Working in the United Nations – A veterinary epidemiologist’s perspective

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Outline

• What is the FAO?
  – Structure
  – Departments
  – Main goals
  – Activity areas

• FAO and animal health
  – Main issues addressed
  – Main programmes at HQ and decentralized offices
  – GLEWS

• Opportunities
Food and Agriculture Organization (FAO) of the United Nations (UN)

- Agency founded in 1943 – 194 members globally
- Structure:
  - HQ – Rome, Italy
  - Decentralized Offices:
    - Regional (n=5)
    - Sub-regional (n=9)
    - Country (n=80)
Food and Agriculture Organization (FAO) of the United Nations (UN)

- **Departments:**
  - Agriculture and Consumer Protection
  - Economic and Social Development
  - Fisheries and Aquaculture
  - Forestry
  - Corporate Services
  - Technical Cooperation and Programme Management

- **Staffing:**
  - 1738 professional staff
  - 1510 support staff
  - ~3000 others (consultants, etc.)

Food and Agriculture Organization (FAO) of the United Nations (UN)

- Main Goals:
  - the eradication of hunger, food insecurity and malnutrition;
  - the elimination of poverty and the driving forward of economic and social progress for all;
  - and, the sustainable management and utilization of natural resources, including land, water, air, climate and genetic resources for the benefit of present and future generations.
Food and Agriculture Organization (FAO) of the United Nations (UN)

• Five activity areas:
  – Putting information within reach and supporting the transition to sustainable agriculture (data collection, analyses and dissemination)
  – Bolstering public-private collaboration to improve smallholder agriculture - (collaborations with Universities, research organizations, NGO’s, etc)
  – Bringing knowledge to the field (Operational research).
  – Supporting countries prevent and mitigate risks (Capacity building, training workshops, meetings, guidance documents, etc).
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FAO and Animal Health

- Main issues addressed:
  - Zoonotic diseases (Anthrax, Mers-Cov, ebola, etc)
  - Transboundary animal diseases (FMD, PPR, Avian Influenza, etc)
  - Insect-borne diseases
  - Diseases of production and hygiene
  - Veterinary public health (Rabies, etc)
  - One Health
  - Food safety
  - Strengthening of veterinary systems
  - Antimicrobial resistance
Animal Health Service (AGAH)

- Main programmes/Units at FAO HQ:
  - FAO Emergency Prevention System (EMPRES)
  - Global Early Warning System for Major Animal Diseases including Zoonoses (GLEWS)
  - The Crisis Management Centre for Animal Health (CMC) is FAO’s rapid response unit which works alongside governments to prevent or limit the spread of high-impact animal diseases.
  - Veterinary Public Health and Food safety
  - EUFMD: The European Commission for the Control of Foot-and-Mouth disease (EuFMD)
Animal Health Service (AGAH)

- Main operational frame at field level – technical assistance to countries
  - Emergency Centre for Transboundary Animal Disease Operations (ECTAD):
    - A combined effort of FAO’s Animal Production and Health (AGA) and Emergency Operations and Rehabilitation (TCE) Divisions; under the operational responsibility of the CVO-FAO
    - Unites technical expertise and operational capacity within a holistic approach to animal health
    - Operating since 2004, responding to transboundary animal health crises
    - Plan, strengthen and streamline veterinary assistance to FAO member countries and regions, in association with Sister International Organizations and Donors
FAO Emergency Prevention System (EMPRES)

- A priority programme within the Animal Health Service of FAO that was initiated in 1994:
- Key elements: early warning, early detection, early reaction, research, coordination and communication
- Assists member countries in the effective containment and control of the most serious epidemic livestock diseases and TADs as well as newly emerging diseases through mid- to long term projects
- Promotes progressive control or elimination of TADs on a regional and global basis
- Enhancing international cooperation

Constraints

- Weakness of communication / information sharing
- TADs with pandemic potential
- Insufficient preparedness and inappropriate response to disease epidemics
The Global Early Warning System for Major Animal Diseases including Zoonoses (GLEWS)

- A joint FAO, OIE and WHO initiative which combines the strengths of the three organizations to achieve common objectives.
- An early warning system that formally brings together human and veterinary public health systems
  - to share zoonotic disease outbreak information
  - to share epidemiological and risk analysis
  - to deliver early warning messages to the international community on areas at risk of TAD and zoonosis.
- Underpinned by a series of Regional/National networks:
  - UN Member states (OIE,FAO,WHO); Reference Laboratories
  - Unofficial surveillance programs (PROMED,GPHIN) ; others
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Objectives of GLEWS

• Identify unusual disease events in time and space
• Identify factors (if any) that may be involved
  – Monitor global disease and drivers situation
• Conduct risk assessment to determine:
  – Severity; geographic distribution of events; possibility of spread
  – What actions (if any) to be taken
    • Alert messages, official missions to provide assistance etc..
• Provide overview of disease situation (global and regional)
  – Daily, weekly, monthly, quarterly and annually
Objectives of GLEWS (Con’t)

• Share information with countries and partners
• Capacity building:
  – Strengthening outbreak investigations and reporting
  – Surveillance
  – Information systems development
  – Risk assessment and data analyses
  – Guidance development
## GLEWS priority diseases

<table>
<thead>
<tr>
<th>Disease</th>
<th>Disease</th>
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<tbody>
<tr>
<td>New World Screwworm</td>
<td>Nipah</td>
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<tr>
<td>Old World Screwworm</td>
<td>Peste des Petits Ruminants</td>
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<tr>
<td>Q Fever *</td>
<td>Rabies *</td>
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<tr>
<td>Rift Valley Fever *</td>
<td>Rinderpest – Stomatitis/Enteritis</td>
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<tr>
<td>Sheep Pox/Goat Pox</td>
<td>Tularemia *</td>
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<tr>
<td>Venezuelan Equine Encephalomyelitis *</td>
<td>West Nile Virus *</td>
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<tr>
<td>African Swine Fever</td>
<td>Anthrax *</td>
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<tr>
<td>Bovine Spongiform Encephalopathy *</td>
<td>Brucellosis *</td>
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<tr>
<td>Classical Swine Fever</td>
<td>Foot and Mouth Disease</td>
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<tr>
<td>Contagious Bovine Pleuropneumonia</td>
<td>Crimean Congo Hemorrhagic Fever</td>
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<tr>
<td>Ebola Virus* Food borne diseases *</td>
<td>Highly Pathogenic Avian Influenza</td>
</tr>
<tr>
<td>Japanese Encephalitis *</td>
<td>Marburg Hemorrhagic Fever *</td>
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</tbody>
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* Zoonotic disease
FAO GLEWS Team

- Coordinator
- Disease intelligence officer
- Data entry officer
- IT officer
- Veterinary Epidemiologists
- Disease ecologist

- Volunteers and interns
  - Universities (US, Europe, Asia, Americas)
Data sources for GLEWS

• Disease events data:
  – EMPRES-i – Information system of the FAO
  – FAO country offices/projects (PDSR, SMS gateway) - ECTAD
  – Reference Laboratories (FMD – Pirbright in the UK, etc)
  – OIE/WHO – Official and unofficial reporting systems
  – Non-official sources – media (Promed, GPHN, media, etc)
Data sources for GLEWS

• Risk factor data:
  – FAO Statistics (FAOSTAT):
    • Livestock and human population numbers
    • Global livestock trade matrices
    • Human population numbers
    • Poverty indicators
  – Geonetwork:
    • Spatial layers of population density
  – FAO GIEWS
    • data on prices of livestock and products within and between countries
  – Climate agencies (International Research Institute for Climate and Society):
    • International Research Institute for Climate and Society
    • NASA
EMPRES-i - 

- A Global animal disease information system:
  - Released in 2003 – response to emergence of H5N1 HPAI in Asia
  - Source of data for FAO priority diseases
  - Web-based and password protected
  - Access granted to FAO officers, epidemiologists, researchers, modeling experts and, decision makers;
  - Linked to other databases
    - Animal population density layers
    - Other environmental layers (Geonetwork/FAO)
    - Genetic information (Openflu database)

http://empres-i.fao.org
http://empres-i.fao.org/empres-i3g/
Descriptive analyses – Global disease situation

H5N1 HPAI (2005 - 2012)
Risk assessment – identification of countries at risk of spread

Hazard HPAI H5N1 - spread in the Middle East – following reports of outbreaks in Lebanon and Iraq this year:

HPAI H5N1 outbreaks in the middle east (2006 – 2016)

Scenario tree of pathways for introduction of HPAI from currently infected countries to uninfected countries in the Middle east.

Trade

Main flyways

Important bird areas in the Middle East region
Risk assessment – identification of risk factors

FMD serotype SAT2 in Egypt – (Emergence of SAT 2)
Risk assessment: Identification of risk factors

FMD in Viet Nam
Risk assessment: Identification of risk factors

H5N1 HPAI in Indonesia

[Graphs showing colonization and persistence probability against human and poultry density]
Risk assessment: Identification of risk pathways

- Assessing destination of livestock from Egypt to the MENA region
- Assessing source of livestock imports into Saudi Arabia
Risk assessment: Identification of risk pathways

Spread of diseases (2011-2013)

- FMD: Foot and Mouth Disease
- PPR: Peste des petit ruminants
- HV-PRRS: Highly virulent Porcine respiratory reproductive syndrome
- H5N1 HPAI: H5N1 Highly Pathogenic Avian influenza
- A(H7N9) LPAI: (H7N9) Low Pathogenic Avian influenza
- LSD: Lumpy Skin Disease
- MERS CoV: Middle Eastern Respiratory Syndrome coronavirus
Risk assessment: modelling and mapping

Predicted suitability for FMD:
- High: 0.890749
- Low: 0.0411981
Risk assessment: Niche modelling

Define and map spatial risk factors
- Poultry population density
- Backyard chicken density
- Intensive chicken density
- Free-grazing duck/farmed wild bird density
- Per capita GDP (linked to levels of biosecurity?)
- Human population density

Derive principal components
Statistical clustering of principal components
Spatial representation of clusters (niches)

Characterise niches based on:
- influenza virus clades
- viral diversity
- evolutionary rates
- recombination events

Source: Gilbert et al. (2013) – letter of agreement with University
Assessing data/surveillance quality

- Assessing underreporting
  - Assessing residuals of best fit model
  - Explicitly model underreporting
Sharing information - reports and alert messages

Global overviews

H5N1 HPAI Global Overview

September 27, 2012 by Admin

Bulletin 32 / April-June 2012 This overview is produced by the FAO-GLEWS team, which collects and analyses epidemiological data and information on animal disease outbreaks as a contribution to improving global early warning under the framework of the Global Early Warning for Transboundary Animal ... [Read more...]

Filed under: Bulletin, Disease News • Tagged with: H5N1, HPAI, Pathogenic Avian Influenza

EMPRES Watch

December 27, 2012 by Admin

Bulletin 27/2012 :: Rift Valley fever: vigilance needed in the coming months A significant threat to poultry production not to be underestimated ... [Read more...]

Regional overviews

ANIMAL DISEASE INTELLIGENCE REPORT
(EAST, SOUTH EAST AND SOUTH ASIA)

Prepared by FAO EMPRES/GLEWS

August-September 2012

#SUMMARY

#SECTION 1: Overview of the animal disease situation
- Official sources
- Unofficial sources
- Vector - virus diseases and vector distribution
- #SECTION 2: Major disease events and drivers
- H5N1 HPAI in Southeast Asia
- Dohukov virus
- #SECTION 3: Disease forecasts
- #SECTION 4: Other highlights and relevant publications during the period

http://www.glews.net/
Information sharing – across organizations (FAO-OIE-WHO)

GLEWS platform

- Restricted to the GLEWS Taskforce Members
- Event Management
- Analysis & Reporting functionalities
- Automatic Notifications
- e-Mail registry
- Performance & Metrics module
- Administration and Configuration

GLEWS Website

- Publicly accessible
- Content Management System (restricted users)
- Public Maps and Event List (only officially confirmed/denied cases)
- Simple Analysis functionalities
- Public Documents

GLEWS Public Events

http://www.glews.net
EMPRES-i EMA allows:

- To collect epidemiological data from the field.
- To transmit a disease report to EMPRES-i platform.
- To visualize from the field on a map geo referenced data of outbreaks available in the EMPRES-i database (“Near me”).
- To safely store epidemiological data in one database – EMPRES-i platform.
Implementation of reporting systems in country

Egypt - Community animal health Outreach (CAHO)

108 CAHO in 15 Governorates
Participatory surveillance, extension and communication
During crisis: maintainance of animal health activities

Indonesia – Participatory disease surveillance and response (PDSR)
Capacity building – Field epidemiology training

West Africa training in Lome, Togo – April 2016:
- 9 countries
- 22 participants:
- Laboratory specialist
- Surveillance and disease control
- Rinderpest awareness

East Africa Training in Arusha, Tanzania – July 2015:
- 4 countries and 30 participants
- Participants – epidemiologist and laboratory specialists
Country support - Surveillance for Swine influenza in Asia - Understanding Influenza at the Interface

EPT+ is focused on improving our understanding the role livestock play in serving as reservoirs for potential pandemic influenza threats with a specific focus on influenza viruses.

Working at FAO Seminar. Manhattan, KS. May 9, 2016
Country support – Understanding factors associated with H5N1 endemicity in Indonesia

Study Period: March to September, 2016
Design – repeated cross-sectional
Target location: Purbalinga, West Java

Target systems:
- Farms - Backyard and commercial
- Trading enterprises - LBM, CY

Funded by the USAID – Emerging Pandemic Threats - EPT2
FAO GLEW Collaborations - current

- Analysis – Letters of agreement
  - UC Davis
  - Massey University
  - Yale University

- Data sharing – data sharing agreements
  - UC Davis
  - FAO National programmes

- Preparation of risk assessment reports
  - Department of Agriculture and Forestry (DAFF), Australia
Opportunities in FAO

- **Students:**
  - FAO Volunteer programme: at least 18 years
  - FAO internship programme – no more than 30 years
  - Other criteria:
    - be a citizen of a Member Nation;
    - be certified as medically fit to work;
    - provide FAO with a letter of motivation
    - Volunteers do not receive any remuneration/ Interns are paid 700 monthly


- MOU with some universities for internships
  - Funded either by FAO or the University of interest

- Duration: 3 – 6 months
Opportunities in FAO

- Junior professional Programme:
  - University graduates up to 32 years of age
  - Other criteria:
    • be a citizen of a Member Nation;
    • be certified as medically fit to work;
    • provide FAO with a letter of motivation
    • have fluency in at least one of the five official languages of FAO: Arabic, Chinese, English, French, Spanish.
    • Volunteers do not receive any remuneration/Interns are paid 700 monthly

- Application via the FAO irecruit website: ()
- MOU with some universities for internships
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Opportunities for collaboration

- MOU on student internships
- Become a reference center for FAO:
  - Subject matter areas (Epidemiology, AMR)
    - Risk assessment and modelling
    - Tool development for developing countries
    - Assistance with guidance development
    - Data collection - Field study design and implementation
    - Economic analyses
    - Training courses for developing countries
    - Reviews, etc..
- Instruments
  - MOUs
  - Letters of agreements
  - Short term contracts/consultancies
• Questions?
Thank you!

http://www.fao.org/animal-health