UK Health Security Agency

Enclosure AB/23/064

UKHSA Advisory Board

Title of paper	Artificial Intelligence Discovery Exercise
Date	23/11/2023
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1. Purpose of the paper

1.1. Outline and update on the ongoing Artificial Intelligence Discovery Exercise to seek input and guidance from Advisory Board members.

2. Recommendations

2.1. The Advisory Board is asked to:

a) **NOTE** the progress of the UKHSA Artificial Intelligence Task Force in developing our organisational readiness for adoption and utilisation of Artificial Intelligence; and

b) **COMMENT** on areas where our approach could be developed further and if there are any additional opportunities and risks we should be exploring from the wider Artificial Intelligence (AI) perspective.

3. Background

3.1. There are transformational opportunities that Artificial Intelligence presents for improving public health, health security and developing UKHSA as a high performing agency. UKHSA is developing the organisational capability and capacity to engage with the continual developments of Generative Artificial Intelligence so that it can make timely assessments of what we choose to adopt.

3.2. The advent of high-profile large language models such as ChatGPT has driven a significant increase in public awareness and interest, also pushing the pace of adoption for many organisations.

3.3. Artificial Intelligence development is rapid, covering a broad field of technologies including Machine Learning, Deep Learning and Generative AI. In particular, Generative AI technologies, which produce new content such as images and text, represent a significant opportunity for organisations to create efficiencies across multiple areas of application and to transform the way we work.

3.4. Utilising AI to increase resilience, productivity, and growth across the private and public sectors is a key ambition for HMG, set out in the National Artificial Intelligence Strategy and highlighted in the recent Artificial Intelligence Safety Summit. In 2024, it is anticipated that the next generation of considerably more powerful models will be released, continuing to increase the capabilities of AI. This rapidly evolving field represents significant opportunities for UKHSA to identify and embed capabilities that represent the best value for both UKHSA and our end users.

3.5. Artificial Intelligence adoption is an organisation-wide consideration for UKHSA. To be proactive in capturing the benefits and managing the risks associated with building on our existing Artificial Intelligence use and to explore its potential further, the Executive Committee agreed to establish a cross-organisation Artificial Intelligence Taskforce.

3.6. The 11 workstreams (outlined in Annex 9.1) are undertaking a discovery exercise to draw out opportunities and real risks, to outline the possibilities and to recommend next steps. This discovery exercise focuses specifically on Generative Artificial Intelligence as this is an area predicted to have immediate impact on organisations. The themes explored in the discovery exercise are likely to encompass considerations needed for other applications of AI. These workstreams are working across the Agency, HMG and with commercial partners to develop our position.

3.7. Both HMG and the global health security and public health community are taking action to explore and harness Generative AI to drive efficiencies, improve outcomes for public health and for health security. The discovery exercise is connected to the Public Health landscape of AI and is engaging with key partners in the Department of Health and Social Care (DHSC) and the NHS (external government / policy stakeholders engaged with as part of the discovery exercise are outlined in Annex 9.2).

3.8. The US Centre for Disease Control has published some examples of their adoption of AI to drive public health to be more responsive, accurate and equitable[1]. AI has been adopted in the US CDC to improve the speed and accuracy of tuberculosis surveillance through automatic detection of chest x-rays. Additionally, Artificial Intelligence has been used to in outbreak response to Legionnaires' disease by automatically detecting cooling towers from aerial imagery.

4. UKHSA approach to Artificial Intelligence

[1] Centres for Disease Control and Prevention, Office of Public Health Data, Surveillance, and Technology, *Artificial Intelligence and Machine Learning: Applying Advanced Tools for Public Health* (2023) [accessed 20 November 2023]

4.1. The decisions we make on adopting Generative Artificial Intelligence capability will be based on a comprehensive assessment of the transformational and efficiency gains it will have on UKHSA delivering our strategic objectives, especially in becoming a high performing agency and our ability to use data and insight to improve outcomes for public health.

4.2. Developments in both the capabilities of Generative AI, and the field of AI more broadly, and the legislative landscape, means that we will need to continue to iterate and build on our thinking. The discovery exercise aims to articulate what is currently known about the opportunities and risks, the progress UKHSA has already made in adopting Generative AI, and to set out prioritisation processes that will effectively harness opportunities and manage uncertainty. This includes understanding the ambition and frameworks being developed centrally by the Central Digital and Data Office and the Digital, Data and Technology Profession.

4.3. As AI technologies become more advanced, they have the potential to significantly impact our workforce and the requirements we have for our workforce in both a positive and negative way. As part of this discovery exercise, People Group (comprised of the *Workforce* and the *Internal Comms* Workstreams) are undertaking a series of activities to assess the challenges and opportunities of Artificial Intelligence adoption on UKHSA staff.

4.4. This will include undertaking a Workforce Impact Assessment and exploring the consequences of AI adoption on our current operating model. By evaluating the potential drawbacks, benefits and risks to our workforce we can take a pragmatic approach which will ensure AI systems enhance our offering while still maintaining human-centric values.

4.5. Technology colleagues are working to ensure that Generative Artificial Intelligence is part of our innovative approach and is driven by value. The UKHSA's partners across the health ecosystem and technology sector, with their wider outside-in perspective, have a valuable contribution to make. Technology will work with its partners to bring innovation to the Agency and, in appropriate cases, support validation through proof-of-concepts and prototyping. This includes considering the potential of AI to support the modernisation of Health Protection Operations as part of HPOps 2024, and the Science modernisation programme.

5. Conditions for success

5.1. UKHSA has been trialing new processes and practice in AI over the past year, establishing development links with major frontier providers to develop proof of concepts.

5.2. Our next step is to build awareness and understanding of Generative Artificial Intelligence more broadly as a fundamental part of UKHSA's future working

model, along with UKHSA harnessing its benefits safely. A communications plan is being developed to ensure that colleagues across the Agency understand the work of the discovery exercise, are aware of the current Civil Service guidance and our own guidance as it develops on AI use.

5.3. The outputs of the AI Taskforce Discovery exercise will be collated to deliver a representative UKHSA strategic position that:

a) outline a process to identify the spend-to-save opportunities presented by Generative Artificial Intelligence

b) articulates the mechanism and the governance for triaging use cases for adopting Generative Artificial Intelligence which aligns to wider legislation and regulations, accounts for risks and accelerates adoption

c) outlines a process for procurement and prioritisation of investment considers what Generative Artificial Intelligence could mean for our workforce and approach to change management. Including how we can use AI to free up specialist resources and skills by removing time consuming tasks.

6. Risks

6.1. The pace of change in the AI landscape requires robust processes to ensure UKHSA is up to date with the latest governance and best practise whilst enabling dynamic and innovative use of AI. We are in the process of establishing a cross-cutting risk management process to direct the organisation’s approach, ensuring we are keeping aligned to the rest of government, the health system, and external stakeholders. We are also planning to align and embed our strategic approach into our ongoing business planning process through work with our business planning team.

6.2. Central to AI adoption is ensuring that UKHSA's: data governance and risk function (including cyber), supporting technology, and organisational capabilities; are fit for the scale of adoption.

6.3. The predictive power of Generative Artificial Intelligence, poses a risk of biases perpetuating existing health inequalities, putting vulnerable populations at a greater risk of experiencing poor health outcomes. Any adoption of Artificial Intelligence within UKHSA will include a health equity impact assessment that will include the need to ensure AI algorithms are inclusive so that bias risk is addressed.

6.4. The National Security Policy team are also working across HMG to consider the risks of misuse, for example where a bad actor is aided by new Artificial Intelligence capabilities in developing a biological attack capability. This work was covered at the Artificial Intelligence Safety Summit as a priority objective.

7. Adoption

7.1. Several commercial Proof of Concept opportunities of Generative Artificial Intelligence are being explored. Our focus is on identifying opportunities to build on our understanding of the technology in a way that has the widest positive impact, but also helps understand the range of risks and governance requirements. Demonstrating to colleagues the benefits of Artificial Intelligence in a tangible way will also be a focus of our organisational planning and change management.

7.2. Alongside proof of concepts, multiple use cases are being reviewed (Annex 9.2), these use cases were submitted via a form shared across UKHSA which has provided all colleagues the opportunity to submit their ideas and be part of the discovery exercise. Use cases include scientific, public health and corporate applications and the triaging of these use cases will enable us to take a more strategic approach to our adoption. The use cases will be assessed systematically and within a governance and accountability structure.

7.3. We are developing our approach to triaging use cases based on expert external advice. Use cases will be triaged into themes (Knowledge accessibility, Document generation and content creation, Technology, enhancing access to expertise, Security compliance and ethics) and scored against four criteria (Feasibility, Usability, Strategic alignment, Dependencies), the triage will ensure we are prioritising Use Cases supporting improved health outcomes. Short listed use cases will then be developed further, either using internal capabilities or in partnership with external suppliers.

7.4. UKHSA's Data, Analytics and Surveillance Directorate are collaborating with Technology colleagues to develop an in-house platform, called Janus, to allow secure use of Large Language Models (LLMs) within the UKHSA network. This implementation runs on our High Performance Computer (HPC) system and thus supports some of the largest open-source model currently available (e.g. Llama 2). The approach has the benefit that a single-model, deployed internally can be applied to multiple use cases such as processing text to extract key information (e.g. symptom extraction) to enhance our public health response. We anticipate that the platform will support multiple models and multiple concurrent users. Once tested for effectiveness on comprehensive validation sets, we will be able to safely use these models to support appropriate public health use cases. Alongside the internal Janus platform, data scientists are developing approaches using cloud-based services - either to run customised/fine-tuned LLMs or to use third-party LLMs such as OpenAI's Chat GPT-4. The latter is restricted to use of public data but does have a higher performance, and so is being explored for projects using public data in line with Cabinet Office guidance.

8. Next steps

8.1. The findings from the discovery exercise will be shared with the Executive Committee in the New Year including options and recommendations for next steps. This will include a roadmap to Artificial Intelligence adoption, noting that this will be dynamic and incomplete given the rapidly evolving nature of the technologies.

8.2. Pilots will be selected from the Proof of Concept and Use Case development to test a range of adoption approaches, increase engagement and practically test our ambition for future Use Case development and to allow for evaluation and improvement of the governance processes that have been established.

8.3. We plan to update the advisory board on our adoption plans before the end of this financial year.

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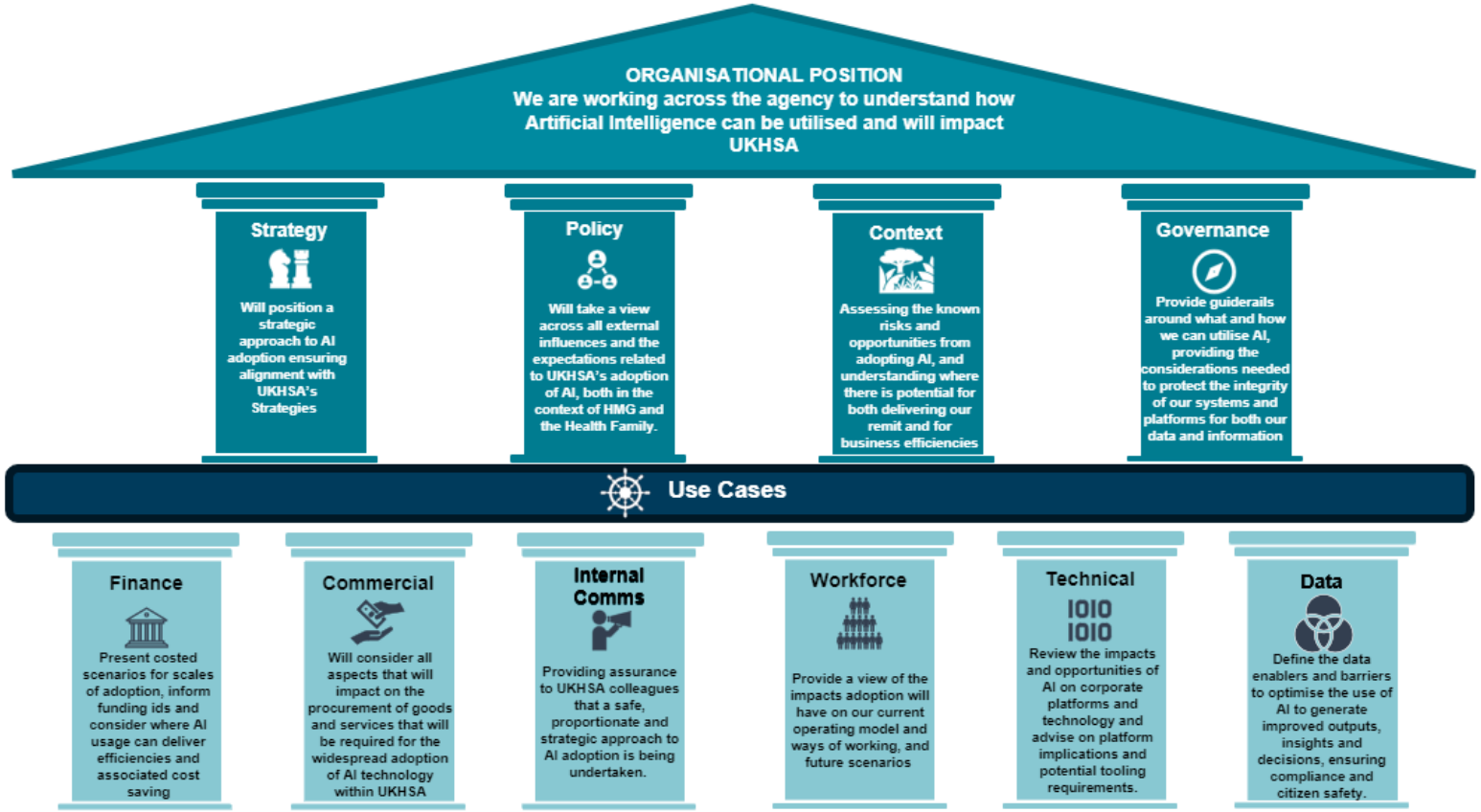
9. Annexes

9.1. Cross Agency Workstreams of UKHSA's Artificial Intelligence Taskforce



9.2 Engagement with external government / policy stakeholders

- DHSC
- NHS England
- Public Health Wales
- Medicines and Healthcare products Regulatory Agency
- National Institute for Health and Care Excellence
- Government's Chief Technology Officer, Central Digital and Data Office
- Chair of International Association of National Public Health Institutes / Executive Director at the Norwegian Institute of Public Health
- Public Health Scotland
- Public Health Agency (Northern Ireland)
- Department for Science, Innovation and Technology
- Department for Transport
- HM Revenue & Customs

9.3 Summary of Health Security Use Cases by theme submitted as part of the discovery phase

Theme	Submissions
Document generation and content creation	2
Enhancing access to expertise	8
Knowledge accessibility	13
Security compliance and ethics	2
Technology	3
Grand Total	**28**