Pathogen X

WHO Health Emergencies Programme Day 1

Pathogen X will happen again

- Context:
  - Climate change
  - Urbanisation: climate change and urbanisation may disrupt niches
  - Increasing zoonotic and vector borne disease risk
  - Impact of human behaviour and agricultural practices on ecosystems
  - New diseases emerge primarily in LMICs: least resourced and most vulnerable
  - One Health approach including live animal trading data, wet markets
  - Influence of geopolitical context: human migration, conflict
  - Viral, pandemic influenza, AMR, bacteria?
  - May come from something we know or something we don’t
  - Pathogen X may be very different from past outbreaks even if similarities to previous outbreaks

Lesson 1: Big ticket lessons

- ‘One for all approach’
- Require ‘Hot start versus Warm start’
- ‘Avoid cycles of panic and neglect’
- ‘Avoid Grey Rhino approach: Not ready, we cannot work together’
- Maintain capabilities between outbreaks: funding and utility
- Importance of
  - Trust in science
  - Trust in Governments including provision of timely access to proven technologies
  - Community engagement and influencers
- Anticipate fear and stigma
- Equity considerations and North:South divide
  - Importance of strengthening engagement of LMICs in research
  - Equitable global access to therapeutics, vaccines, diagnostics and countermeasures
  - IP and tech transfer considerations
  - Manufacturing
- Trans-disciplinary response including science communicators
- Resources are finite so rational use needed: avoid duplication
- Applying the science of foresight

Lesson 2: ‘Sharing, sharing, sharing’

- ‘Proud to be with WHO: Sense of community and belonging’
- Importance of WHO as convenor and normative agency
- Virtual platforms have facilitated democratisation of data
- Importance of partnership and collaboration in data sharing: countries, scientists, international agencies, private sector
- Standardisation: Assays, Animal models, Clinical trial design and networks, Endpoints, Ethical frameworks, regulatory approaches
- Rapid data sharing: open access, pre-prints, genomic and lab networks, animal models
- Include diverse data bases for surveillance: public, private, media, security, non-traditional sources, ProMED, GISAID

Lessons3: From the past for the future

- Takes time to recognise outbreaks, and populations are likely to be susceptible
- Global response must be rapid: Could COVID-19 pandemic have been avoided with earlier global responses?
- Importance of Surveillance networks: laboratory, clinical, community, animal and human, inter-species jump, prior immunity, spread, disease course
- Investing in new surveillance technologies: digital technology, rapid diagnostics, multiplex diagnostics, genomics, affordable lab assays, system for pathogen X diagnosis must also be useful for endemic diseases, local manufacturing enabling access
- Predicting the future: Modelling, epidemiology, identify hotspots, phylogeny, genomics, serology, new software tools in advance of outbreak, science fiction
- Human capacity building especially in LMIC for surveillance, lab , modelling, clinical management
- Transdisciplinary research including behavioural, social sciences, anthropology, bioethics…….
- Increase trust by ensuring community access to: diagnostics, vaccines, therapeutics, medical countermeasures
- Strengthen public health responses
- Curriculum change for awareness in Health Care Professionals
- Improve public health education for children in school

Lesson 4: Viruses, Bacteria and Pathogen X

- Expedite and democratise microbial surveillance and discovery
- Risk: Around 120 viruses from 27 families known to infect humans with potential for increased H-H transmission and virulence, some with no prototype vaccine or therapeutics
- Risk of AMR: patterns of antibiotic use and need for new drugs, hospital spread (NNU, ICU), community, One Health
- New diagnostics: Faster, cheaper, easier; for individual patients; for surveillance and monitoring; predicting new outbreaks, source of outbreak
  - Pathogen genomics, Metagenomic sequencing
  - sequence-capture based diagnostics,
  - screening for viral diseases: predictive technologies and animal monitoring to identify areas of high risk,
  - point of care technologies (known pathogens),
  - bioinformatics,
  - multiplex diagnostics
- Global regulatory engagement to enable evaluation
- Global pathogen resources e.g. Genbank, GISAID, regional biobanks
- Tech transfer

Lesson5: WHO's future role: 'Make predicting the future more scientific'

- Facilitate global preparedness during peacetime
- WHO Prioritisation Review Committee:
  - Viral Family Review Group and Bacterial review group
  - Transmission, Virulence, Counter measures
  - Liaising with other global groups who have undertaken prioritisation exercise
- Global alignment with international stakeholders
- Ongoing normative role:
  - R&D Blueprint
  - Standardisation of assays and animal models
  - Diagnostic preparedness
  - Clinical trial design for changing scenarios
  - Vaccine and therapeutic research support
  - Regulatory authority dialogue and reliance
  - Novel modelling approaches
  - Prioritisation of engagement of LMIC scientists and clinicians
  - Sharing of global expertise
  - Transdisciplinary consultations
  - Ongoing review of IHR and pandemic preparedness

Thank you