

One Health, Traceability, and Emerging Technologies



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“War is ninety percent information.”

—Napoleon Bonaparte

Outline



One Health


Talk about the promises and shortcomings of One Health.

Traceability

Discuss how traceability may accomplish the outputs of One Health.

Emerging Technologies

Innovations accomplishing One Health objectives through traceability.



One Health

The interplay between animal health, human health, and the environment.

Promises of One Health

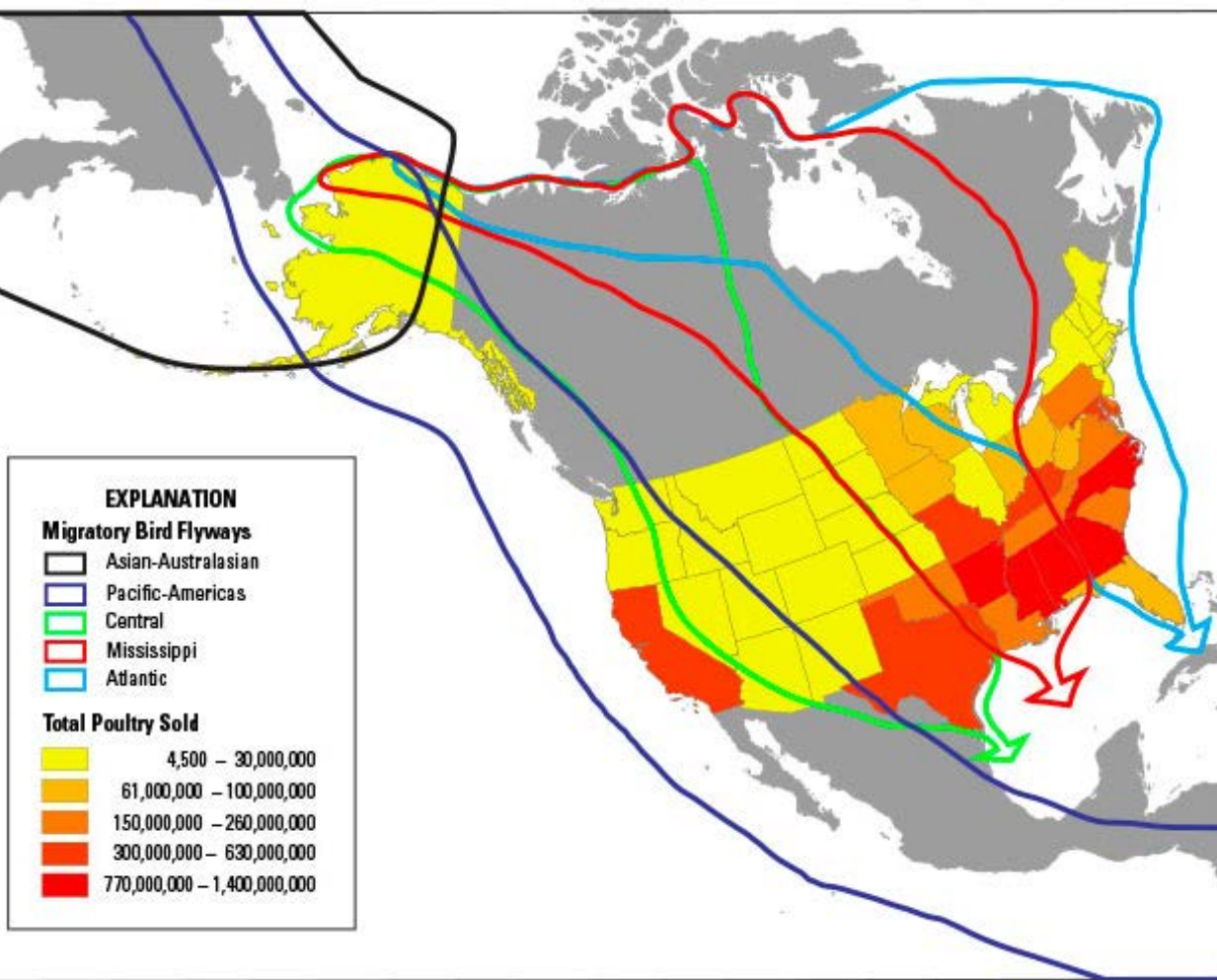
- **Increased cooperation between public health entities in the three disciplines**
- **Information sharing and research collaboration**
- **The ability to root out novel exposures and vulnerabilities**

ONE HEALTH



High Path Avian Influenza

- Devastating outbreak in 2014-2015
- Loss of production and trade issues
- One Health approach paramount to understanding outbreak



Pitfalls of One Health

Lack of Methods

Methodology for One Health objectives are still siloed in their individual disciplines (e.g. human medicine, veterinary medicine, environmental science)

Broad Purview

Because the breadth of the goals, One Health related research has difficulties coming together for conclusions

Not Enough Data

From the previous two points, there is either too much or too little operational data to make meaningful conclusions.

Traceability and One Health

What Traceability offers One Health

New Methods

Methods used in traceability improvement efforts can be applied to One Health research.

Holistic Data

The breadth of traceability will continue to expand, allowing data from multiple disciplines to be linked.

More Data

Automated data collection processes in traceability methods could enhance One Health research.



Traceability Data to One Health

- Applicable traceability data types
 - Geo-location
 - Date/Time
 - Environmental Antecedents
 - Transition Events (CTEs)
- Automated and Digitized
- Precision



Methodology Enhancements to One Health

- Interoperability
- Technology solutions to current issues
- Data collection
- Analytics and machine learning

Emerging Technologies

Technologies on the horizon

1

Blockchain

2

Data Analytics

3

Internet of
Things

4

Embedded
sensors.

5

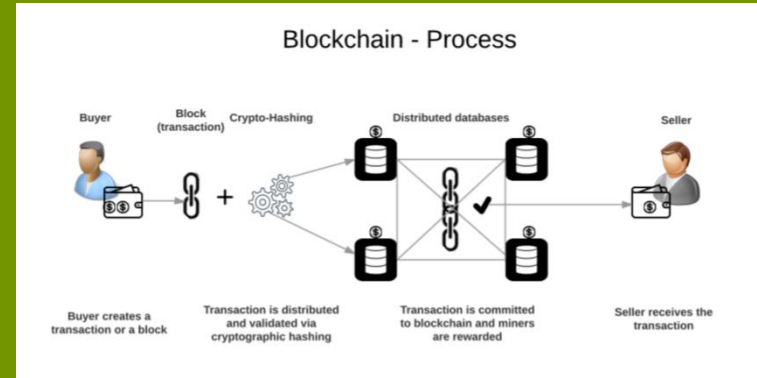
LEO satellites

Blockchain

Digital Infrastructure

Promises of Blockchain

- Constantly updated distributed ledger, immutable to change
- Speed up recall procedures
- Ability to connect disparate parts of supply chain



- Walmart/IBM collaboration
- Provenance
- Ripe.io

Example from OwlTing

PROVLNANCL SN : *A201705008005

Nice Garden Industrial Co., Ltd



Product Owner | Nice Garden Industrial Co., Ltd

Producer | Nice Garden Industrial Co., Ltd

Product Name | Choice Pig Pork upper-back

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-  2016/10/19
 Vaccination Swine Enzootic Pneumonia
 PRRS
-  2016/10/26
 Vaccination Porcine Reproductive & Respiratory Syndrome
 PCV2
-  2016/11/4
Starter Feed
Porcine Circovirus Type 2
 Feed contains QVN™ concentrate for suckling piglets, including high-performance Vitamin D3 and organic minerals that can activate physiological functions and strengthen bone formation.
 Feed (raw materials) : corn, soybean meal, etc.
Concentrate : vitamins, minerals, organic minerals, amino acids, enzymes, probiotics, organic acids, calcium, phosphorous, salt, etc.
-  2016/12/10
 Vaccination CSF
Classical Swine Fever
-  2016/12/15
 Vaccination PR
Pseudorabies
-  2016/12/29
 Vaccination FMD
Foot And Mouth Disease

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Low Earth Orbit Satellite Internet

- SpaceX announced LEO network to be deployed by 2024
- Low latency
- Higher bandwidth
- Global reach
- Applications
 - Seafood
 - Rural areas

TECH

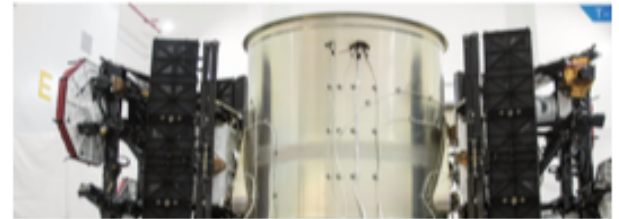
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FCC authorizes Elon Musk's SpaceX to provide broadband satellite services

- This marks the first time the FCC has allowed a U.S.-licensed satellite constellation to provide broadband services through low-Earth orbit satellites.
- SpaceX's proposed satellite system, dubbed "Starlink," includes 4,425 satellites with frequencies in the Ka and Ku bands.

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FCC authorizes SpaceX to provide broadband services

7:39 PM ET Thu, 29 March 2018 | 00:40



Internet of things

- Integration of data collection devices
- Consolidation of data silos
- Dynamic communication between entities

Embedded sensors

- Inexpensive, yet sophisticated
- Potentially reusable
- Takes various types of data



Traceability and One Health

One Health needs better data coordination and methods clarification

Traceability initiatives can enable One Health

Emerging technologies in traceability will help accomplish One Health initiatives

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