.signal-ai.com/b5f2a1e5-e06a-3f01-9eaf-	English

families are forced to cancel trips to France				eeed640ca884?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	
Coronavirus UK: Holidaymakers' fury as families are forced to cancel trips to France	The digital news hours	17/07/2021	Online	https://article.signal-ai.com/eb395594-3596-321f-8ecf-1d6c6bf9e1e9?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Double-jabbed Britons arriving back from France must quarantine for 10 days	Thegirlsun	19/07/2021	Online	https://article.signal-ai.com/446784f4-7f13-3718-a83e-ecfed81902fd?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Double-jabbed Britons arriving back from France must quarantine for 10 days	Thesunbest	19/07/2021	Online	https://article.signal-ai.com/94d41bb2-691b-3de4-a22b-7c6c626a6c30?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Double-jabbed Britons arriving back from France must quarantine for 10 days	Salten	17/07/2021	Online	https://article.signal-ai.com/cd917de2-2806-33dd-b001-2d949532e1ac?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Holiday chaos as double-jabbed travellers from France told to quarantine	Yorkshire Post	17/07/2021	Print		English
Holiday chaos as double-jabbed travellers from France told to quarantine	Yorkshire Evening Post	17/07/2021	Print		English
Abattoir staff get NHS app exemption amid	Mogaz news en	16/07/2021	Online	https://article.signal-ai.com/b89ce276-e7e8-3b93-82df-	English

fears 'Pingdemic' could lead to FOOD ...				e2ab29f91656?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	
Ministers hail plans to adapt Covid app as UK cases rise | Coronavirus	J99 news	16/07/2021	Online	https://article.signal-ai.com/85778dba-0c83-3138-bf8a-8399bcd571e3?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers plan to customize Covid app when cases in England rise Coronavirus	MCU-Times	16/07/2021	Online	https://article.signal-ai.com/a7588562-7324-3877-ac35-0b437df01bbf?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to tweak Covid app as cases in England rise / Coronavirus	Nouvelles Du Monde	16/07/2021	Online	https://article.signal-ai.com/4b22fb50-5727-3a83-9ebc-81403d04d74c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	French
Ministerial Regal plans to change the Covid app as cases in England increase coronavirus	Knews.uk	16/07/2021	Online	https://article.signal-ai.com/cbefeaef-6b85-3979-bd3f-bb21936e753d?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to fix Covid app as cases in England surge	The Guardian	16/07/2021	Online	https://article.signal-ai.com/2a8e1cd7-500e-3071-9554-0f750978c1fe?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to tweak Covid app as cases in England surge	Yahoo! UK and Ireland	16/07/2021	Online	https://article.signal-ai.com/7e2527d8-fad8-3b40-8f7a-5524c788c350?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-	English

				39a0-4c04-98da-d927231e9700&origin=csv	
Ministers shelve plans to tweak Covid app as cases in England surge	Head Topics UK	16/07/2021	Online	https://article.signal-ai.com/08ad94df-e56a-3681-ad63-b9e9ac3d3e26?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to tweak Covid app as cases in England surge	BusinessFast.co.uk	16/07/2021	Online	https://article.signal-ai.com/0ed0e64b-1c61-371c-a82e-1a37ae9ebd81?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to tweak Covid app as cases in England surge	Yahoo! Finance UK and Ireland	17/07/2021	Online	https://article.signal-ai.com/896e49ad-7101-3720-ab66-5f7e2d86975e?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to tweak Covid app as cases in England surge	Yahoo! Singapore	16/07/2021	Online	https://article.signal-ai.com/a889d0ae-50c7-30e6-afb4-1c5b4f8583fa?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to tweak Covid app as cases in England surge	Yahoo! Canada	16/07/2021	Online	https://article.signal-ai.com/b148d2ab-08c2-3bd1-8706-8706321499b8?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to fix Covid app as cases in England surge	Allusanewshub	16/07/2021	Online	https://article.signal-ai.com/06e020c1-2194-3b35-9fcd-7fc9103afe02?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-	English

				d927231e9700&origin=csv	
Ministers shelve plans to tweak Covid app as cases in England surge	New on News	16/07/2021	Online	https://article.signal-ai.com/217b3915-f382-3b6c-8bb7-ae0fb598dc97?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to tweak Covid app as cases in England surge | Coronavirus	Verve Times	16/07/2021	Online	https://article.signal-ai.com/366c2b10-6519-37a3-9c40-bd2ae63d3cda?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to tweak Covid app as cases in England surge	Head Topics	16/07/2021	Online	https://article.signal-ai.com/51227b3a-8c4a-3069-84e3-3604377c5e4a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to tweak Covid app as cases in England surge | Coronavirus	The news motion	16/07/2021	Online	https://article.signal-ai.com/60090f4c-51a6-3d8b-992b-93013fd4e0c7?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to fix Covid app as cases in England surge	Yahoo News UK	16/07/2021	Online	https://article.signal-ai.com/bb7e8f25-3c83-38f3-9b12-77070b6456b3?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to tweak Covid app as cases in England surge	Yahoo! Singapore News	16/07/2021	Online	https://article.signal-ai.com/d55fc58e-d5ee-3a20-ae71-91f9071d822c?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Ministers shelve plans to tweak Covid app as cases in England surge | Coronavirus	News Concerns	16/07/2021	Online	https://article.signal-ai.com/e4925b17-3302-3401-8a01-02442f45d5d7?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Ministers shelve plans to fix Covid app as cases in England surge	Yahoo Canada Sports	16/07/2021	Online	https://article.signal-ai.com/efcb30cc-6f93-33c8-a572-7220b1aa5736?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Corona Virus: Five steps to avoid infection with the virus in enclosed spaces	Saudi24news	16/07/2021	Online	https://article.signal-ai.com/cb53e0ca-9c2a-3ea1-aabe-77e57b147f09?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Corona Virus: Five steps to avoid infection with the virus in confined spaces	Vaaju	16/07/2021	Online	https://article.signal-ai.com/d4afdafe-ac0a-3b09-a6f1-9c06fc925ff3?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Abattoir staff get NHS app exemption amid fears 'Pingdemic' could lead to FOOD SHORTAGES with up to 6 million Britons being told to stay at home every week by the end of July - as bosses say a fifth of workers are already being pinged by app	Daily Mail	16/07/2021	Online	https://article.signal-ai.com/abee78a3-12ce-323e-8d05-e871f1f41f89?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Abattoir staff get NHS app exemption amid fears 'Pingdemic' could lead to FOOD SHORTAGES	NewsColony.com	16/07/2021	Online	https://article.signal-ai.com/4edec93a-d416-366e-93dc-f827cc22c3f5?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-	English

				d927231e9700&origin=csv	
Abattoir staff get NHS app exemption amid fears of FOOD SHORTAGES	Big World Tale	16/07/2021	Online	https://article.signal-ai.com/5b8bfbea-3fcd-3198-907d-0fcf8fb1c5aa?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Abattoir staff get NHS app exemption amid fears 'Pingdemic' could lead to FOOD SHORTAGES	Express Informer	16/07/2021	Online	https://article.signal-ai.com/9444c2b8-cca8-3795-99fe-f7f85418c414?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Abattoir staff get NHS app exemption amid fears 'Pingdemic' could lead to FOOD SHORTAGES	Duk news	16/07/2021	Online	https://article.signal-ai.com/281ff984-fa38-3ea1-9e18-9376d66f18c6?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Abattoir staff get NHS app exemption amid fears 'Pingdemic' could lead to FOOD SHORTAGES	Newsfeeds	16/07/2021	Online	https://article.signal-ai.com/29e0c21b-2745-381b-9ec1-f4c2350027e2?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
	This Is Money (UK)	16/07/2021	Online	https://article.signal-ai.com/3123da53-e2d2-3bb1-8486-ebbd9dd70723?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Abattoir staff get NHS app exemption amid fears 'Pingdemic' could lead to FOOD SHORTAGES	Newsbinding	16/07/2021	Online	https://article.signal-ai.com/59d8d22b-29ea-3ca1-aa0d-20c715e9db46?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Abattoir staff get NHS app exemption amid fears 'Pingdemic' could lead to FOOD SHORTAGES	UAENews.ekumkum.com	16/07/2021	Online	https://article.signal-ai.com/802f27c4-3e1e-3ccf-a0fb-905caaaf18b3?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Abattoir staff get NHS app exemption amid fears 'Pingdemic'could lead to FOOD SHORTAGES	The Nation (USA)	16/07/2021	Online	https://article.signal-ai.com/9913cfe9-97cc-3cb9-925d-0cea381d8e92?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Abattoir staff get NHS app exemption amid fears 'Pingdemic' could lead to FOOD SHORTAGES	News Colony	16/07/2021	Online	https://article.signal-ai.com/b5881453-b5e7-3c83-a188-81dc70f0b245?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Abattoir staff get NHS app exemption amid fears 'Pingdemic' could lead to FOOD SHORTAGES	Eminetra.co.uk	17/07/2021	Online	https://article.signal-ai.com/eb66d4f9-35ba-37e3-8d96-57309aea7f70?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
briefings	Science Media Centre	16/07/2021	Online	https://article.signal-ai.com/61423b5c-6124-3a82-a3e6-bec9f5c13994?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
MIL-OSI United Kingdom: Infection Resilient Environments	ForeignAffairs.co.nz	16/07/2021	Online	https://article.signal-ai.com/96a0dd8d-5c4c-3d2a-a048-c5dae1653774?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Good ventilation will be 'more important than ever' after Freedom Day on July 19 to cut Covid risk, says Leeds academic Cath Noakes	Yorkshire Post	16/07/2021	Print		English
Good ventilation will be 'more important than ever' after Freedom Day on July 19 to cut Covid risk, says Leeds academic Cath Noakes	Yorkshire Post	16/07/2021	Online	https://article.signal-ai.com/a11922c5-21ad-31d2-a9fb-4f23b0383057?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Good ventilation will be 'more important than ever' after Freedom Day on July 19 to cut Covid risk, says Leeds academic Cath Noakes	Yorkshire Evening Post	16/07/2021	Online	https://article.signal-ai.com/162236d4-9b13-3025-8fcd-67b91a752d64?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Good ventilation will be 'more important than ever' after Freedom Day on July 19 to cut Covid risk, says Leeds academic Cath Noakes	Yorkshire Evening Post	16/07/2021	Print		English
Causes of indoor coronavirus infection	Alroya.om	16/07/2021	Online	https://article.signal-ai.com/66f12bea-4dd8-3ce8-a959-0e4eb179a8fa?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Arabic
Five steps to avoid indoor coronavirus infection	BBC Arabic	15/07/2021	Online	https://article.signal-ai.com/f8f2c982-9f72-3958-a188-27722f8f792a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	Arabic

Turning Healthcare Buildings Into 'Safe Havens'	Facilities Management Uk Magazine	08/07/2021	Online	https://article.signal-ai.com/382b83db-950c-3a72-b061-4fbc8b8cbca1?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Indoor air quality needs to be talked about far more than it is	Workplace Insight	08/07/2021	Online	https://article.signal-ai.com/bed7077a-2107-372a-befc-5ebacb1eef9d?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Indoor air quality needs to be talked about far more than it is	WorkplaceInsight.net	08/07/2021	Online	https://article.signal-ai.com/e17c3738-089b-3184-b385-12cfeaacaa49?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Indoor air quality needs to be talked about far more than it is	Workplace Insight	08/07/2021	Blog	https://article.signal-ai.com/9717e5a1-4315-3305-afa7-69dd6a4d75e9?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Turning healthcare buildings into 'safe havens'	Heatingandventilating.net	05/07/2021	Online	https://article.signal-ai.com/659ada02-6f5d-3576-a4e5-504eeedf645f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
Improving indoor air quality to combat Covid-19 in care homes	Air Quality News	02/07/2021	Online	https://article.signal-ai.com/d6ecdde2-c921-3fc6-a8b7-1b63959ba32a?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

High-profile cases signal rise in Covid-19 ahead of lockdown easing	The Guardian	28/06/2021	Online	https://article.signal-ai.com/953012f5-5524-3c09-847c-0efee9be73d9?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
High-profile cases signal rise in Covid-19 ahead of lockdown easing	Yahoo! UK and Ireland	28/06/2021	Online	https://article.signal-ai.com/a9bec16c-489e-341a-a8b9-c0b7a996e835?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
High-profile cases signal rise in Covid-19 ahead of lockdown easing	MSN New Zealand	28/06/2021	Online	https://article.signal-ai.com/c745dd85-cf18-386b-bf96-3f372af77e28?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
High-profile cases signal rise in Covid-19 ahead of lockdown easing	Msn International Edition	28/06/2021	Online	https://article.signal-ai.com/af769d04-c1df-375b-b5c2-2979c1b4c8dd?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
High-profile cases signal rise in Covid-19 ahead of lockdown easing	Yahoo News UK	28/06/2021	Online	https://article.signal-ai.com/b9b506b4-7307-36bc-87b9-901d52547202?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English
High-profile cases signal rise in Covid-19 ahead of lockdown easing	MSN Australia	28/06/2021	Online	https://article.signal-ai.com/bd4dbac5-aee7-3f24-94b7-e25fe4617dae?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English

Improving indoor air quality to combat Covid-19 in care homes	Social Care Today	28/06/2021	Online	https://article.signal-ai.com/f1e0a2a5-9bd7-39da-9642-6acd7dad139f?v=web&u=194b50e5-1cf0-486c-8184-247d81d36d50&w=e325b6fc-39a0-4c04-98da-d927231e9700&origin=csv	English