

WORLD VACCINE



CONGRESS WASHINGTON

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<http://www.onehealthinitiative.com>

Establishing a One Health Approach to Combat Emerging Zoonotic and Transboundary Diseases

One Health – from Concept to Practice



COLLABORATION

No one-not rock stars,
not professional
athletes, not software
billionaires, and not
even geniuses-ever makes
it alone.

Malcolm Gladwell



Problem Difficulty

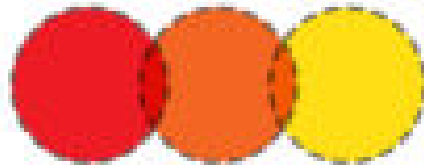
Research Approaches

Complex



Transdisciplinary

Complicated



Interdisciplinary



Multidisciplinary

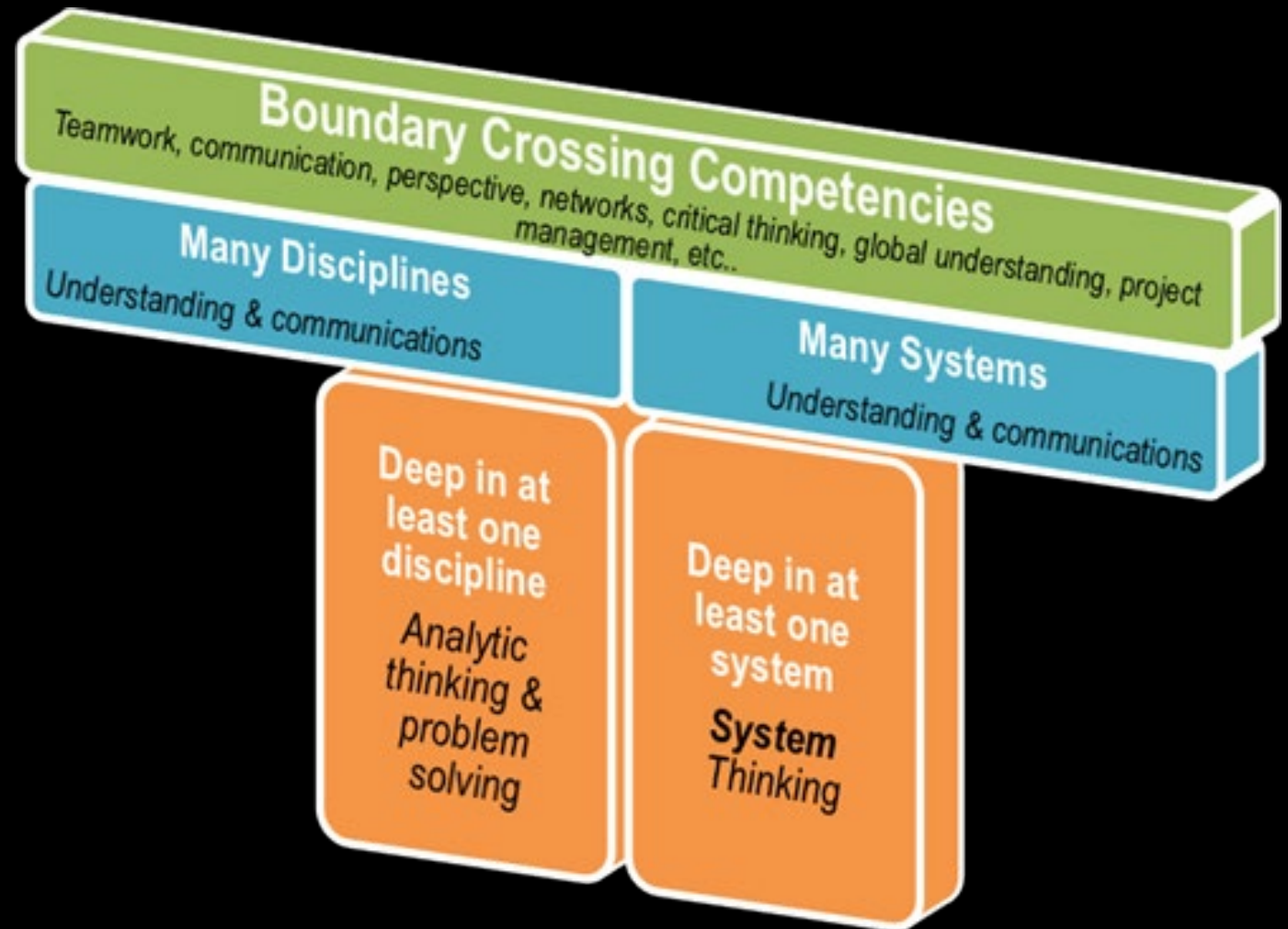
Simple



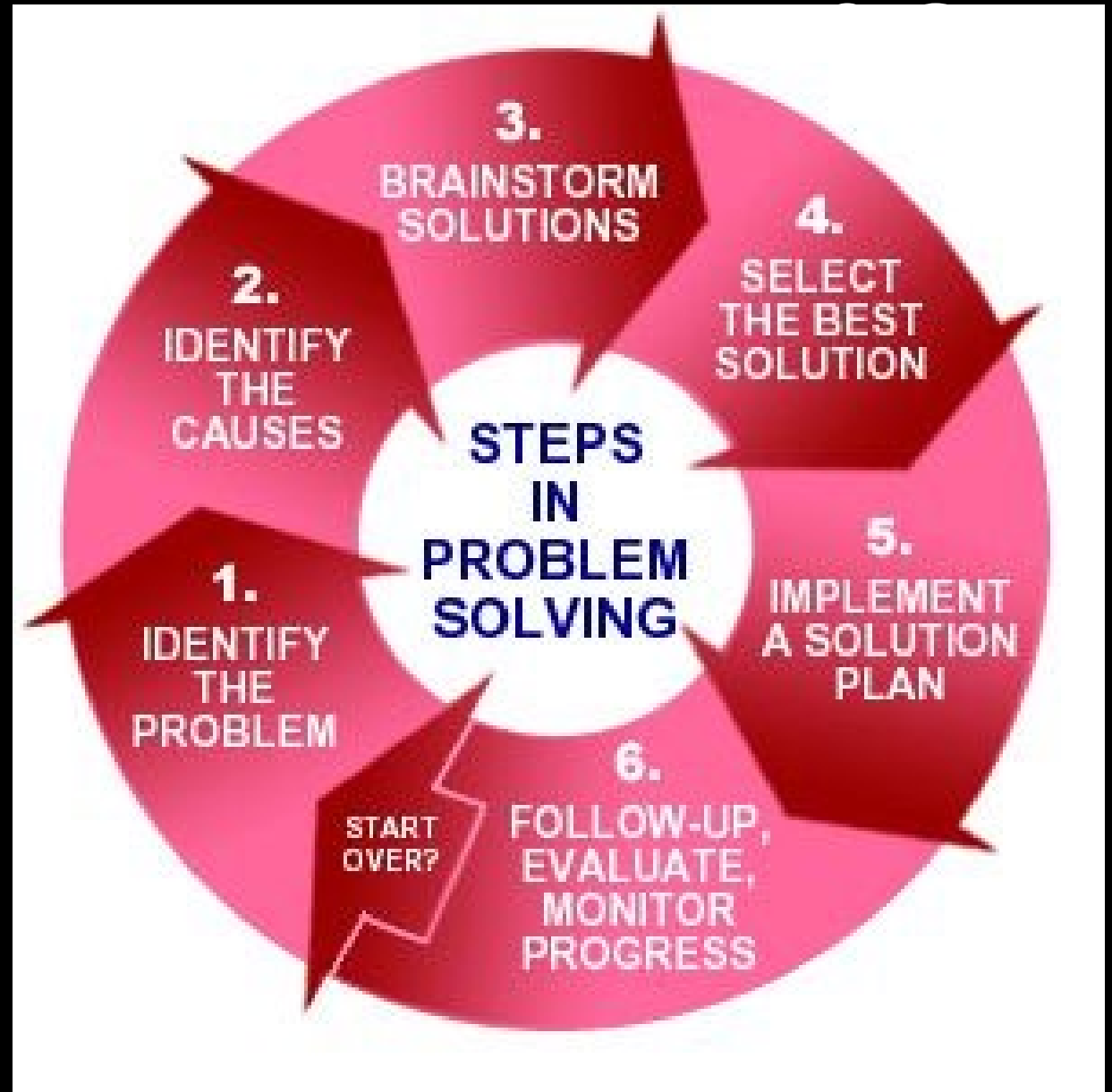
Disciplinary

T-SHAPED TRANSFORMATION

One Health is a collaborative, multisectoral, and trans-disciplinary approach - working at local, regional, national, and global levels - to achieve optimal health and well-being outcomes for people, animals, plants and their shared environment ... we are all inextricably linked.



1. Networks
2. Economics
3. Leadership



PERSPECTIVES



HUMAN-ANIMAL CONNECTION

Food (wild and domesticated), transportation, sport, research... and companionship




ENVIRONMENTAL HEALTH

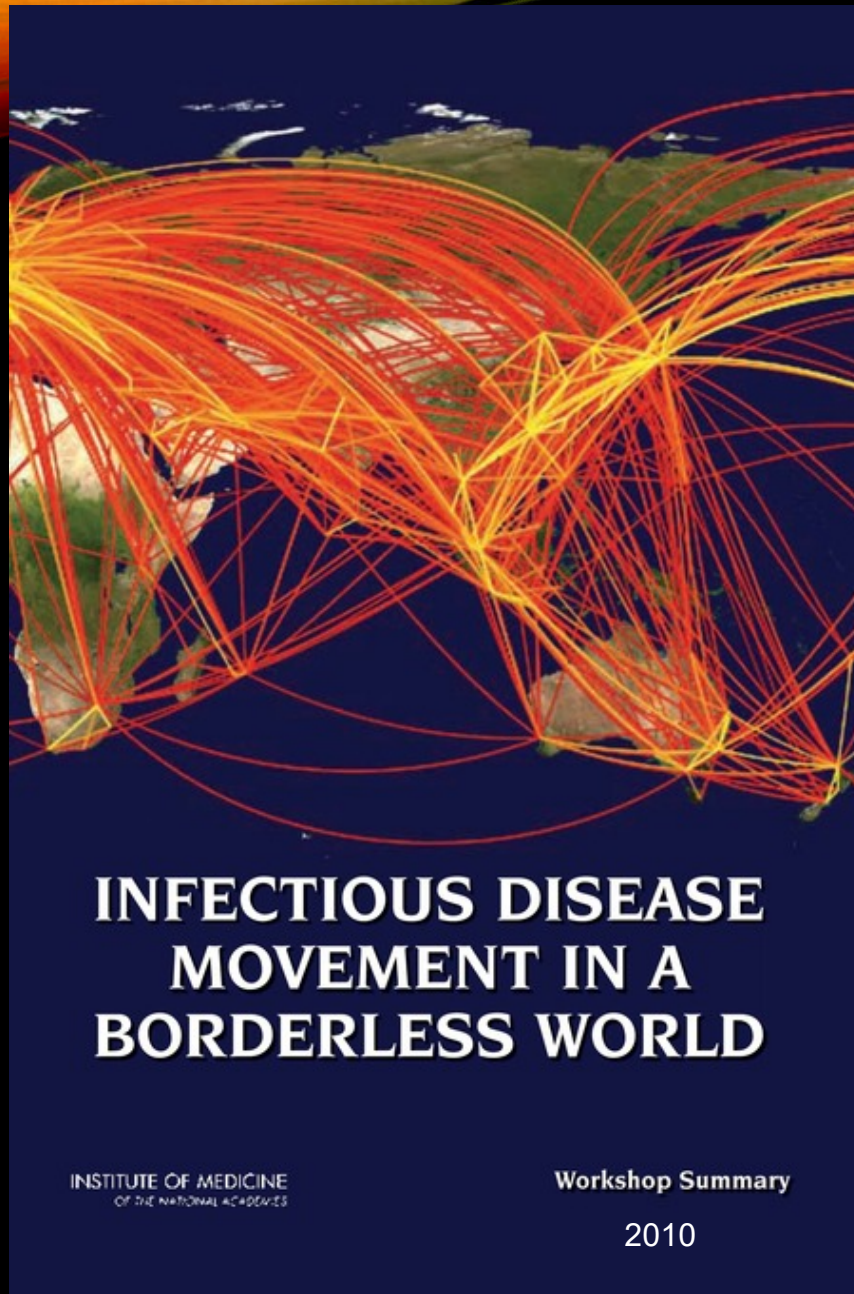
1. Food and Water Safety
2. Zoonoses & Vectorborne Disease Prevention & Control
3. Safe and Healthy Places



Microbes, chemicals, radiation and other hazards

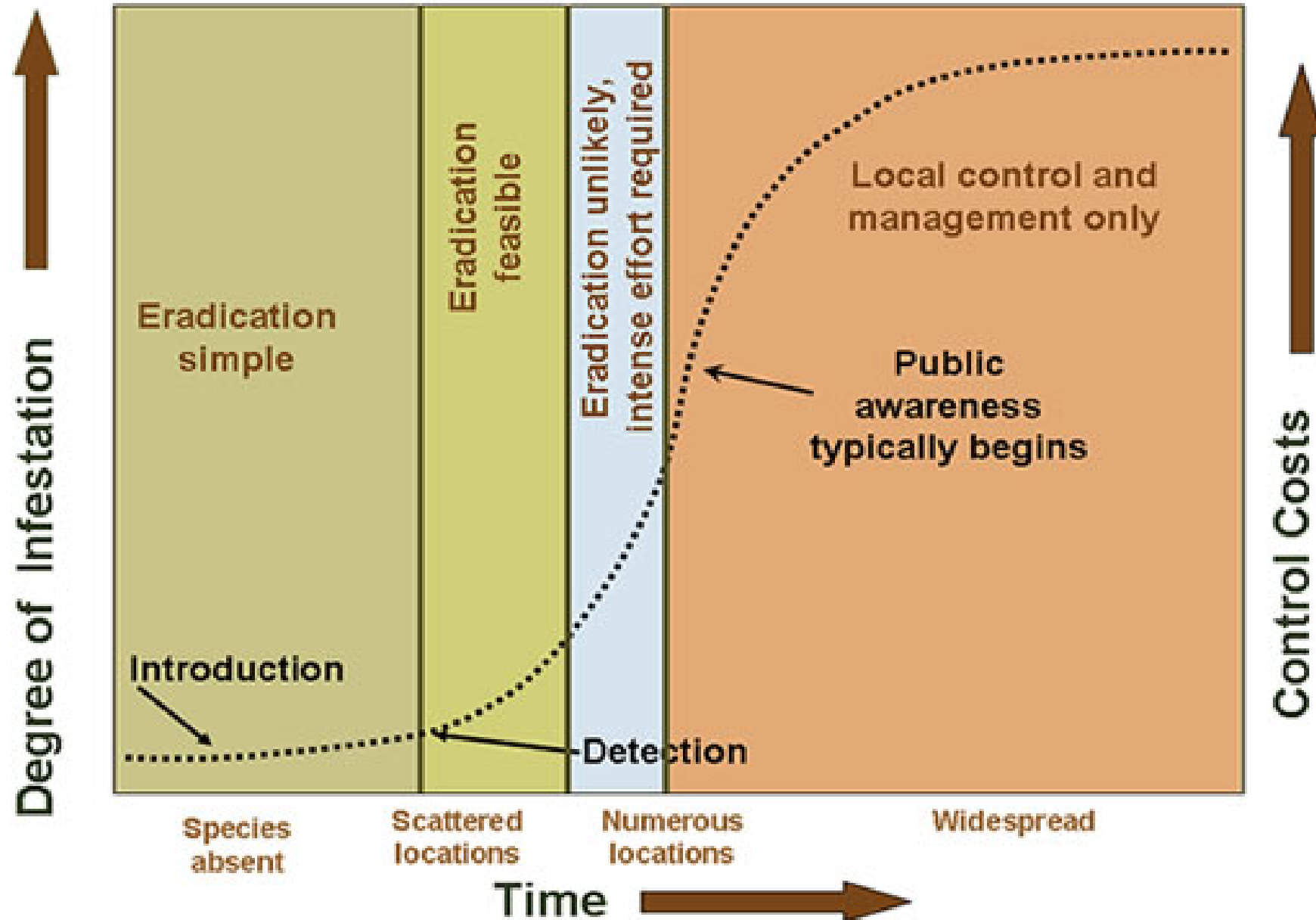
- 
- Human, animal, and environmental health are inextricably linked.
 - Considerable overlap between fields before 20th century.
 - Explosion in scientific knowledge in 20th century:
 - led to the development of intellectual silos and an increasingly reductionistic approach to health and disease.

Time has come for systems thinking



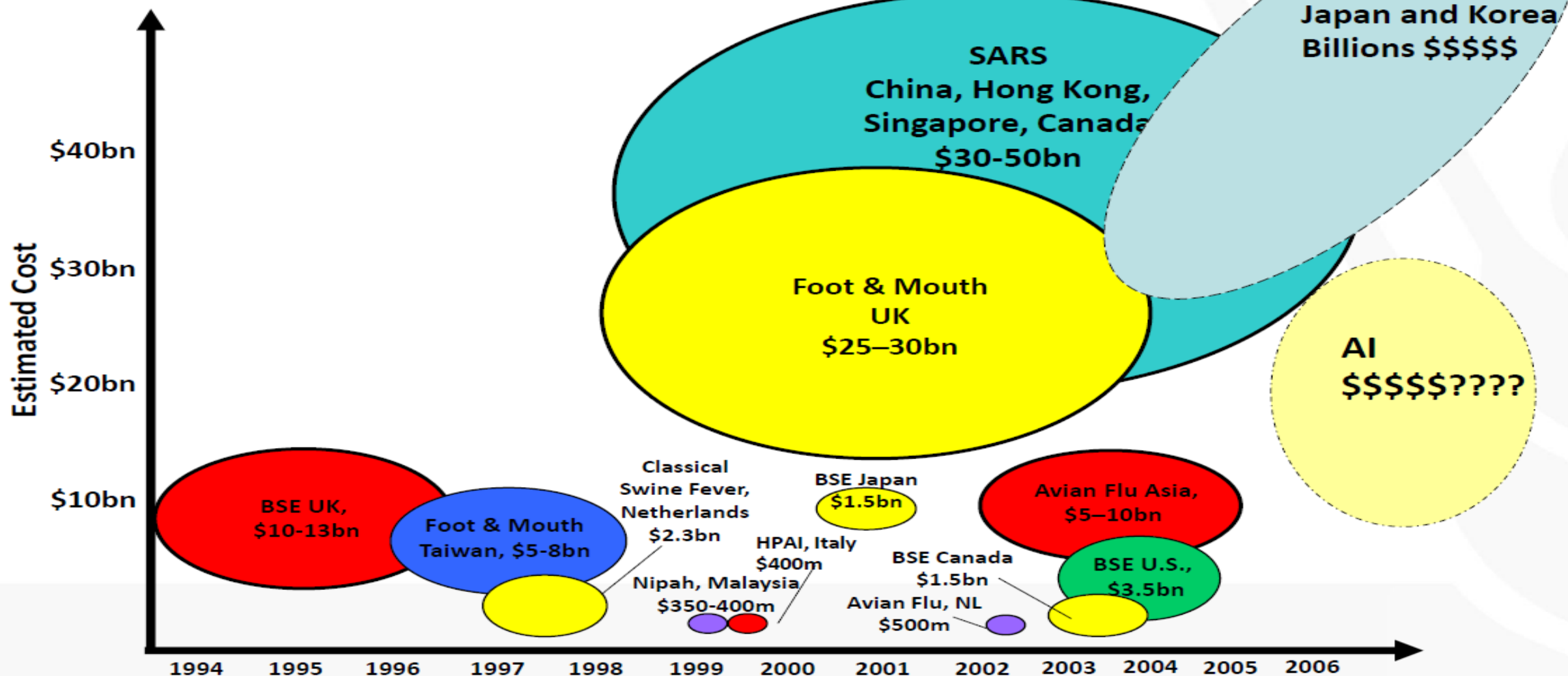
*“Knowing is not enough; we must apply.
Willing is not enough; we must do.”*
— Goethe

Invasion Stages Through Time

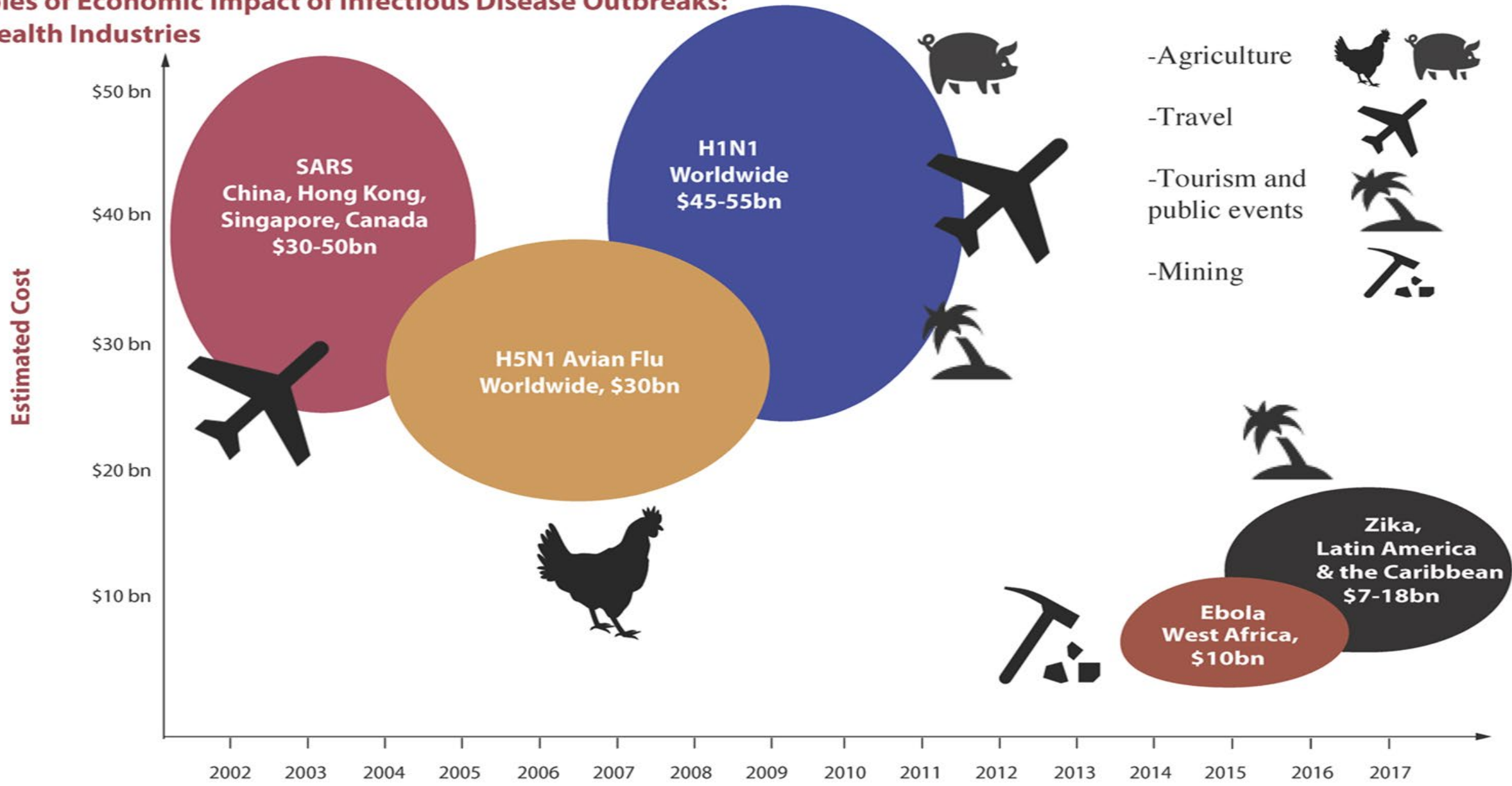


Economic Impact of EID

Figures are estimates and are presented as relative size.



Examples of Economic Impact of Infectious Disease Outbreaks: Non-Health Industries



Figures are estimates and are presented as relative size. Based upon bio-era, World Bank, and UNDP data. Chart updated by EcoHealth Alliance.

[Slide credit: [World Banking on One Health](#), October 11, 2017 presentation by Dr. Tim Bouley at the [Uppsala Health Conference](#), Uppsala, Sweden.]

FIVE FACTS ABOUT RIFT VALLEY FEVER



RVF is a viral zoonosis, which can be transmitted from livestock to people through mosquitos or direct contact.



Climate change may alter the distribution of mosquitos, potentially spreading RVF to new countries.



Outbreaks are associated with heavy rainfall or flooding, which provides ideal conditions for hatching mosquitos.


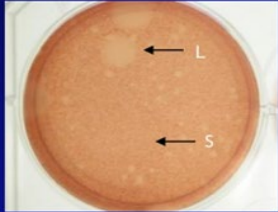


Researchers are working on vaccines, including one that inoculates both people and animals.



Climate surveillance and vigilant monitoring can help to control RVF outbreaks.

RVF traditional vaccines

VACCINE	STRAIN	ADVANTAGES	DISADVANTAGES
Inactivated (OBP, VSVRI) 	Pathogenic field strain	<ul style="list-style-type: none"> Safe in pregnant animals Can be used in outbreak 	<ul style="list-style-type: none"> Short term immunity Multiple vaccinations required Risk of handling virulent strain during production Colostrum immunity present but poor Sheep better protected than cattle 100 x more antigen required than for live attenuated Longer production lead time
Live Attenuated (OBP, KEVEVAPI) 	Smithburn	<ul style="list-style-type: none"> Highly immunogenic Single dose Good immunity (within 21 days) Effective and easy production Safer production Large batches: >4m doses 	<ul style="list-style-type: none"> Potential residual virulence Teratogenic for foetus Potential risk of reversion to virulence Not advisable for use in outbreaks Theoretical possibility of transmission by mosquitos (?)

Courtesy: Baptiste Dungu, GALVmed

<https://healthforanimals.org/resources-and-events/newsletter-repository/17-disease-outbreaks.html?q=58>

Presentation by Dr. Kariuki Njenga, Centers of Disease Control & Prevention, at the Enhancing Safe Inter-regional Livestock Trade, Dubai, UAE, June 13-16, 2011.

Rift Valley fever (RVF) is an acute viral disease that can cause severe disease in domestic animals (such as buffalo, camels, cattle, goats and sheep) and humans. Disease in these species is characterized by fever, severe illness, abortions, and a high morbidity and mortality rate. The RVF virus and Hantavirus belong in the family Bunyaviridae - can cause fever and encephalitis.

RVF is generally found in regions of eastern and southern Africa, but also in most countries of sub-Saharan Africa, Madagascar, Saudi Arabia and Yemen. RVF must be reported to the World Organization for Animal Health (OIE).

RVF is a potential, emerging threat to wildlife, livestock and humans in the USA.

World Health Organization (WHO) Ten Threats to Global Health in 2019

1. Air pollution and climate change
2. Non-communicable diseases
3. Global influenza pandemic
4. Fragile and vulnerable settings
5. Antimicrobial resistance
6. Ebola and other high-threat pathogens
7. Weak primary health care
8. Vaccine hesitancy
9. Dengue
10. HIV/AIDS

<https://www.who.int/emergencies/ten-threats-to-global-health-in-2019>

OPPORTUNITIES FOR ONE HEALTH



Emerging Diseases



Bio- Agro- Terrorism



Emergency Response



Biomedical Research



**Food Security
Nutrition
Foodborne Disease**



Disability



Antibiotic Resistance



Mental Health



Environmental Health



Injuries



Occupational Health



Health Education



**Obesity
Physical Activity**





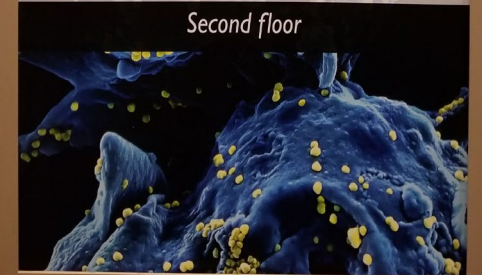
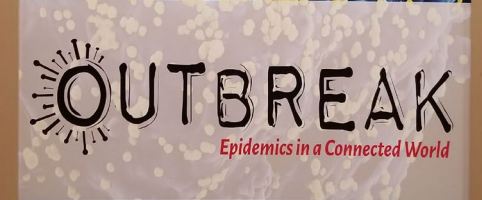
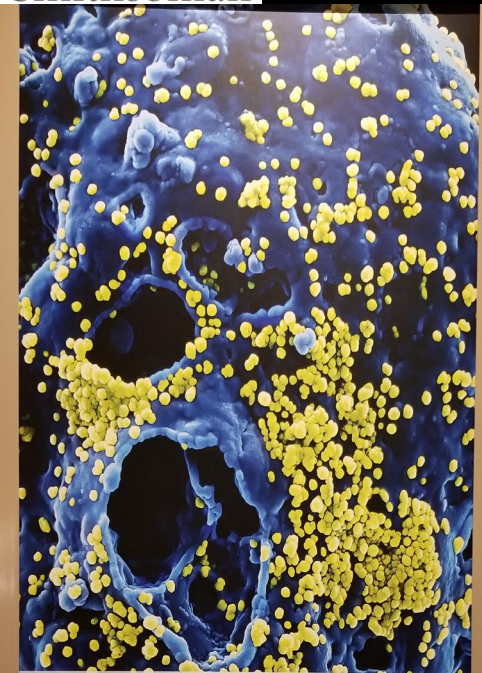
NEW SMITHSONIAN EXHIBITION EXPLORES PANDEMICS AND EMERGING INFECTIOUS DISEASES

The Smithsonian's National Museum of Natural History will mark the 100th Anniversary of the Great Influenza Pandemic of 1918 with a new exhibition, **Outbreak: Epidemics in a Connected World**, which has a One Health focus and will remain on view for the public for three years!

- **The origins of zoonotic diseases** - Since the rise of domestication, human interactions with other animals have increased and changed. Today, three-quarters of all new infectious diseases affecting humans originate in animals, and "Outbreak" focuses on how they spill over, spread and how they can be contained.
- **Humans' role in spreading animal-borne viruses** - "Outbreak" will look at the effects of habitat fragmentation and diversity loss, urbanization and global travel on increasing the risks of zoonotic-disease emergence and highlight the role of scientific research and behavior change in lowering risks of disease transmission.
- **How outbreaks are handled** - Future outbreaks are certain to occur. The exhibition introduces people who play many different roles in the global fight against epidemics, from identifying their animal origins to developing vaccines and interventions to help prevent the next one.

Understanding how we can prevent zoonotic viruses like Ebola, Zika and influenza from emerging and quickly spreading around the world—recognizing that human, animal and environmental health are connected as 'One Health'—is a critical science lesson for the 21st century ... Sabrina Sholts, lead curator of the exhibition.

<https://newsdesk.si.edu/releases/new-smithsonian-exhibition-explores-pandemics-and-emerging-infectious-diseases>





<http://www.onehealthinitiative.com/>

Thank you!

