Harnessing AI to bridge knowledge gaps in global antimicrobial resistance efforts

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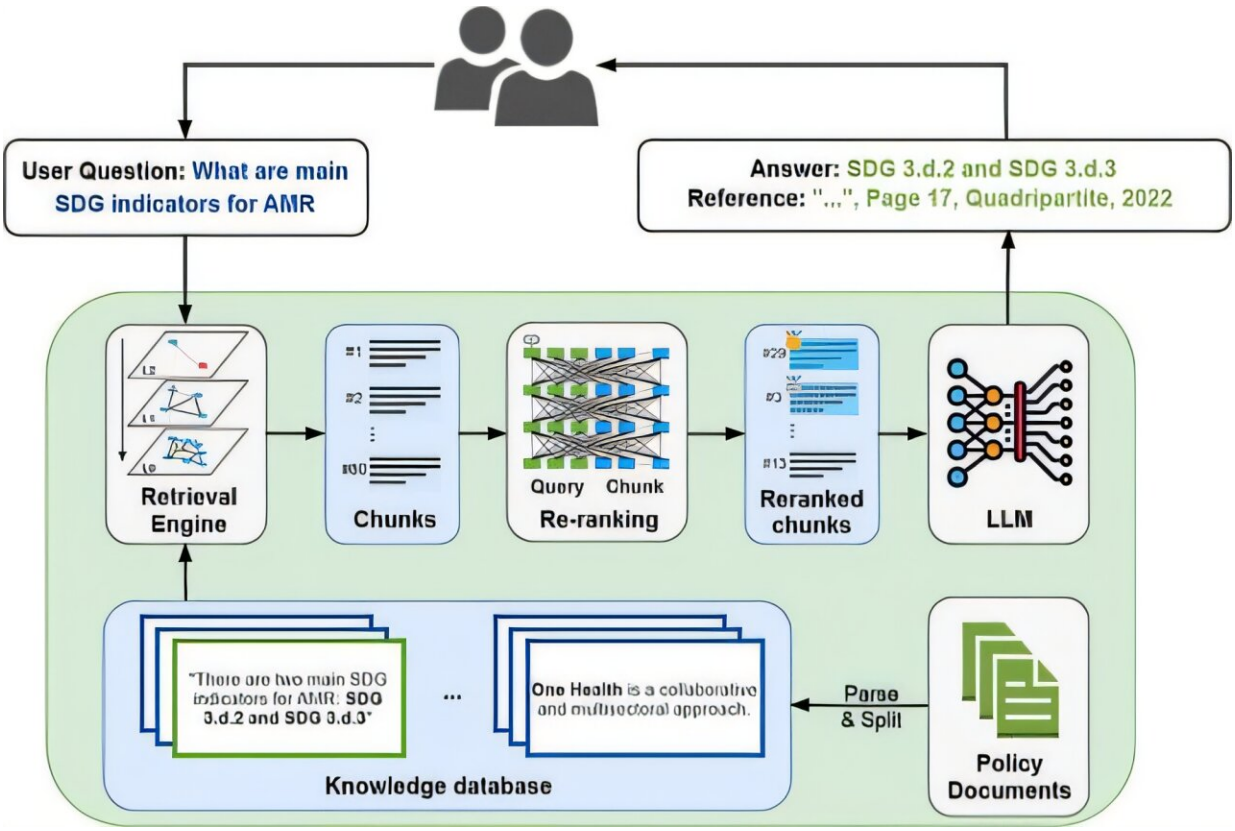

Graphical abstract. Credit: *Environmental Science & Technology* (2025). DOI: 10.1021/acs.est.4c07842

AMR is when microorganisms that cause infections, such as bacteria and viruses, change over time and no longer respond to antibiotic medicines.

It makes serious conditions such as HIV, tuberculosis and malaria more difficult to treat and increases the risk of severe illness, disease spread and death.

AMR particularly impacts low-to-middle-income countries where water quality is often poor and the environmental spread of AMR via waste can be high.

In 2015, the World Health Organization (WHO) formulated a Global Action Plan to co-ordinate efforts to tackle AMR.

As a result, 194 WHO member states committed to developing country-specific One Health AMR National Action Plans (NAPs).

The One Health model recognizes the interconnection between people, animals, plants, and their shared environment.

However, inadequate logistical capacity, funding, and poor access to essential information can hinder informed NAP policymaking, especially in low-to-middle-income countries.

Now an international team of researchers, co-led by Professor Yong-Guan Zhu from the Chinese Academy of Sciences and Professor David Graham from Durham University, UK, has created an AI tool to bridge critical gaps in knowledge needed for informal policy development and to assist in the preparation of National Action Plans.

The research has been published in the journal *Environmental Science & Technology*.

The large language model tool developed by the research team, called the AMR-Policy GPT, contains information from AMR-related policy documents from 146 countries.

It works in a similar way to established AI chatbots such as ChatGPT but has a focusing element that encourages more current, accurate, and contextually relevant information on AMR compared with more generic chatbots.

Professor David Graham of Durham University's Department of Biosciences, said, "We believe our prototype is a valuable starting point for National Action Plans, especially for parts of the world that lack local data or infrastructure to support integrated action against AMR.

"Any solutions to do with global health need to be viewed holistically and our tool will help guide AMR policy development by increasing knowledge-sharing across countries worldwide, especially related to the environmental spread of AMR.

"Essentially, it provides decision makers with well-referenced information from across all disciplines at their fingertips.

"And with the ability to continuously update, our framework ensures that the chatbot tool remains up-to-date and effective."

The researchers stress that the primary purpose of AMR-Policy GPT is an 'intelligent' information source to assist in the policymaking process—like having a smart friend in the room, and it is not designed to write comprehensive NAPs.

The researchers will continue to build on the prototype and explore how it can be further improved and expanded following feedback from users.

In the future they would like to integrate even more scientific knowledge with policy information to create an enhanced AMR-Policy GPT.

Professor Zhu said, "Given the enormous and growing volume of

information on AMR and its possible influence on policy, we think that AI is an excellent tool for knowledge integration and also for the initial distillation of understanding."

Also included in the study were researchers from Shanghai Jiao Tong University in China and Johns Hopkins Bloomberg School of Public Health in the U.S..

More information: Cai Chen et al, Using Large Language Models to Assist Antimicrobial Resistance Policy Development: Integrating the Environment into Health Protection Planning, *Environmental Science & Technology* (2025). DOI: 10.1021/acs.est.4c07842

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