



Effective Epidemic Response


Research Techniques
BME462

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A new twenty-first century science for effective epidemic response

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- Change in environment and ecology causes epidemics
- Crisis response during discrete outbreaks to an integrated cycle of preparation, response and recovery
- Many disciplines such as social science, research, crisis management.



- Traditional and nontraditional studies about epidemic diseases.
- Different factors and effects combine and causes more complex epidemics.
- Disruption on health systems and long-lasting socioeconomic effects .

Table 1 | Selected key areas to integrate into twenty-first century epidemic responses

Area	Key areas and/or disciplines
Governance and infrastructure	Local, national and international organizations; integrate accountability and transparency across multiple stakeholders; improve data sharing, improve logistics and crisis management
Engagement and communication	Encourage a community-led response, community engagement and health diplomacy
Social sciences	Anthropology, political science, human geography, linguistics
Ethics	Consent, clinical trial designs
Emerging technologies	Pathogen genomics, metagenomics, systems serology and analytics, data science and artificial intelligence
Research and development	Diagnostics, therapeutics and vaccines
One Health	Ecology and environmental, veterinary and agricultural sciences



How to be ready for an epidemic ?



Modern Research and Its Associated Problems

- The modern research culture has required many researchers to specialize in narrow fields, with less emphasis on translation than on field-specific innovations.



However, during the epidemic diseases that make rapidly evolving, high-impact events bring together communities, responders and researchers who do not routinely interact.

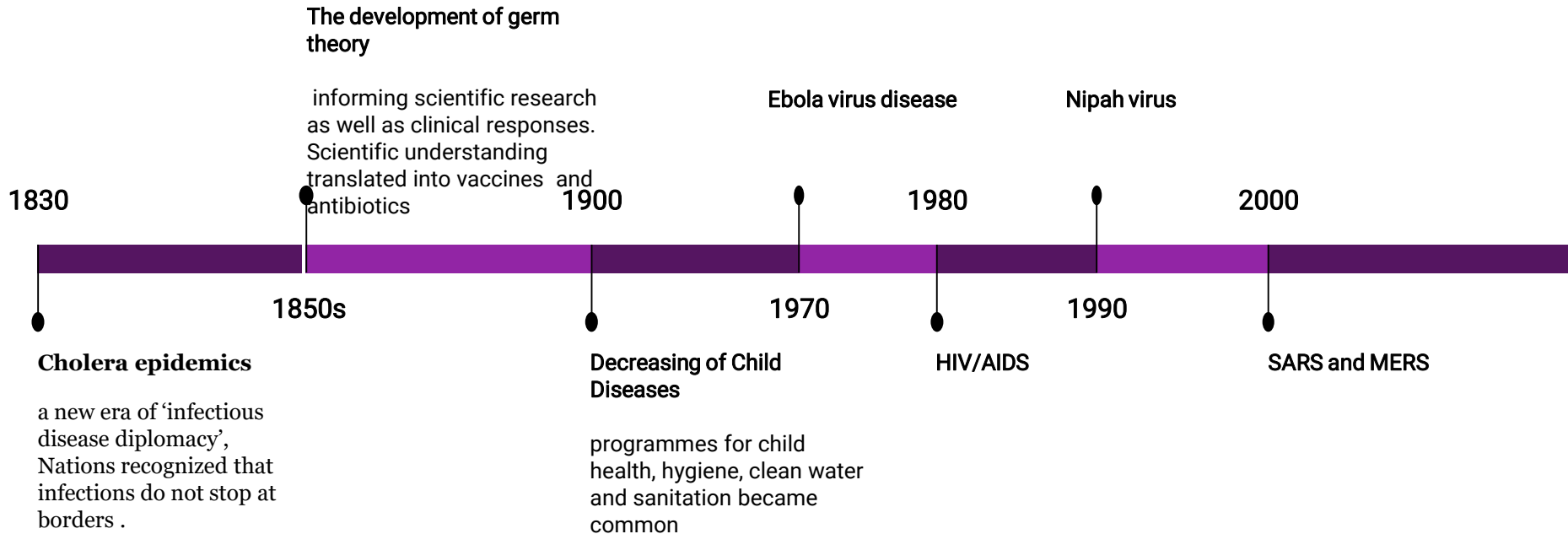
Communities

First !

From communities>> through local and regional health authorities>> national public health institutes and international organizations

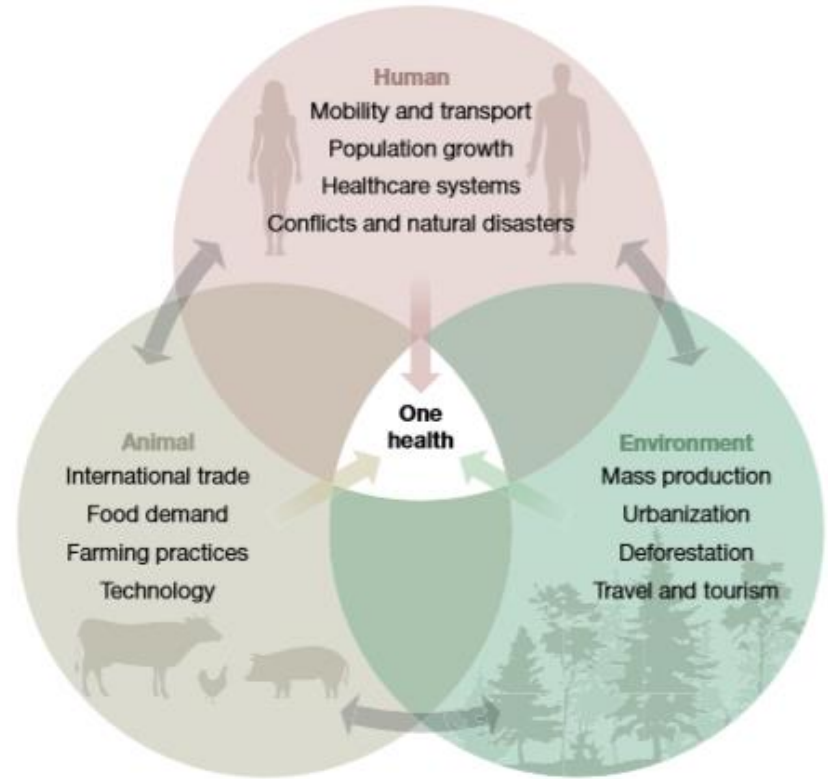


Nineteenth and twentieth century epidemiology



The New Normal and The One Health

- 150 pathogens were identified as emerging or evolving since 1980.
- Demographic transitions and change in societies' structure
- Climate change and environment change
- Healthcare systems.



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Governance and infrastructure

- Drafting policies in advance
- Processes for vaccine and therapeutic approvals during outbreaks.
- Inverse care law
- Centres for Disease Control (CDC)

Engagement and communication

- There is no public health without the support of the community
- Community event-based surveillance systems
- Violence and health

Social sciences

- Social science humanizes the epidemic response
- Awareness of the associations between the context or local practices and the risk of transmission
- Human behavioural surveillance to avoid social problems and raise awareness.

Emerging technologies

- The prevalence of technology made gathering data for epidemiological studies is easier than before, and brought an opportunities to move toward Precision Public Health, by the predictive technology, machine learning and artificial intelligence.
- Countries should invest in new surveillance systems.
- surveillance is more effective when technology is integrated with existed systems among different countries, districts and communities

Research and development



ETHICAL PROTOCOLS FOR
MANAGING INFORMED
CONSENT AND
INTRODUCING THEM IN
CLINICAL SETTINGS
MUST BE PLANNED IN
ADVANCE WITH AT-RISK
COMMUNITIES



HOW THE RESULTING
DATA CAN ADD TO
PREVIOUS TRIALS AND
INFLUENCE THE
APPROACH TO TRIALS IN
FUTURE EPIDEMICS



PREPARATION OF SUPPLY
CHAIN LOGISTICS AND
COMMUNICATION WITH
AT-RISK POPULATIONS



PLANS ARE NEEDED FOR
CONTINUAL
PRECLINICAL RESEARCH

Non traditional ways to avoid or fight epidemics

- Artificial intelligence :
 - tracking online searches about disease symptoms may aids in early detection of epidemics.
 - Assist in predicting which patients will suffer from a life-threatening lung damage.
- Crystallography
- Platform vaccine technology

Recovery :

Epidemics are far more
than death and
debilitation:

- Increased pressure on healthcare systems and workers and it draws resources from services not directly linked to the epidemic.
- Healthcare resources shortage and its fatal consequences on patients other than those infected by epidemic .
- Healthcare worker death .
- Sometimes , survivors may need to be cared after the epidemics

conclusion

- Epidemics are real and should be taken seriously .
- Training and preparing the health care workers and epidemiologists as well as peoples.
- Despite the advance in technology and researches today , it is still highly threatening of life of many peoples.

Thanks for listening

Be Healthy and have nice
days

“No matter how the severe the disease, it is still in our power to mitigate the impact of the pandemic wave and hopefully stop it from overwhelming our health-care systems. By staying home, minimizing mass gatherings and reducing physical contact, we can dampen the epidemic, reducing the number of cases and the speed at which they occur”