Global Health Security: Utilizing the One Health Approach to Control COVID-19 & Disease X
Global Health Security Agenda

Risks
- Emerging organisms
- Drug resistance
- Intentional creation

Opportunities
- Public health framework
- New lab and surveillance tools
- Successful outbreak control

Priorities
- Prevent wherever possible
- Detect rapidly
- Respond effectively

Vision: A world safe and secure from global health threats posed by infectious diseases, whether natural, deliberate, or accidental.
Zoonotic Origin of Coronaviruses

- 7 known Human Coronaviruses
  - Mild disease: HKU1, OC43, NL63, 229E
  - Severe outbreaks: SARS-CoV, MERS-CoV, SARS-CoV2 (COVID-19)
  - Almost all have zoonotic origins or circulate in animals:
    (bats, camels, cattle, civets?)
- Non-human CoVs such as porcine epidemic diarrhea virus (PEDV) may have emerged by host switching
- One of the most impactful viral families in veterinary medicine

Why should we protect bats?

• Protect biodiversity & ecosystems
  • Insectivorous – control pests
  • Pollinators – promote agricultural
  • Seed dispersers – connect fragmented landscapes

• Attempts to reduce populations:
  • Generally unsuccessful
  • Encourage recruitment of susceptibles, increasing transmission potential
  • Allow immigration from other areas
  • Stress populations, increasing virus shedding
PREDICT

DEVELOPED the One Health Workforce by training more than 6,800 people in over 30 countries.

OPERATIONALIZED One Health surveillance and sampled over 164K animals and people, helping minimize the spillover of zoonotic disease threats from animals into human populations.

STRENGTHENED laboratory systems and zoonotic disease detection capabilities in over 60 labs around the world.

DETECTED over 1,100 unique viruses, including zoonotic diseases of public health concern such as Bombali ebolavirus, Zaire ebolavirus, Marburg virus, and MERS- and SARS-like coronaviruses.
Laboratory Capacity and COVID-19 Response

• PREDICT improved testing capacity in 67 labs in 36 countries
• Built a network of linkages between laboratories, countries and government ministries
• Laboratories have additional tools and the ability to detect newly emerging viruses when assays or sequences do not yet exist
• Importance of these skills was underscored following the emergence of SARS CoV-2 in China
• Teams around the world able to call on the PREDICT network to share experience using PREDICT assays to detect the new virus & provide technical assistance to disease control plans
Ongoing Obstacles
ONE HEALTH WORKFORCE
CAPACITY STRENGTHENING
The Global Virome Project (GVP) is an innovative 10-year partnership to detect the majority of our planet’s unknown viral threats. It will pivot our approach from responding to outbreaks to proactively preparing for them. The GVP will mark the beginning of the end of the Pandemic Era.
Spillover and Wildlife Trade for Consumption: Rethinking our Relationship with Wildlife and Wild Places

Prof. Dr. med.vet. Chris Walzer
Wildlife Conservation Society
VetMed Univ. Vienna, Austria
What do we know?

- Zoonoses are diseases the move between animals and humans
- Emerging Infectious Diseases [EID] are dominated by zoonoses
- 72% of all zoonotic EIDs originate in wildlife
- EID frequency is increasing
  - HIV, EBOLA, H1N1, SARS, NIPAH, HENDRA, H7N9
What do we know?

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**Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study**

**Summary**

Background In December 2019, a pneumonia associated with the 2019 novel coronavirus (2019-nCoV) emerged in Wuhan, China. We aimed to further clarify the epidemiological and clinical characteristics of 2019-nCoV pneumonia.

Methods: In this prospective, single-centre study, we included all confirmed cases of 2019-nCoV in Wuhan Jinyintan Hospital from Jan 1 to Jan 28, 2020. Cases were confirmed by real-time RT-PCR and went through an epidemiological, demographic, clinical, and radiological assessment and laboratory data. Outcomes were followed up to Jan 25, 2020.

Findings Of the 99 patients with 2019-nCoV pneumonia, 49 (49%) had a history of exposure to the Huanan seafood market. The average age of the patients was 52 years (SD 19.6), including 67 men and 32 women. 2019-nCoV was detected in all patients by real-time RT-PCR. 80 (81%) patients had fever, 79 (80%) had cough, and 70 (71%) had respiratory symptoms. The median duration of fever was 10 days (IQR 7-14 days). Of the 99 patients, 45 (46%) had hypertension, 18 (18%) had diabetes, 15 (15%) had chronic obstructive pulmonary disease, and 14 (14%) had coronary heart disease. Of the 80 patients with pneumonia, 37 (46%) had severe disease and 13 (16%) had critical disease.

**Abstract**

Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus–Infected Pneumonia

What do we know?
What do we know?
What do we know?

- Across 25 high-risk viral families, there are estimated to be **1.7M unknown viruses**
- About **700k** of which likely have the potential to infect humans
- For example, for every known coronavirus, there are thousands of unknown coronaviruses circulating in wildlife

Carroll et al. (2018) Science
What do we not know?
It is not about bat-soup, civets or pangolins
Barriers to spillover. This figure was adapted from Plowright et al. 2017.
What do we know?

Detection rates of coronaviruses

Field rat value chain interface
• What **do we not** know?
IPLC - Congo Basin

- Long-standing program
  - Carcass monitoring [Ebola virus community engagement targeted 6,600 people living in northern RoC]
  - Community outreach IPLC needs and rights
2004 **One World, One Health** meetings with human public health, conservation and infectious disease experts were organized by WCS

- **Manhattan Principles**

- **Berlin Principles 2019**
2019 Berlin Principles on One Health

- Recognize and take action to: retain the essential health links between humans, wildlife, domesticated animals and plants, and all nature; and ensure the conservation and protection of biodiversity which, interwoven with intact and functional ecosystems, provides the critical foundational infrastructure of life, health, and well-being on our planet.

www.wcs.org/one-planet-one-health-one-future

Ostfeld et al. 2002 Mazet et al. JVME 33 2006
What do we need to do?

- Permanently ban the commercial trade in wildlife for consumption
- Strengthen efforts to combat trafficking of wild animals within countries and across borders
- Work to change dangerous wildlife consumption behaviors, especially in cities
- Mainstream holistic One Health Approaches
We Stand for Wildlife™
Reducing the Demand for and Trade in Wildlife Products – The View from South-East Asia

K. Yoganand
Regional Lead for Wildlife and Wildlife Crime
WWF Greater Mekong
Outline

• Key ideas

• Wildlife trade ➔
  ➢ Declines/extinctions
  ➢ Infectious disease (spillover) risks

• Consumer demand
Why South-East Asia?

- Historical species diversity – high
- Population extinctions – >90% ?
- Defaunated landscapes - widespread
- Empty forests - common
- Indiscriminate snaring – crisis
Why South-East Asia?

- Trade hotspot, trafficking route
- Largest wildlife market, together with East Asia
- Human population increase
- Disposal income increase

International Trafficking Routes For Pangolins

Source: Nepali Times
Southeast Asia: At the heart of wildlife trafficking

(Map: Krishnasamy, K. and Zavagli, M. (2020). Southeast Asia: At the heart of wildlife trade. TRAFFIC Southeast Asia, Petaling Jaya, Selangor, Malaysia)
How large is the wildlife trade / market? (not including timber and fisheries)

Speculative estimates – reliable data is limited

<table>
<thead>
<tr>
<th>Region</th>
<th>Illegal trade (in billion USD)</th>
<th>Legal trade (in billion USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southeast Asia</td>
<td>1 – 2 /year</td>
<td>3 – 10 /year</td>
</tr>
<tr>
<td>East Asia</td>
<td>5 – 10 /year</td>
<td>50 – 100 /year</td>
</tr>
<tr>
<td>Global total</td>
<td>7 – 23 /year (2007 estimate)</td>
<td>150 – 200 /year (15 bn in international trade the early 1990s)</td>
</tr>
</tbody>
</table>

This involves 100s of millions of wild animals, 1000s of species every year (million+ live primates)
What drives the trade?

• Consumer demand
  • Live wildlife – for caged/captive display (“pets”)
  • Wildlife meat – local communities and urban consumers
  • Parts and products for traditional medicine
  • For biomedical research – often international
  • Clothing and fashion (fur, ornaments) – global supply

• Profiteering
• Corruption
• Up to 10% of the population in SE Asia may be consumers (tbc)
Laws on wildlife trade and consumption

- Mostly based on species status, population trends
  - often based on outdated or unreliable data
- No international or national protection for many species
- Regulate import, possession, trade, and hunting, but not eating
- Laws regulate wildlife farming, but often weak on enforcement
- Laws rarely consider infectious disease risks of species/taxa
Law enforcement on illegal wildlife trade

- Weak law enforcement
- Legal trade weakly regulated
- Legal trade confuses and strains law enforcement
- Uncontrolled wild sourcing
- Laundering through farms
- Corruption and fraud
- Illegal trade thrives
High-risk taxa

• Prohibit trade and consumption of high-risk taxa
  – for food and traditional medicine

• High-risk taxa
  – viral pathogen transmission risk to humans
  – Provisionally include all mammals and birds
  – Assess all mammal and bird species for risks
  – Particularly high-risk are bats, primates, rodents, carnivores

(From: Scheffers et al (2019), Science, 366, 71-76)
High-risk wildlife trade, farms & markets

High-risk market:
• Large volumes of trade
• High human visitation rates
• Live animal, wild meat trade
• Wet markets, highway stalls, tourist centres, wild meat restaurants and farms
• Legal vs illegal – viral disease risk same
  – Legal trade is far larger than illegal trade

WWF
Wildlife trade supply chain – Risks of spillover at every stage (irrespective of legality)

- Sourcing wild animals
- Legal or illegal hunting/capture
- Middlemen/smugglers/syndicates
- Transportation
- Storing and Processing
- Distributors/wholesale trade
- Retail trade locations (“markets”)
Reducing consumer demand

- Identify consumers and motivations for demand
- Target urban consumers for wild meat
- Other consumer segments for medicinal products
- Conduct public outreach on disease risks of wildlife consumption
- Legal bans and ban awareness very effective in reducing demand
Policy and enforcement opportunities

- China example of prohibiting trade and consumption of certain taxa for food
- Vietnam made a start but now unknown?
- Immediate prohibition through Prime Minister Orders, followed by changes to law
- Fix policy gaps and weaknesses on other aspects of wildlife trade
- Post-COVID-19 recovery should include increased resources for law enforcement
  - On illegal trade
  - For protection in natural habitats
## Elephant ivory markets example

<table>
<thead>
<tr>
<th>Countries</th>
<th>Legal status of ivory markets</th>
<th>Enforcement on open markets</th>
<th>Enforcement on underground, online markets</th>
<th>Prosecution &amp; convictions of criminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myanmar</td>
<td>Closed</td>
<td>Becoming stronger</td>
<td>Weak</td>
<td>Low</td>
</tr>
<tr>
<td>Thailand</td>
<td>Partially open, regulated</td>
<td>Strong on regulation</td>
<td>Moderate</td>
<td>Low to Moderate</td>
</tr>
<tr>
<td>Laos</td>
<td>Closed</td>
<td>Becoming stronger</td>
<td>Weak</td>
<td>Very low</td>
</tr>
<tr>
<td>Cambodia</td>
<td>Closed</td>
<td>Weak (with increasing availability)</td>
<td>Weak</td>
<td>Very low</td>
</tr>
<tr>
<td>Vietnam</td>
<td>Closed</td>
<td>Weak</td>
<td>Weak</td>
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</tr>
</tbody>
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Sofia Venturini/WWF Myanmar
Stop the supply – WWF’s Zero-poaching work in Myanmar
Thank you!

WWF Laos