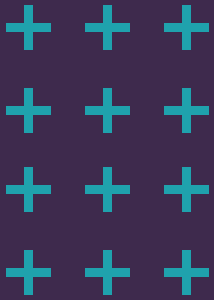


IGNITE 2022

Preparedness and response to bio-emergencies: how can the UK's medical science community best support a national and international effort to tackle bio-emergencies



Foreword

The IGNITE summit series exists to enable established and emergent medical innovators to explore ways in which medical innovation might be accelerated and made more productive through a series of debates chaired by leading authorities in the field.

This, the fifth such summit, held as we begin to emerge from Covid restrictions recognised the unpalatable likelihood of further global biothreats. Despite the remarkable achievements of science in combating the Covid pandemic in terms of generating vaccines in record time and repurposing existing therapy we must learn from the experience and ask how science and society could be better prepared for future threats.

The intensity and global nature of a pandemic has brought into sharp relief some aspects of the innovation process that we often overlook. Many of these were explored in detail during the discussions hinged on how we should value and create opportunities to benefit from the experience of others. The summit was structured to involve leaders from Australia and Canada as well as the UK to share their insights, recognising that we should value and create opportunities to benefit from the experience of others. The discussions focused on the importance of taking a 'one health' perspective, the culture, conduct and communication of science, the need to advance our understanding of behavioural dimensions, and the impact of inequalities, that, with hindsight, may not have been prominent enough in how we managed this pandemic.

A goal of all the IGNITE summits is to focus down on a series of actions that the scientific community individually and collectively can take forward. In this way it is our sincere hope that UK science and its many partners will, by considering and attending to the learning collated here, be in a stronger position to understand and respond to the next great bioemergencies and biological threats.



IGNITE



NIHR | University College London
Hospitals Biomedical
Research Centre



casmi



UCL
Academic Careers
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nhsa
Northern Health Science Alliance
A Health Partnership for Northern England



Executive summary:

Ignite is an executive level summit for leaders across sectors to meet and positively impact medical innovation through a series of debates under the Chatham House rule. Since 2020, the summit has been jointly organised by the Collaboration for the Advancement of Sustainable Medical Innovation (CASMI), University College London, and the Northern Health Science Alliance (NHSA).

The 2022 virtual summit (28 February - 2 March 2022) brought together leaders from across the United Kingdom, Australia, and Canada and focused on how the UK's medical science community can best support a national and international effort to tackle bio-emergencies. This was

followed by a virtual action planning event (28 March 2022) to enable the delegates to reflect on the debates and to solidify actions.

In this report, we outline the main themes and actions that emerged from the debates during Ignite 2022. We categorise actions into those that Ignite delegates will: 'own' – take upon themselves to drive; 'catalyse' – engage with other relevant individuals and institutions to make it happen; or 'expose' – highlight the need for the action to be taken. The main themes and associated actions are summarised below in Table 1. This is followed by a summary of the discussion points for each main theme.

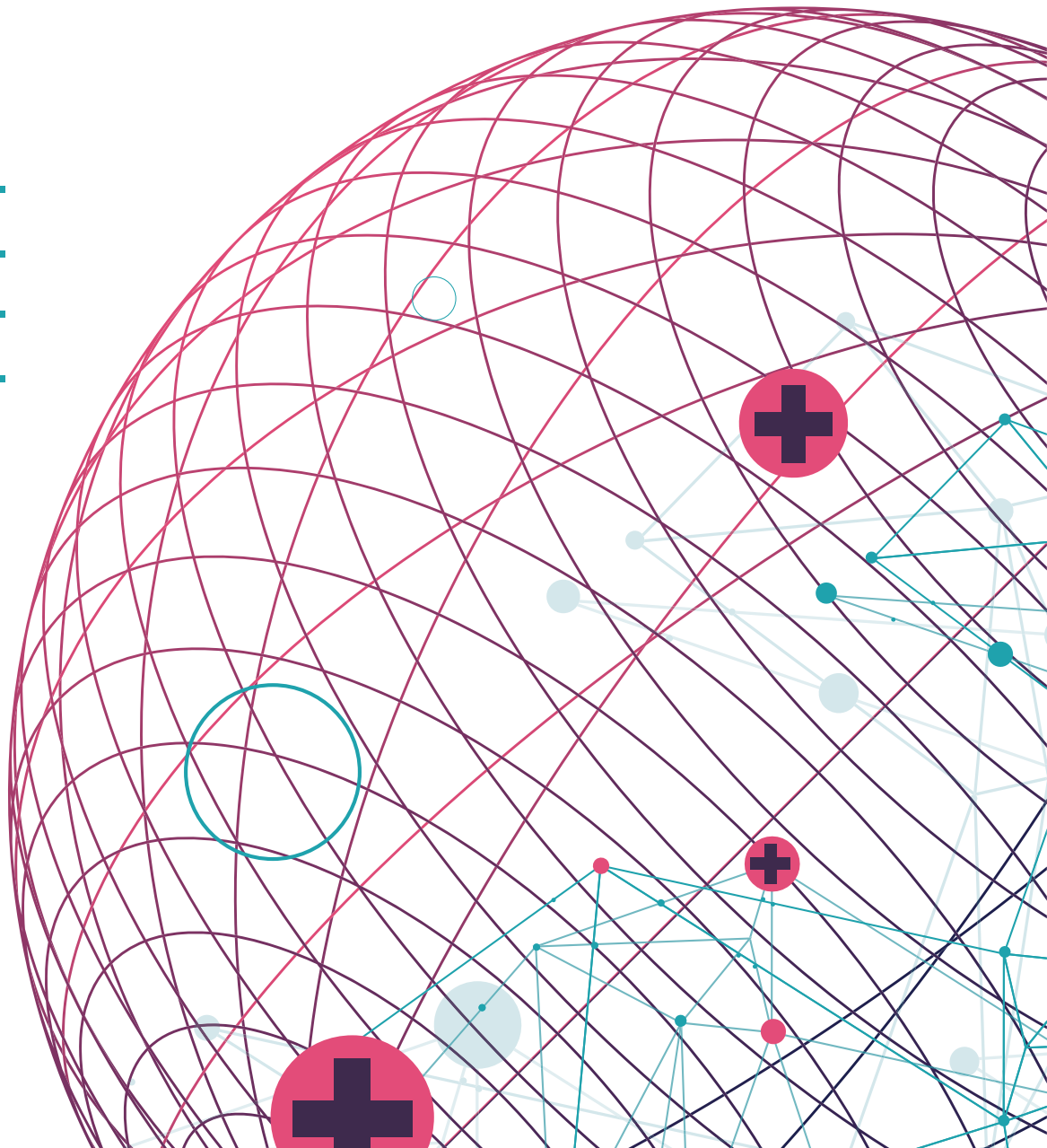
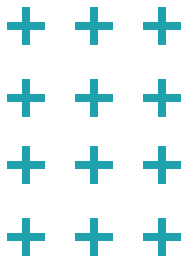


Table 1. Main themes and action items identified during Ignite 2022

| Main Theme* | Action item | Action item category – OWN, CATALYSE, or EXPOSE** | Champion | By When |
|---|--|---|---|---|
| Theme 1: The concept of a 'one health' approach to human and animal health | Step 1: Identify and bring together organisations across the UK, Australia, Canada, and countries from the global south, that have an interest in this area in order to create a forum for discussion and knowledge sharing; Step 2: Hold a virtual meeting to discuss what a joint one health approach might mean. | OWN | Peter W Riddles AM PhD, CSIRO Chair | First steps taken by July 2022 |
| Theme 2: The culture, conduct, process and communication of science to enhance its contribution | Highlight the need for resources to support scientists to combat misinformation, such as a series of practical guides for scientists covering topics such as communicating uncertainty, combating misinformation, and engaging with communities who have previously been excluded and who have mistrust. | EXPOSE | Prof Sir John Tooke, CASMI Chair; Ignite 2022 Chair | First steps taken by July 2022 |
| Theme 2: The culture, conduct, process and communication of science to enhance its contribution | Engage diverse young people in future Ignite summits through existing structures. | OWN | Ignite organising team with advisory input from Prof Jugnoo Rahi, UCL GOS Institute of Child Health | As part of preparations for the 2023 Ignite summit (date TBC) |
| Theme 3: The role and impact of health inequalities in bio-emergencies | Reconvene discussions between inequalities experts from the UK, Australia, and Canada to explore shared learning from the pandemic and opportunities for synthesis of findings and/or future collaboration. | OWN | Dr Séamus O'Neill, CEO the NHSA; Ignite 2022 Chair | Hold first discussions by October 2022 |
| Theme 4: The deficit in terms of behavioural and socio-political science | Explore how the SPI-B SAGE evidence-based reports, produced during the covid pandemic, can be exposed and used more functionally and effectively to improve behavioural response strategy for future bio-emergencies. | CATALYSE | Prof Susan Michie, Director of the UCL Centre for Behaviour Change; SPI-B SAGE Member | First steps taken by July 2022 |
| Theme 5: Workforce considerations - The concept and potential of adaptable surge capacity as part of a biodefence force | Initiate a discussion to explore barriers to embracing veterinary capability in terms of testing for human health and how veterinary resources could support surge capacity during a human pandemic. | CATALYSE | Prof Chris Molloy, CEO, Medicines Discovery Catapult | First steps taken by July 2022 |
| Theme 6: Workforce considerations - The concept and potential of adaptable surge capacity as part of a biodefence force | Describe how bio-threat needs should influence a health and care workforce strategy for the UK. | EXPOSE | Prof Sir John Tooke, CASMI Chair, Ignite 2022 Chair | As part of his ongoing work with Health Education England |

*Main Themes were identified by delegates during the 2022 Ignite summit.

**We categorise actions into those that Ignite delegates will: 'own' – take upon themselves to drive, 'catalyse' – engage with other relevant individuals and institutions to make it happen, or 'expose' – highlight the need for the action to be taken.

Main theme summaries:

Theme 1: The concept of a 'one health' approach to human and animal health

The 'one health' approach to human and animal disease should be expanded to embrace consideration of environmental and societal influences and their ecological implications.

- We agreed that there is an urgent need to understand what the mechanisms and impact of breaking up natural ecosystems are and the means to mitigate the risks.
- Similarly, climate change will further exacerbate these challenges and hamper our ability to address future pandemics. Research is required to ensure that the impacts are better anticipated.
- Human and animal doctors need to work more closely. There is a perception that the more developed the country, the greater the siloing.
- Consideration of environmental factors linking human and animal health is also relatively neglected. Indigenous communities have a greater appreciation of the interrelationships from which we can learn.

- We need basic surveillance and monitoring of wildlife species and domesticated/farm animals to understand what pathogens are out there in animals. UK is starting this with a new one-health initiative - <https://www.digitalmarketplace.service.gov.uk/digital-outcomes-and-specialists/opportunities/16208>
- We need to make sure that we are putting surveillance in the right place at right time and foster local/specific solutions. Digital infrastructure, data linkage and analytic capacity to exploit the data sources that already exist are essential.
- A fundamental need is to understand how viruses evolve and adapt to a new host and the role of the environment in facilitating spread. Human and veterinary virologists need to work together.
- It is evident there is much to be learned from the way different countries are tackling these challenges and there needs to be more sharing of data, knowledge, and best practice across countries.

Theme 2: The culture, conduct, process and communication of science to enhance its contribution

Communication: We need to reflect on how communication between the public(s) and science/scientists could be improved. Initial communication appeared to work well but was eroded over time. The reasons for this need to be better understood and potentially include: loss of trust due to government behaviour; fatigue; lack of evidence-based principles for effective communication; inability to engage communities and enable behaviour change.

The nature of science: By its nature science is a mechanism of learning through observation and experiment to confirm or refute hypotheses. In this way knowledge continues to evolve.

At the start of the pandemic we knew very little about the new virus and responding to new evidence as it emerges can undermine the authority of those charged with making decisions unless this is better understood. Failure to understand these defining principles threatens trust in science

Trust in science: Trust is one of the biggest determinants for how people respond to the requirements (alongside having the opportunity, capability, and motivation). Mistrust may relate to:

- A misunderstanding of the nature of science or misinterpretation of the science through a lack of scientific literacy
- Inappropriate use or sharing of data
- Perceptions of the ulterior motives of those using the data to argue for a course of action
- Conspiracy theories and misinformation which do not represent a dispassionate synthesis of all available evidence.

Risk: Understanding and communicating risk statistics are important and could be done better. Social media can be an echo chamber amplifying an unbalanced perception of risk.

Engagement and culture: There is a tendency to underestimate what the public can understand and take on: more effort needs to be put in to engage and explain. We need to think about community resources and leadership and how to support them. There are cultural issues that might perpetuate pandemics, e.g. burial practices during Ebola that encouraged contact with infected bodies, and we need to understand them through forging relationships with the communities involved.

Dealing with uncertainty: There is a balance between presenting a plan to the public (for reassurance and demonstration of positive action), but also communicating that there are things we do not know, and thereby demonstrate honesty. We need consistent and regular communication. There is a need for public discussions but also a private/safe sounding board to explore the potential actions that could be taken and that takes account of all available evidence.

Assumptions about behaviour: The behaviour of the public has been crucial to the effectiveness of mitigation strategies. We have been dependent on their response and in the early days of the pandemic in the absence of vaccines or proven treatments this is the only defence we had. We should talk about scientists' requirement to explain what isn't known and our requirement to understand the public's (communities and people) viewpoint.

Too many assumptions were made about how the public would react before we acted. Public trust is only one of several important determinants. Adherence to guidance is not all about trust and

motivation, it may reflect financial and practical reasons and support (e.g., sustenance of mental health or family income). We need to draw on local leaders. Understanding the capability and opportunity of citizens to adopt the advised behaviours is really important component of any proposed intervention.

Elitism: The scientific community can be perceived as privileged and elite. Greater efforts are needed to give hard-to-reach communities better agency and more work is required to understand the best ways of engaging to facilitate co-production of solutions.

Could we leverage the third sector as trusted advisors? The politics of government decision can get in the way of communicating science effectively, particularly with vulnerable sectors and individuals. Could the third sector act as a more effective interface to help address these challenges?

Building on scientific capabilities that the pandemic has fostered: Can we build on participation in citizen science during the pandemic (e.g. home lateral flow tests, ZOE app) to build affinity with the scientific method?

Theme 3: The role and impact of health inequalities in bio-emergencies

Key questions: Have we learnt more about inequality because of the pandemic? Do we care more? Are we doing more to address this?

Inequalities, both globally and locally:

- Covid has shone a light on and deepened inequalities (3-fold difference in mortality outcomes based on deprivation).
- Those most deprived were least able to benefit from strategies put in place (e.g. furlough, work from home etc.) so were more at risk of infection and worse outcomes. This was exacerbated in countries with no national health system.
- The most disadvantaged communities had the lowest levels of trust in the interventions proposed.
- Countries with high levels of social and economic inequalities had worse pandemic health outcomes.
- An Australian example provided insights: Those who didn't comply with rules were victimised even though the reason many didn't comply was due to inequalities (language barriers, lack of access to health provision etc.). As a result certain high risk communities weren't adequately protected and prioritised. True community-based partnerships are crucial to build trust.

Global response:

- Competing needs: Who benefits? What's the overall population impact? Delivering covid vaccines is competing with other health provision services, creating trade-offs that need to be considered (e.g. malaria, HIV etc.)
- Resilience structures (e.g. WHO): Underfunded, and with major governance issues. International treaty/ agreements should be considered.
- Surveillance: We don't have adequate global surveillance capability, it is localised. It needs to be across countries, across animals and humans, and sustainable over time. We must remind ourselves that a magic bullet (a salvation vaccine and/or therapy) is not enough. A best pandemic is an averted one – we need surveillance for this globally (one health approach) and early warning systems as well as international trust to share data and samples.
- Global public health response capability: Best management of a pandemic demands a concerted global public health response.

That capability must be fostered along with the digital and health enablement that would allow all Nations to participate.

Social determinants of health: Precarious public health to begin with – those in poverty and with comorbid conditions fared worse.

- Health and economic resilience was at a low before the pandemic – a decade of austerity in the UK, decline in life expectancy, deaths of despair, and increase in infant mortality rate. We entered the pandemic with a lot of people living on the edge, struggling with food insecurity, poor housing etc. Our welfare state and social security networks need bolstering – these are political choices about how our economy should be interpreted and who would be supported.
- The solutions always look the same – tackle poverty, unemployment, and education. We know what is wrong with our education system in the UK for example and many of the other root causes of inequalities but we do not do enough to address.

Enlightened self-interest:

- Until a pandemic is globally contained the potential for the emergence of challenging variants remains.
- Advantaged Nations can mitigate this risk by doing more to aid disadvantaged populations. Building local vaccine manufacturing capability for example will aid access and resilience.

Mission approach:

- Often the focus is on addressing a technical challenge and pooling resources, but impact will be limited without attention to the social context and how public(s) respond.
- Our missions should be more ambitious – e.g. this generation of children should be the healthiest we've seen. This will need political will. Upstream determinants need to be addressed in order to make real progress.

Inequality in the context of innovation:

- The benefit of innovation and to the health of the public(s) is dependent on the context in which innovation can be delivered and co-delivered. There are some things for which we already have solutions that we now need to fund. Innovation can actually deepen inequalities.

■ When it comes to innovation and our current models, patents are often seen as the goal, but patents are not the same as impact. Covid vaccine access – to what extent should we push for patent waivers

and support local provision of manufacturing... how do we think about the innovation pathway as a way to overcome inequality (rather than potentially exacerbating it)?

Theme 4: The deficit in terms of behavioural and socio-political science

Bio-emergency preparedness is about behaviours and equalities at least as much as it is about platforms and technology.

False assumptions that must be addressed:

- Governments would think rationally and want to explain what they did
- Trusted Communicators could co-ordinate explanations and information
- Scientific debates would be insulated from politics in ‘war time’
- Governments would use tried and tested mechanisms.

Following the science and social science:

- Governments are attempting to follow the science, but they also need to follow the social science so that we can protect and promote the health of the public. We need action to flatten the socio-economic gradient and influence the impact of economic effects for future bio-emergencies.
- It is worth addressing inequalities now particularly among children to enable future resilience and to protect against unforeseen health and economic response.
- We need a strong economic analysis of what is needed to persuade politicians, e.g. improving the health of the next generation will improve economic productivity etc. We are not currently educating our children to have the skills of the future. The political science implications need to be addressed if we want to make rational progress.

■ We have good models and analyses of the economic impact of not tackling health inequalities. It is actually easy to make a good business case here. The numbers are so huge that perhaps people don't believe them, especially when they are ideologically opposed. We need to understand more as to why this is so.

Resilience:

- We need to be better at arguing for policies that invest in public health provision.
- We can't address resilience without addressing the capability of public health systems and underlying national health systems.
- The G7 pandemic preparedness plan (100 day mission) focused

on technocratic solutions. We cannot produce a 100-day outcome without preparing capacity and infrastructure during business as usual. This needs to be running for other diseases too (e.g. AIDs, TB). We need that capability and the political will for this to be built now.

■ In the NHS, delivery capability has been crucial to delivering the Recovery programme and vaccine trials. The research capability needs to be integral to provision so that we can deliver resilient health systems of the future and so that we are in a position to rapidly learn and devise solutions when new threats materialise.

Changing behaviour and environments:

■ We need to think about changing behaviour, but also about changing environments to enable health.

■ We need to recognise health as a legitimate outcome of a good society.

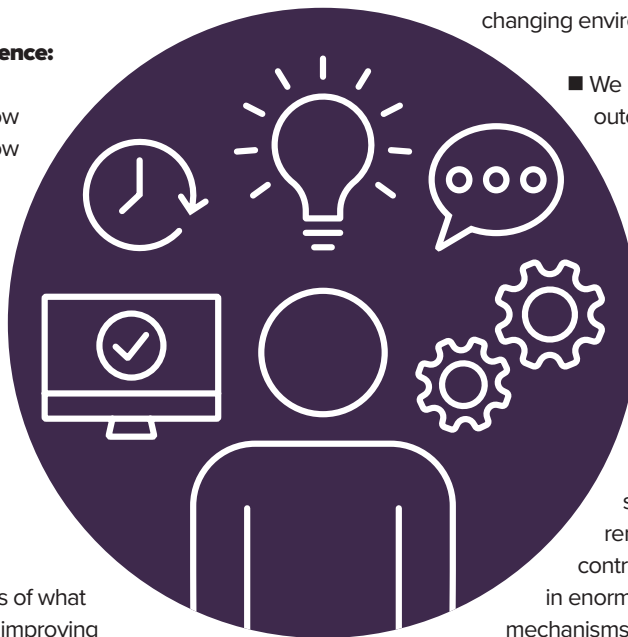
■ What is the role of scientists and innovators in the process of setting policy particularly in relation to issues of inequality and health behaviours? What is the degree to which science experts should stick with their disciplinary expertise and not comment on policy, for example? Science has always had an ideological underpinning and we should feel able to comment whilst remaining conscious of confounding contributory factors. The UK's scientists put in enormous effort through SAGE and other mechanisms and it will be important to review how well those structures worked so that their contribution can be enhanced in the future.

Equality versus equity: We need a better understanding of how generic procedures and advice can affect specific groups and if things are truly equitable.

Momentum:

■ How do we maintain momentum when the acute threat is over? Or when the threat is slow burning (e.g. inequalities, obesity, mental health) - how can we light fires when the impact is slower to evolve and cumulative?

■ We could over-focus on the timing and precipitate nature of a pandemic and ignore more insidious bio-emergencies. We need to be capable of dealing with various challenges, acute and chronic, and recognise the value of investing in the infrastructure and mechanisms to tackle both.



Theme 5: Workforce considerations - The concept and potential of adaptable surge capacity as part of a biodefence force

Resilient, adaptive capacity is needed. We can't expect people to take on additional work indefinitely. Surge capacity as opposed to a 'standing army' is needed.

Governance considerations: How do we sustain the collaboration and resilience upon which a strong response depends and what are the governance considerations for this? Biodefence – similar to security defence in that it should be a federal concern. Use the military as a model and put this on the agenda now to set up something similar so that we are prepared next time. The skills required are many – technical, logistic, research, care, surveillance and analytical, procurement etc. Now is the time to put the governance issue on the table and develop a body that is legislated to have the power to sustain necessary infrastructure, the skill base, and international collaborations. An integrated response is critical to drive what is required.

Workforce development:

Technicians:

- In the UK, loss of our technicians has been a trend. We now use core facilities (or outsource). This limits expertise.
- In Germany, there is a training stream for technicians. Could we in the UK invest in people to be technicians in academia? There is a benefit in building and maintaining the capacity, but also these people are essential in a surge.
- Could we influence policy to galvanise and utilise the expertise developed in this pandemic (e.g. technicians that supported projects such as the Lighthouse project)?

Capacity development: Even with all the infrastructure, if we don't have the people then we cannot accomplish things. We need to improve workforce planning and engagement and aim younger.

- Health Education England is building a new framework which should seek to incorporate this. A health and care workforce strategy is critical for health system capacity in future for global health systems.

- Given the range of skills required and the need for them at indeterminate intervals a 'Territorial Army' approach could be adopted whereby volunteers in the various required disciplines have dedicated time to train and prepare for the crisis when it occurs and function as part of an integrated team.

Training needs:

- We need to reset the way we prepare the medical workforce of the future e.g. breaking down the silos between medicine and psychology. This sends a strong statement that physical and mental health are interdependent. We need multidisciplinary doctors in a new model of training and ones who embrace the public health dimension of their work and fully appreciate the need to address social, behavioural, and environmental determinants, alongside genetic influences.
- We need to rethink how we arm the public to understand science and how we teach it at school and encourage others to go into it. There is a receptive engagement at an early stage in schools because of this lived experience of pandemic – people know that it will likely happen again and advantage needs to be taken of this intrinsic interest.

