I am grateful for the opportunity to contribute my thoughts and personal experiences regarding the Australian Government's response to COVID-19. As a [redacted] individual from Melbourne, the pandemic deeply impacted my life, [redacted] This experience highlighted the unique challenges faced by my demographic, both socially and economically, during such crises.

My central point emphasises the critical need to focus on preventing future pandemics. From my perspective, addressing the risk of novel pathogens is something within our control. We should aim to prevent their emergence and swiftly tackle them if they arise. Considering the immense human and economic toll of pandemics, and acknowledging the possibility of facing even more severe outbreaks than COVID-19, prevention must be our foremost objective.

I strongly believe that the new Australian Centre for Disease Control should prioritise the prevention and control of emerging pathogens. The research paper by Bernstein et al., titled 'The costs and benefits of primary prevention of zoonotic pandemics," supports this stance economically. Their findings, even under conservative assumptions and without accounting for emerging technological advances, argue convincingly for substantial investment in pandemic prevention.

My feedback is primarily aimed at 'preventive health measures', as outlined in the third term of reference.

Source: "The costs and benefits of primary prevention of zoonotic pandemics" - PMC (nih.gov)

AI-Bioconvergence

In addressing pandemic prevention, Australia must urgently consider the increasing threat of engineered pandemics. The Inquiry's terms of reference, which focus on anticipating future pandemics, must include this critical aspect. The growing accessibility of technologies for designing and releasing novel pathogens is a significant concern, as highlighted by experts like MIT Professor Kevin Esvelt. This issue is also detailed in the Geneva Security report "Delay, Detect, Defend: Preparing for a future in which thousands can release new pandemics."

Professor Brian Schmidt AC from the Australian National University has expressed deep concern over the "democratisation" of biotechnology, foreseeing a future where creating new diseases might become alarmingly simple. The expanding market for synthetic DNA and AI tools exacerbates this risk.

Recognizing the gravity of this situation, President Biden issued an executive order in October 2023, mandating a framework for secure DNA screening. This includes screening for risky DNA sequences, implementing access controls, and enforcing robust oversight. Currently, about 20% of DNA orders are unscreened, posing a significant risk.

Australia, having a permitting regime for synthetic DNA importation, should align with the US by updating this regime. This would require labs importing DNA into Australia to adopt these new screening measures for all orders.

However, this approach alone isn't sufficient. Continuous advancements in biotechnology and AI could allow users to circumvent these regulations. Thus, the Inquiry should recommend that the Department of Industry collaborate with the Department of Health and

the CDC to establish safety standards for frontier models in Australia. This should focus on identifying and restricting AI models that pose biosafety risks. There should be clear expectations set for developers to ensure that AI with dual-use capabilities that pose catastrophic risks are controlled. It's also vital to monitor biotechnological advancements to prevent the widespread ability to engineer pathogens.
Sources:

- Biden, J. (2023) Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence. The White House.
- Engineered Pathogens and Unnatural Biological Weapons: The Future Threat of Synthetic Biology – Combating Terrorism Center at West Point
- Andrew Leigh MP: Speeches and Conversations";16 December 2021; at 18:41
- Home | International Gene Synthesis Consortium
- The Common Mechanism - IBBIS
- SecureDNA - fast, free, and accurate DNA synthesis screening
- Understanding AI-Facilitated Biological Weapon Development: https://www.longtermresilience.org/post/report-launch-examining-risks-at-the-intersection-of-ai-and-bio

Preventing novel sequences of concern via detection and screening

Gopal et al's report from the Geneva Centre for Security Policy, titled "Securing Civilisation Against Catastrophic Pandemics," sheds light on the criticality of early detection in managing pandemic threats, especially those engineered for national security disruption. The report describes two grave pandemic scenarios: "wildfire" and "stealth" pandemics.

A "wildfire" pandemic is characterised by highly lethal and transmissible agents that could lead to societal collapse by disrupting essential services like food, water, power, and law enforcement. These pathogens must be virulent enough to incapacitate key workers, even during lockdowns. Theoretically, such pathogens, comparable to those in other species, could be engineered to affect humans.

The report also outlines the concept of "stealth" pandemics. These involve pathogens that are initially mild or asymptomatic, with a prolonged incubation period, allowing widespread infection before their severe impacts are recognized. Current diagnostic protocols, which rarely sequence common colds, would likely miss such engineered pathogens.

I liken a "wildfire" pandemic to a mix of measles and ebola traits, while a "stealth" pandemic combines elements of measles and HIV. In both cases, the rapid multiplication of cases highlights the value of time in pandemic response.

The basic reproduction number (R0) is crucial in understanding pathogen spread. For instance, measles, with an R0 of 12 to 18, demonstrates how quickly a highly infectious disease can escalate. Early detection of novel pathogens is vital to mitigate their impact. Catching a pathogen by the second generation of spread and responding by the third, instead

of the fourth or fifth, could be crucial in managing bioterrorism and preventing societal breakdown.

Thankfully, the COVID-19 pandemic has propelled advancements in early detection technologies. In Australia, we've improved testing infrastructure and surveillance approaches. The Inquiry should recommend building upon this progress to establish a robust public health monitoring and early detection system. This might include routine pathogen-agnostic testing of individuals with influenza-like symptoms who test negative for specific pathogens, and expanding wastewater screening through metagenomics.

Publications like those from the Nucleic Acid Observatory, and papers by Australians such as Sharma et al's "Threat Net: A Metagenomic Surveillance Network for Biothreat Detection and Early Warning" and Liang et al's "Managing the Transition to Widespread Metagenomic Monitoring: Policy Considerations for Future Biosurveillance," offer insights into such systems.
In facing both natural and engineered pandemic threats, rapid detection and response remain our most potent defence. As infectious disease landscapes evolve, prioritising and enhancing early detection is not only a health imperative but also a matter of national security.

Citations:

- Securing Civilisation Against Catastrophic Pandemics | Geneva Centre for Security Policy (October 2023)
- Sharma S, Pannu J, Chorlton S, Swett JL, Ecker DJ. Threat Net: A Metagenomic Surveillance Network for Biothreat Detection and Early Warning. Health Secur. 2023 Sep-Oct;21(5):347-357.
- Chelsea Liang, James Wagstaff, Noga Aharony, Virginia Schmit, and David Manheim. Managing the Transition to Widespread Metagenomic Monitoring: Policy Considerations for Future Biosurveillance. Health Security.Feb 2023.34-45.

The terms of reference of this inquiry primarily care about being better prepared for the future. The evolution of public health has always been driven by forward-thinking individuals who bring fresh ideas and perspectives to tackle health challenges. Emphasising the importance of pandemic prevention is paramount, and this includes acknowledging and preparing for novel methods through which pandemics could arise. Tackling these challenges will necessitate delving into complex and sometimes uncomfortable topics, such as the implications of AI-bioconvergence and the critical need for advanced detection and screening techniques for emerging pathogens. Addressing these cutting-edge issues is vital to ensure a healthier and more secure future. Prioritising these innovative approaches in pandemic prevention will be instrumental in safeguarding global health against the ever-evolving landscape of infectious diseases.