

FACTS FROM FICTION

COMMUNICATING BIORISK TO THE LAY PUBLIC

USDA ARS 4TH International Biosafety & Biocontainment Symposium



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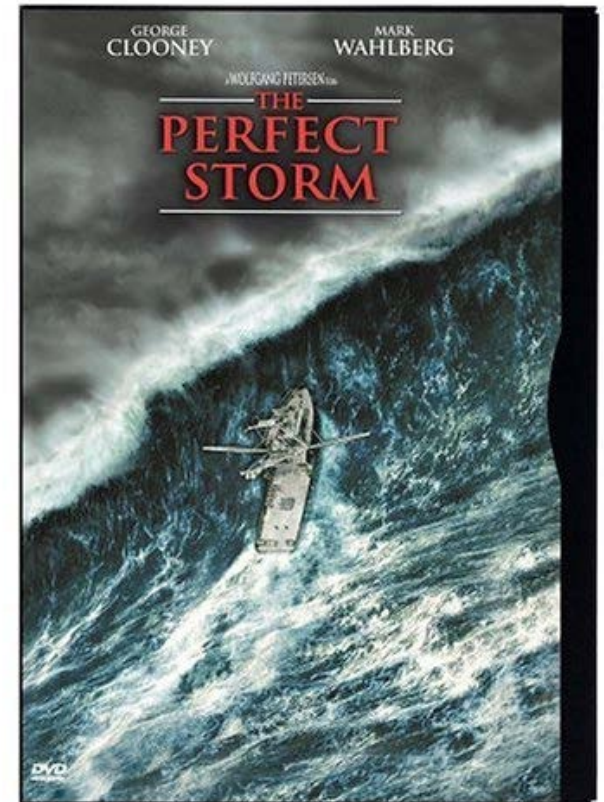
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SCIENCE AND THE LAY PUBLIC: A PERFECT STORM

- Emerging infectious diseases and bio-threats
- Rapid advances in biotechnology
 - Including dual use
- Poor communications; ill-informed public
- Politicization of science





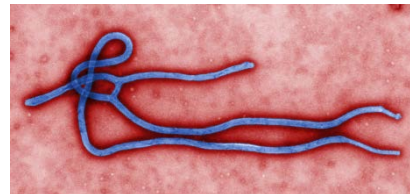
What we have here, is a failure to communicate.

CONSEQUENCES

- Lagging or inappropriate public policy
- Insufficient resources for critical research



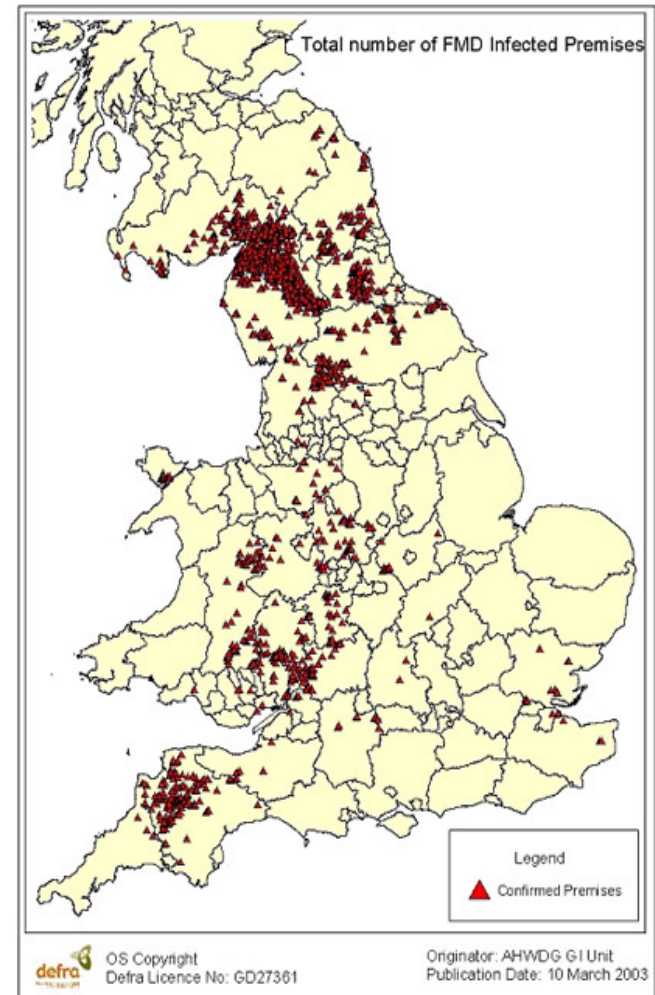
- Confused or emotional public



**CASE HISTORY:
FOOT AND MOUTH DISEASE OUTBREAK
UNITED KINGDOM, 2001**

UK OUTBREAK, 2001

- First diagnosed on one farm, 2/19/01
- In months, spread through England, Scotland, Wales



UK OUTBREAK, 2001

HOW THE DISEASE SPREAD

After its initial outbreak in February 2001, foot-and-mouth disease took just two weeks to spread across Britain. See the text below to chart the infection's rapid progress.



FMD, UK OUTBREAK, 2001

CONSEQUENCES

- Six million animals slaughtered
- Losses \$10-20 billion (including exports and tourism)
- Social and environmental impacts: slaughter; carcass disposal; concerns about ground water contamination; public confidence in food supply
 - What if in U.S.?

COMMUNICATIONS???

**CASE HISTORY:
CITRUS CANCKER OUTBREAK
FLORIDA, USA**

BACKGROUND

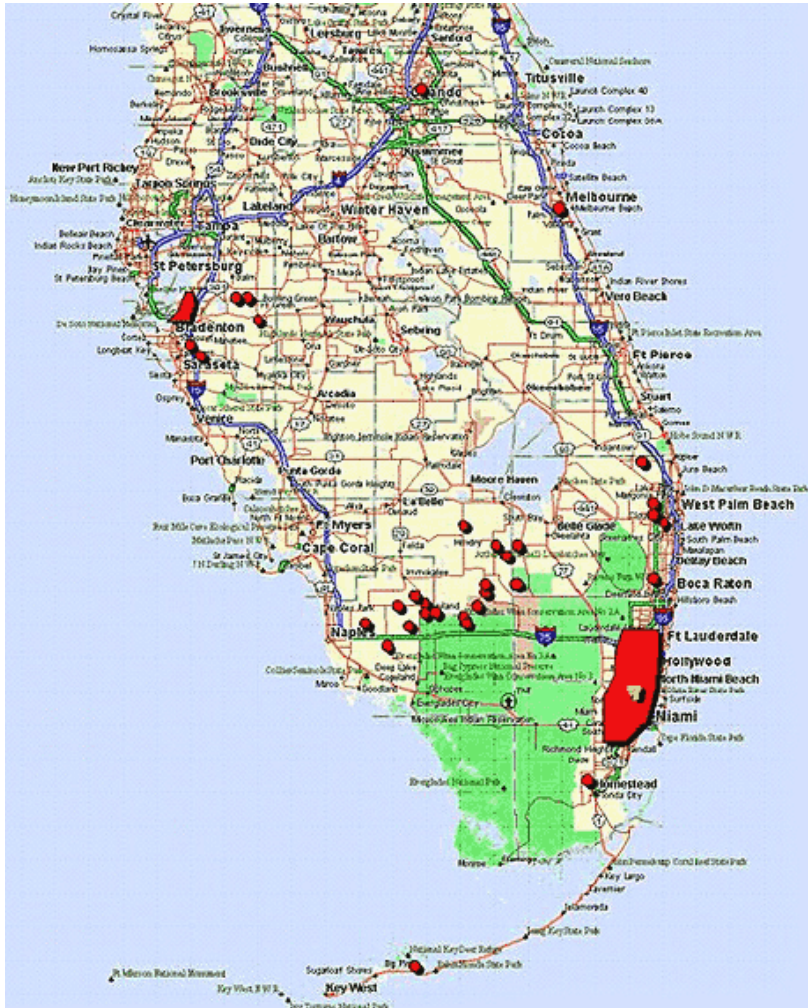
- Citrus is a \$9 billion industry in Florida; up to 80 percent of U.S. orange juice
- Agent is *Xanthomonas axonopodis* pv. *citri* (Xac.), a bacterial plant pathogen
- Symptoms: lesions on fruit, foliage, young stems
- Consequences: defoliation, dieback, fruit drop in severe cases; in less severe cases, fruit is unmarketable
- Multiple introductions in 20th century; most recent in mid-1990s (ongoing)

CITRUS CANKER IN FLORIDA

LESIONS AND FRUIT DROP



CITRUS CANCKER, MOST RECENT OUTBREAK



Citrus canker outbreaks in south Florida peninsula. Red areas indicate location. Note the large red areas of Miami-Dade and Broward counties to the southeast and large area of Manatee County to the northwest.

TIMELINE OF EVENTS, MOST RECENT OUTBREAK

- **1995: Quarantine areas established when first detected; trees eradicated within 125 foot radius of infected tree**
- **2000: Statewide, mandatory eradication zone expanded to 1,900 feet (ARS research in Ft. Pierce, FL)**
- **By March, 2002: >1.56 million commercial trees and ~600,000 infected and exposed dooryard trees removed or cut back**
- **Public outcry; lawsuits in Broward County delay tree removal; disease spreads; USDA/ARS scientist testimony**

COMMUNICATIONS???

**CASE HISTORY:
MELAMINE CONTAMINATION,
2007-2008**

BACKGROUND

Two Related Incidents:

- **Spring 2007, North America: Contamination of pet food leading to acute renal failure in cats and dogs. Contamination then shows up in poultry, livestock, fish feed.**
 - Widespread deaths of cats and dogs
 - 60 percent of American households have pets
- **September 2008, China: Melamine in infant formula sickens babies.**

THE CULPRIT: MELAMINE IN PET FOOD

- FDA determined that pet food plants imported vegetable protein products from China (labeled as wheat and rice gluten).
 - FDA finds melamine (industrial chemical) in samples.
 - Cornell scientists find melamine in urine and kidneys of deceased cats.
- Chinese sources admit to intentionally adding melamine to gluten to boost N content (false indicator of protein).

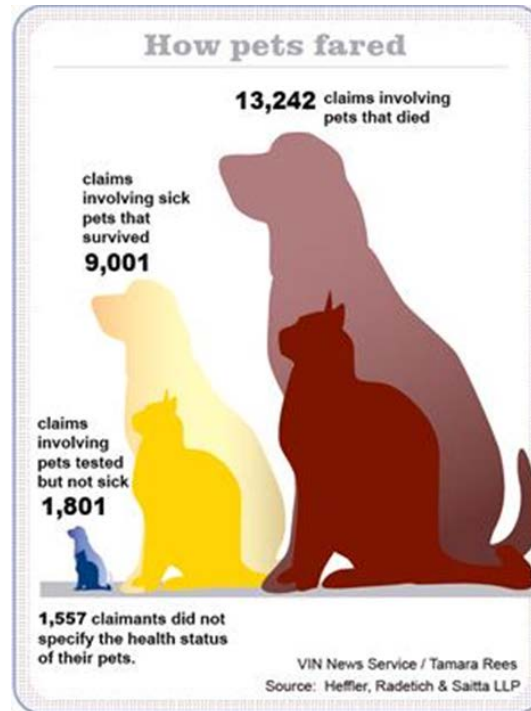


SCOPE OF THE PROBLEM

- **Two Chinese companies supply vegetable protein product to five U.S. importers and a Canadian fish feed manufacturer.**
- **U.S. importers supply product to 14 pet food manufacturers.**
- **Ultimately, hundreds of thousands of affected pets.**

FALLOUT!

- Lawsuits

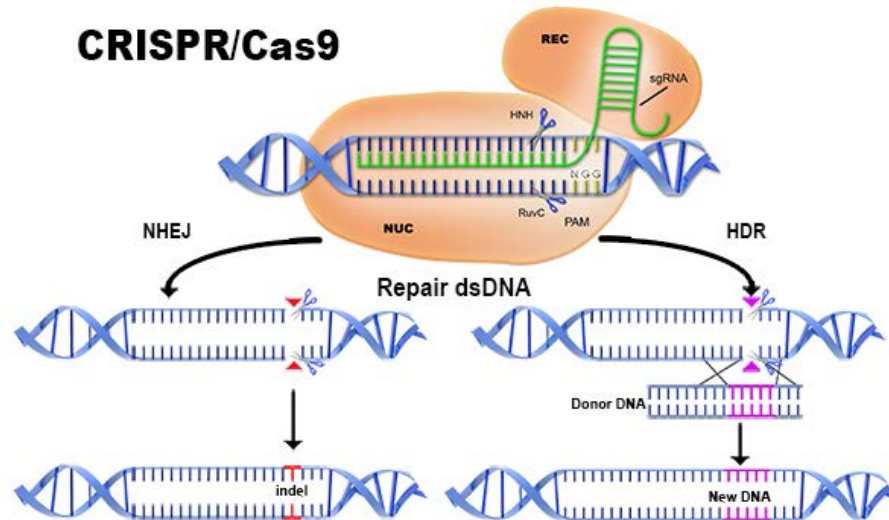


- Hundreds of calls daily to FDA from public

RESPONSE

- **DHS coordination: established Interagency Working Group to coordinate response (first time for food safety incident)**
- **Major recall; investigations**
- **Science response (literature search; studies)**
- **FDA complaint coordinators**
- **COMMUNICATIONS: Close partnership with media (briefings, press releases, interviews)**
- **Legislation: Title 10 of FDA Amendments Act of 2007 to address safety of pet food**

EMERGING THREATS



AN IMPERATIVE

WE MUST DO BETTER AT COMMUNICATING SCIENCE-BASED BIO-RISK INFORMATION TO THE LAY PUBLIC

- **Improve public understanding; perspective**
- **Avoid panic**
- **Better inform public policy**
- **Strengthen communications among scientists, decision-makers, and the public**
- **Importance of a communications plan in place before crisis**
- ***The lay public includes legislators!***

BRIDGING THE GAP: Scientists and the Lay Public



WHAT ROLE SHOULD SCIENTISTS PLAY?

“At a time when science plays such a powerful role in the life of society, when the destiny of the whole of mankind may hinge on the results of scientific research, it is incumbent on all scientists to be fully conscious of that role, and conduct themselves accordingly. I appeal to my fellow scientists to remember their responsibility to humanity.” –Physicist Joseph Rotblat, upon receiving the 1995 Nobel Peace Prize.

Source: <https://www.aaas.org/news/investigating-perceived-social-responsibilities-scientists-engineers-and-health-professionals>. Accessed January 9, 2017

SOCIAL RESPONSIBILITIES OF SCIENTISTS

Two categories of scientific responsibilities (Joshua Ettinger and Jessica Windham, AAAS, April 1, 2015)* :

- Internal to the practice of science
 - Professional ethics, data management, human/animal subjects, academic integrity
- External responsibilities to society
 - Mitigating risks of personal research
 - Participating in public policy
 - *Communicating science to the public*

* <https://www.aaas.org/news/investigating-perceived-social-responsibilities-scientists-engineers-and-health-professionals> accessed January 9, 2017

AAAS STUDY, 2012-2015

Questionnaire: How scientists perceive their social responsibilities (global survey)*

- **2,670 responses**
- **Listed ten social responsibilities**
- **93.7% of scientists said “Explain their work to the public” was critically important, very important, or important**

* <https://www.aaas.org/news/investigating-perceived-social-responsibilities-scientists-engineers-and-health-professionals> accessed January 9, 2017

SCIENTISTS AS COMMUNICATORS

- **Scientists are inherently good communicators**
- **BUT not all scientists are comfortable communicating science to the lay public (or to the press)**

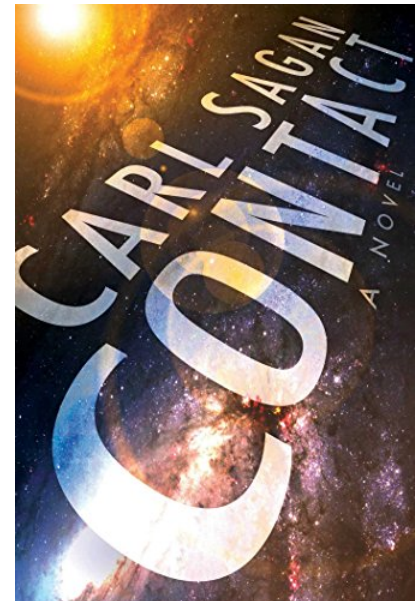
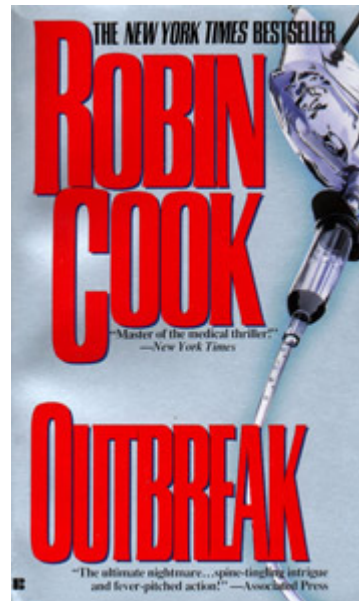
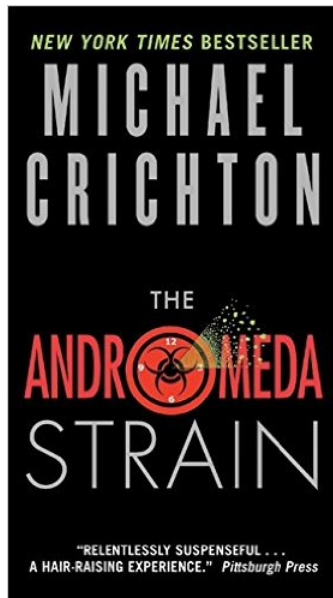


SCIENTISTS AS COMMUNICATORS: OPPORTUNITIES

- Public presentations (organizations, schools, town meetings)
- Professional organizations (e.g. ABSA Public Relations Committee)
- Media interviews
- Congressional testimony
- Writing (beyond journal articles)
 - “Popular science” (e.g. AgResearch Magazine)
 - Articles in popular media, web sites, etc.
 - *FICTION???*

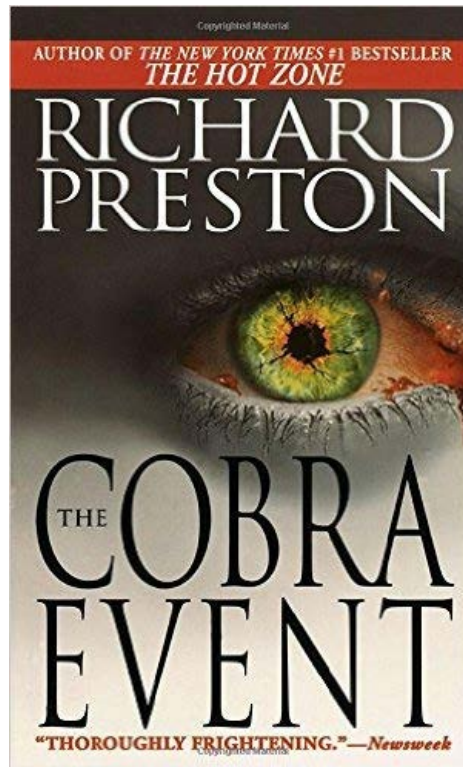
SCIENTISTS CAN BE GOOD FICTION WRITERS

- Everyone has good stories to tell, especially scientists
- Most scientists are inherently good writers
- Ample precedent



CAN NOVELS INFLUENCE PUBLIC POLICY?

Richard Preston's *The Cobra Event* reportedly affected White House policy on bioterrorism, helping prepare U.S. for Amerithrax attacks.



IMPROVING COMFORT LEVEL AND SKILL SET: PROPOSED APPROACHES

- **Training (esp. for early career scientists)**
 - **Public speaking**
 - **Media relations**
 - **Writing for public audiences**
- **Incorporate more public policy in graduate science programs**
- **Interdisciplinary seminars, etc.**
- **Require public outreach for grants?**

SUMMARY

- **Failure to effectively communicate science and bio-risk to the lay public can have disastrous consequences**
- **Case histories illustrate this**
- **But when done right, positive outcomes (melamine case)**
- **Scientists have responsibilities and opportunities to communicate their work to the public**
- **There is a need for programs to help scientists communicate effectively with the public and the press**