Veterinary medicine
Global Health

Alan M. Kelly
David Galligan
James Ferguson

Center for Animal Health & Productivity
University of Pennsylvania, School of Veterinary Medicine
Challenges to society in the 21st Century

Soaring population growth

Global warming,

Loss of biodiversity, Ecosystem health,

Spread of infectious diseases,

Drought

How should Veterinary Medicine be involved?
70% are transmissible from animals to humans

Control requires much closer collaboration between human medicine & veterinary medicine

This is the traditional approach to public health and global health
Increased enrolment in PH programs

Training in biostatistics & epidemiology, infectious disease research & control

Needs are in public practice & academia

Improved collaboration with public health services & the medical profession

But do all these veterinary students need an MPH?

Every veterinary student should be rigorously trained in these subjects

Does an MPH appropriately prepare students to work in global health?
For veterinary medicine to participate fully, the definition of Global Health has to be made broader. Programs in global health are dominated by the medical profession and schools of public health. Their definition is narrow.

Because of our broad education, veterinarians should lead the “One Health” initiative.
Global Health, Veterinary Medicine

Food Production

Food production plays a central role in governing life on earth
hunger as the world’s No. 1 public health threat—killing more people than AIDS, malaria and tuberculosis combined.”

—James T. Morris, Executive Director, U.N. World Food Programme
March 15, 2007

Photos by Astronaut Sunita Williams
Other foreign animal diseases

- Animal influenzas
- Babesiosis
- Bluetongue
- Classic swine fever
- Contagious equine metritis
- East coast fever
- Heart water
- Infectious salmon anemia
- Malignant catarrhal fever
- Newcastle disease
- Pestes de petits ruminants
- Rabbit hemorrhagic fever
- Rift Valley fever
- Venezuelan equine encephalitis
- Vesicular stomatitis

Disease control

Research

Vaccine development

In the 21st Century food production will be crucial

Controlling 1 or 2 infectious diseases is important but not enough
Population Growth

In the next 40 years the global population will grow by 2.4 billion.

Growth is equivalent to adding the population of a metropolitan area the size of the Las Vegas every 10 days for the next 40 years.

Population will be predominantly urban.


*Steinfeld. The livestock revolution—a global veterinary mission*
Urbanization is the engine of globalization. It will have the most consequential effect on the structure of society and agriculture in the 21st Century.

There are estimates that 900 million people will live in cities in China by 2020.

How do you provision these metropolises?

Cities need a constant supply of foods that are safe & of uniformly high quality.
How do you feed 9 billion people without wrecking the environment?

In the next 40 years it is estimated the world will need an increase in food production of 100%.

Simmons, J; Economics and Consumers Choice. Technology's role in the 21st Century.
FAO estimates:
- 20% from added farm land
- 10% from increased farming intensity
- 70% from new and existing Technologies

Where are the greatest needs?

China has 20% of the world’s population but
Only 7% of the arable land.

Increased efficiency of production is critical
Food must be cheap. High food prices have pushed more than 1 billion people into extreme hunger.

Josette Sheeran
Executive Director U.N. World Food Program, August, 2009
Food must be inexpensive to preserve political stability & avoid extremism

Price of corn increased x 80% in 2007-08
Food riots in 30 countries including Haiti
The Green Revolution increased intensity of production & was land sparing. Estimates it spared an area the size of California from deforestation.
The world is moving from 40 years of food abundance to an era of constrained food supplies.

Can genetic engineering of crops change the trajectory?
livestock and poultry production use large quantities of water

$\frac{3}{4}$ of all water used goes to agriculture

7,000 gallons water/1lb beef
Asia has 60% of the world’s population but only 36% of the world’s water resources. UN estimates climate change will lead to a 20% rise in global water scarcity. Most rivers of Asia arise in Tibet. Likely source of future conflict.
Urban populations consume x 2 to x 3 times more animal protein compared to rural populations.

Demand is driven by the development of an urban middle-class.
Refrigeration, supermarkets, fast food outlets, ice cream parlors, + obesity & diabetes.

Food production in emerging economies.
China, urban and rural milk consumption
### Meat & Milk Consumption estimates

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<thead>
<tr>
<th></th>
<th>1998</th>
<th>2030</th>
<th>2030 Increase</th>
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<tbody>
<tr>
<td><strong>Meat consumption per person per year</strong></td>
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<tr>
<td>Developing world</td>
<td>25.5 Kg/yr</td>
<td>37 Kg/yr</td>
<td>45% increase</td>
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<td>Industrialized world</td>
<td>88 Kg/yr</td>
<td>slight decrease</td>
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<tr>
<td><strong>Milk consumption per person per year</strong></td>
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<tr>
<td>Developing world</td>
<td>45 Kg/yr</td>
<td>66 Kg/yr</td>
<td>46% increase</td>
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<tr>
<td>Industrialized world</td>
<td>212 Kg/yr</td>
<td>slight decrease</td>
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*Steinfeld. The livestock revolution—a global veterinary mission Vet. Parasit. 125, 19 – 41, 2005*
80% of the increase in animal protein production in SE Asia has come from intensive systems of production.

Requires expertise in production medicine.

Veterinary education in China & SE Asia is unfamiliar with production medicine.

Veterinary medicine in the U.S. has clear lead.
The dairy industry in the U.S. & China


Avg. milk yields/cow/day
China - 5.4 lbs/day
US 19.69 lbs/day
Milk Yield/cow, Environmental Impact and Societal Demand

Year 1950

Milk/cow/yr × Cow # (millions) = Milk (Billions)

5,314 Lbs × 22.0 = 117 Lbs

Externalities Per Million lbs Balance Eq. Envir./cow Envir./lb milk Milk/acre

Methane/lb milk Nitrogen/lb milk Phosphorus/lb milk
0.0485 0.0188 0.0089

Diet CP% 8.7%
Poor small farmers in:
Sub-Saharan Africa
Central Asia
Central America

World food problems will not be solved unless these farmers become more productive and are lifted out of poverty
Trillions of $ spent on aid with little to show

**TRADE NOT AID**

| Consider the entire farming operation from pastures/crops to production, to marketing. | Must be what community leaders want |
| Economics, Production medicine different management | Widely scattered peoples & animals |
| Inexpensive services | Train community animal health workers |
| Fee for service |
We need to do this with global livestock yields

Veterinary medicine has an important role to play

Wheat yields in developing countries, 1950-2004

Source: FAO
Thank you for your attention
As the services provided by food animal practitioners expand, utilization of and demand for larger numbers of formally trained animal technicians will increase. Food animal practitioners will recognize that many of essential animal health services, though supervised by veterinarians, need not actually be provided by professionals. Thus improved efficiency will be achieved by expanded veterinary paramedical manpower. Thus, although more total veterinary services will be provided, the number of professionals needed in the United States by 1980 will be about the same as the number now primarily engaged in this activity.
Demographic data indicate that numbers of food animal practitioners increased little in the past decade.

The problem is in large part a matter of the economics of food animal veterinary practice.

Areas with perceived shortages commonly do not provide satisfactory remuneration.

Some food-animal practices supplement their income through companion animal practice.
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<tbody>
<tr>
<td>Milk ($/cwt) (1980$)</td>
<td>14.59</td>
<td>15.84</td>
<td>10.51</td>
<td>7.29</td>
<td>5.3</td>
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<tr>
<td>Beef Cattle ($/cwt) (1980$)</td>
<td>70.29</td>
<td>76.08</td>
<td>57.07</td>
<td>39.84</td>
<td>35.85</td>
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<td>Hogs ($/cwt) (1980$)</td>
<td>59.22</td>
<td>46.4</td>
<td>41.08</td>
<td>24.56</td>
<td>18.8</td>
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<td>Lambs ($/cwt) (1980$)</td>
<td>69.32</td>
<td>79.81</td>
<td>42.4</td>
<td>46.34</td>
<td>39.03</td>
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<td>Broilers (cents/lb) (1980$)</td>
<td>35</td>
<td>35</td>
<td>25</td>
<td>20</td>
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<tr>
<td>Eggs (cents/doz) (1980$)</td>
<td>102</td>
<td>66</td>
<td>54</td>
<td>36</td>
<td>24</td>
<td>35</td>
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<td>Corn price $/bushel</td>
<td>1.33</td>
<td>3.11</td>
<td>2.28</td>
<td>1.85</td>
<td>3.04</td>
<td>4.2</td>
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<tr>
<td>Corn Price CPI adjusted to 1980</td>
<td>$0.65</td>
<td>$3.11</td>
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Source: United States Department of Agriculture, National Agriculture Statistics Service, Commodity costs and returns
## U.S. Veterinary MPH & Master’s in Prevent. Med. Programs

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<td><strong># students</strong></td>
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