IHTM

Vaccinology Problem-Based Learning PROJECT DEVELOPMENT

Aim:

The aim of the PBL is to give students a project where they can apply the concepts learned in the sessions (Appendix A) to tackling a global real-world challenge. The project will require integration of the technical knowledge, public and global health applications and policy and ethical considerations in vaccinology. It will also help to connect the lectures in the module, frame the students' engagement with the different topics from a global health perspective, and could help to draw in the DPhils auditing the module.

This project will have a dual benefit to students by also feeding into the series of workshops and activities being held over the next academic year to support the creation of a special issue of the open-access journal *Vaccines titled* "*Future Development and Manufacture of Epidemic and Pandemic Vaccines to serve Global Public Health Needs*" (a review paper of the same title will launch the special issue shortly). This will give the students an opportunity to have real-world impact, showcase the voices of those early in their global health careers, and boost their enthusiasm to stay engaged with the field of vaccinology after the course ends.

Structure

1. Introduction to the problem

At the start of the module, students will be divided into groups (combining IHTM and auditing students) and given their project scenarios. The groups will work on this over the coming months, with touch points to keep the process turning over from halfway through the module.

Background to the problem scenario

The COVID-19 pandemic was an unprecedented experiment in global cooperation to address a threat, bringing together scientists, politicians and civil society on a massive scale. While the COVID-inspired developments in technologies, supply chains, funding systems and health promotion tools have been lauded as an extraordinary success, the existing system would not cope if a more virulent pathogen were to emerge. For example, COVAX did not deliver on its promises of providing timely access to vaccines for those that needed them. If the demand had been greater or more urgent, COVAX would have collapsed totally.

Many solutions were developed reactively to get the world through the crisis at hand rather than proactively to improve the system. Despite the extraordinary success stories, weaknesses have been revealed that should make the global community of decision-makers rethink the strategy going forward. It is inevitable, based on recent trends, that there will be future outbreaks. How can we use the COVID-19 experience to critically review 'business as usual' and make decisions now that will put the world in a stronger position to handle whatever comes next?

Group project options

2 groups (IHTM and auditing DPhils)

1) Group 1
    a. **Role: you are a WHO working group**
    b. **Problem:** you have been tasked to make recommendations on how lower-resource settings can build vaccine development and production capacity over the next 15 years to become more 'epidemic and pandemic secure' and reduce their reliance on high-income countries during emergencies
    c. **Some guiding questions** to consider in building your recommendations:
        i. What are the constraints to building a vaccine industry in lower-resource settings?
        ii. What are the enablers for change? Are there any specific measures that you would recommend the WHO support or recommend that others (such as Foundations and research funders) should support?
        iii. Thinking ahead 15-20 years and considering all vaccines covered in the course, what are the possible trajectories for vaccine technologies and global economic, technological, and political power shifts that you will need to consider?
        iv. How can the industry be sustained between, but be co-opted during, epidemics? If it is not possible to build an industry based on responding just to pandemics, what broader business plan would you recommend?
        v. How does growing vaccine hesitancy play into the recommendations you are making?
        vi. What are the costs and benefits of improving current mechanisms like COVAX or overhauling the system completely so that mechanisms like COVAX are not needed?
2) Group 2
    a. **Role: you are members of an advisory group for GAVI**
    b. **Problem:** you have been tasked to consider what agreements, procedures, or funding mechanisms could be put into place pre-pandemic to shift the global response from one that is reactive to one that is more proactive, and to increase funders' negotiating power (to improve public health outcomes) with vaccine developers and manufacturers during an emergency.
    In addition, you have been asked to prioritise your proposals and justify your decisions. You have also been asked to spell out the specific role GAVI would take and the roles that GAVI should recommend for other stakeholders.
    c. **Some guiding questions** to consider in building your recommendations:
        i. What are the factors that influence negotiations between funders and developers and manufacturers during a pandemic?
        ii. What are the tensions between the incentives to develop vaccines and public health goals? You can use case studies to illustrate your arguments drawn not only from COVID-19 vaccines but also from other vaccines.
        iii. What conditions were funders able to put on manufacturers during previous epidemics and pandemics, such as COVID-19?
        iv. What technical, health system, political and ethical challenges stand in the way of maximising the benefits of global public health vaccine strategies

during epidemics and pandemics, and how would these influence negotiations?

v. What are the public health considerations that funders would want to build into agreements with vaccine manufacturers in advance of epidemics and pandemics?
vi. How can investments to support epidemic and pandemic preparedness be planned to have collateral benefit for health systems over the long term?
vii. What investment/funding models should GAVI adopt to ensure sustainability?
viii. What lessons did we learn from clinical trials, and the sharing and use of clinical data, during the recent pandemic that might help design more responsive development strategies in future?

2. Support through the module

There will be at least one webinar during the initial month of the PBL, and students will be welcome to join webinars after the initial phase of the PBL ends but when they are still working on their opinion pieces/articles. A series of 30-minute sessions will be organised with co-editors of the *Vaccine* special issue and other experts, from midway through the module. The co-editors would be invited to sessions in groups of editors with similar backgrounds/ locations.

This component is unlikely to be replicable in future modules, but would increase the quality of the outputs in this academic year, as there is a potential route for students to have influence in reality.

The purpose of these sessions is to:

- Allow a space for students to ask experts questions and develop their thinking
- Give the students exposure to a range of inputs
- Encourage steady progress on the PBL project

Format

1. Online
2. Introduction to the guest expert: 5 minutes
3. Both Groups get the floor for 10 minutes each to ask any burning questions – responsibility is on the students to come with questions, not on the experts to lecture
4. Wrap up: 5 minutes

3. Feedback session

We have 2 hours scheduled on the 14th March

Presentation options

- Formal PowerPoint
- Informal discussion with feedback from peers and experts

Feedback panel

- Andrew Farlow
- Adrian Hill
- Andy Pollard
- Some editors of the *Vaccines* special issue if available, and others if they are keen.

Appendix A

IHTM Vaccinology Module 2023 Topics (grouped by category, not in order of delivery) Farlow in blue	**Scheduled session (2023)**
Foundations - Introduction to immunology - Principles of Vaccinology - History of Vaccines - Vaccine Safety	 - 12 January - 30 January - 30 January - 1 February
Vaccine funding and deployment systems - Vaccine Hesitancy - Vaccine Health Economics and Deployment - Supply chain - Paying for vaccines and vaccine development, and COVID-19 vaccine lessons and challenges	 - 30th January - 31st January - 31st January - 3 February
Specific vaccine examples - Meningococcal Meningitis - HPV Vaccines - Malaria and Dengue Vaccines - Pertussis - Pneumococcal Vaccine - RSV - Global Progress in TB Control and Vaccine Development - HIV Vaccines	 - 1 February - 1 February - 3 February - 3 February - 3 February - 3 February - 10 February - TBC
Vaccine Immunotherapy - Lecture 1: Hepatitis - Lecture 2: Chronic Disease Vaccines - Lecture 3: Cancer	- 7 March
Enteric pathogens - Lecture 1: Interactive introduction on Enteric Vaccines - Lecture 2: Enteric Fever Vaccines and NTS - Enteric Pathogens Workshop - Lecture 4: Shigella and Cholera	- 9 March
Field visit: general labs, CCVTM and Oxford Biomedica	- 10 February
Feedback and discussion on group problem-based learning projects	- 14 March