

How scientific advances are being used to meet consumers' needs and ensure public health



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What are consumers' needs?

Sherwin Gardner, Senior VP for Science and Technology , Grocery Manufacturers of America, Inc.

- Consumers have a right to
 - expect that the foods they purchase to be safe and of high quality, and
 - voice their opinions about the procedures that government and industry use to ascertain the food supply has these characteristics
- The ultimate responsibility for investing the resources to achieve appropriate controls lies with the food industry
- Industry needs standards that permit flexibility and efficiency in producing and marketing foods

NO EXIT

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THE HISTORY OF TECHNOLOGY



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THE HISTORY OF TECHNOLOGY



Paradox of Progress

As industry gets better, perceptions get worse

Societal & Industry evolution has created new problems





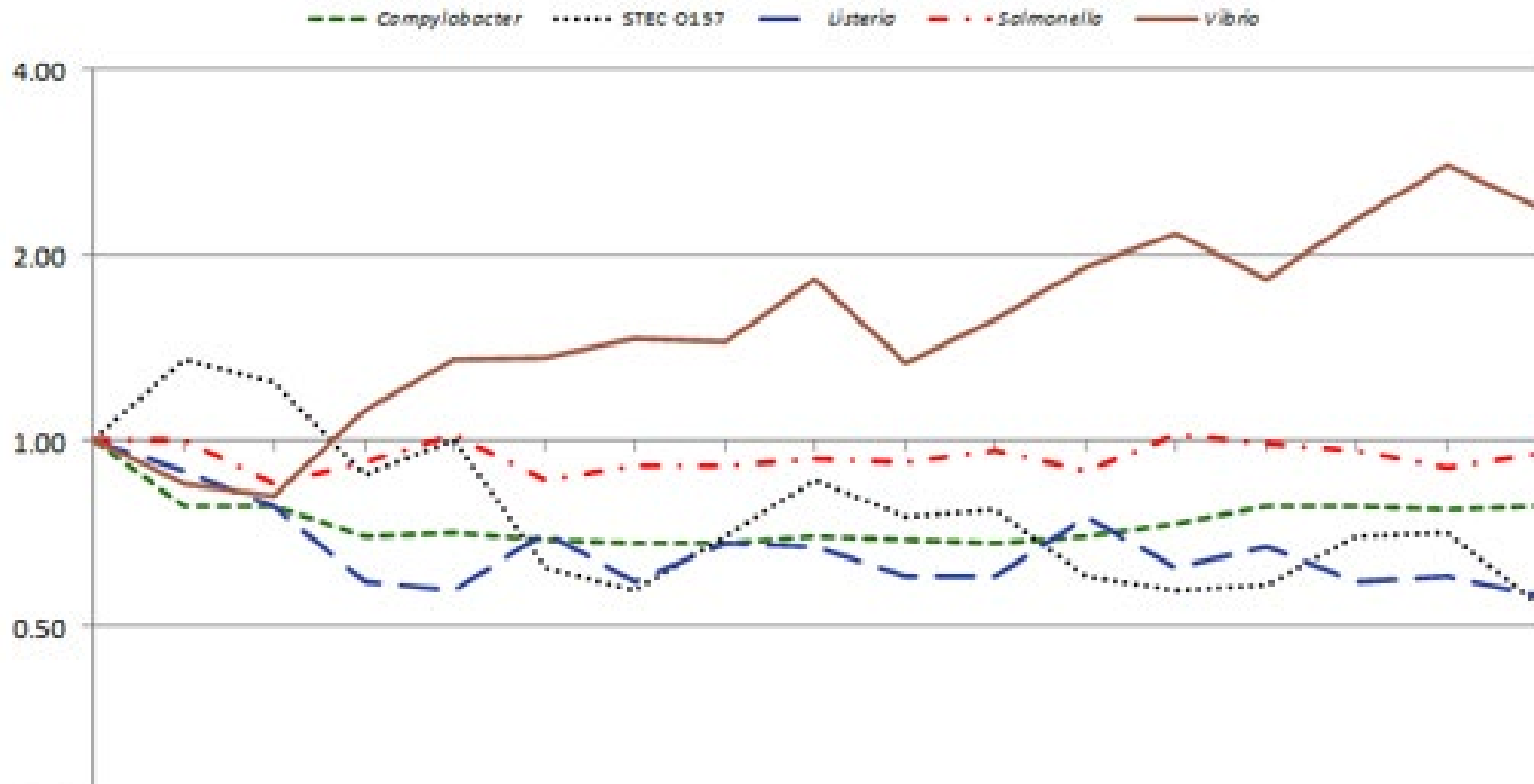
Communicate successes

Residue violations in market hogs

- 1978 Market Hogs - violative residues (USDA)
 - 5.6% for antibiotics
 - 9.7% for sulfonamides
- 2016 Market hogs
 - No violative residues in 800 DS samples (random)
 - 4 (0.02%) violative residues in 18,754 IG samples
- 2016 Sows
 - 1 (0.13%) violative residues in 769 DS samples (DDT)
 - 21 (0.3%) violative residues in 6,461 IG samples

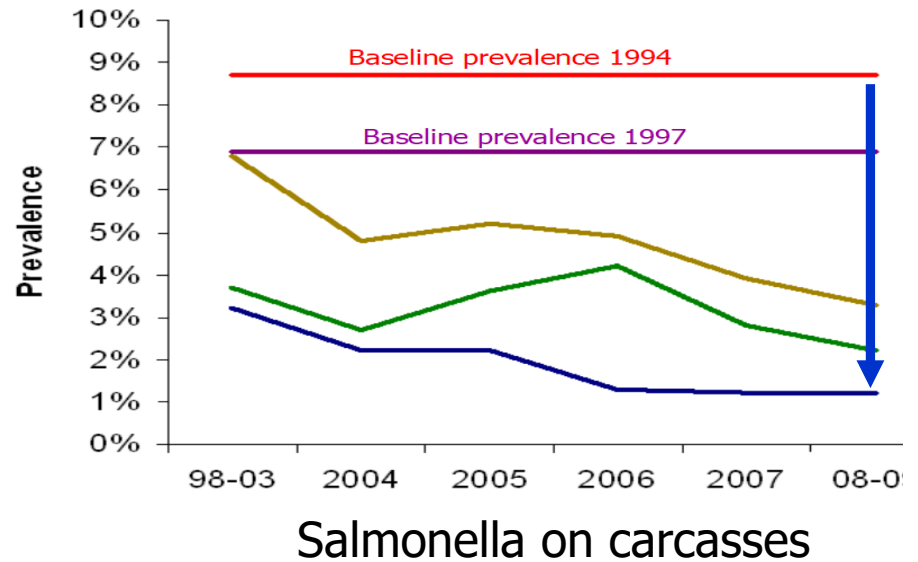
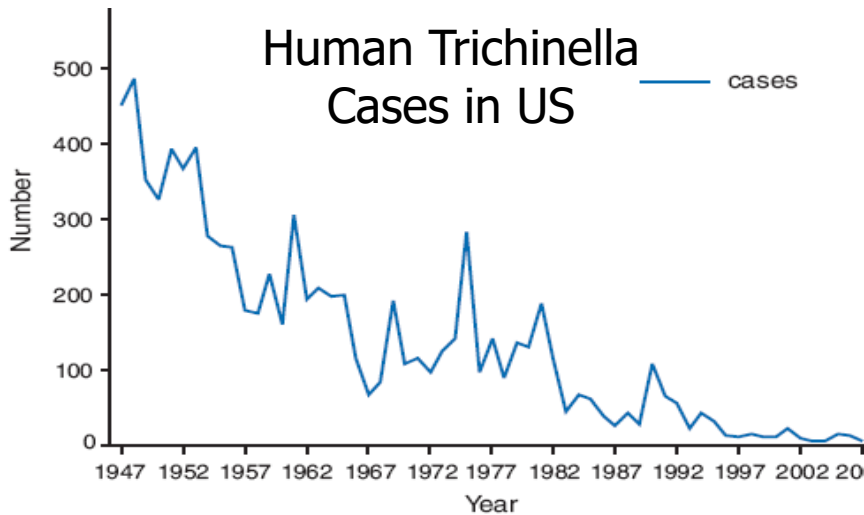
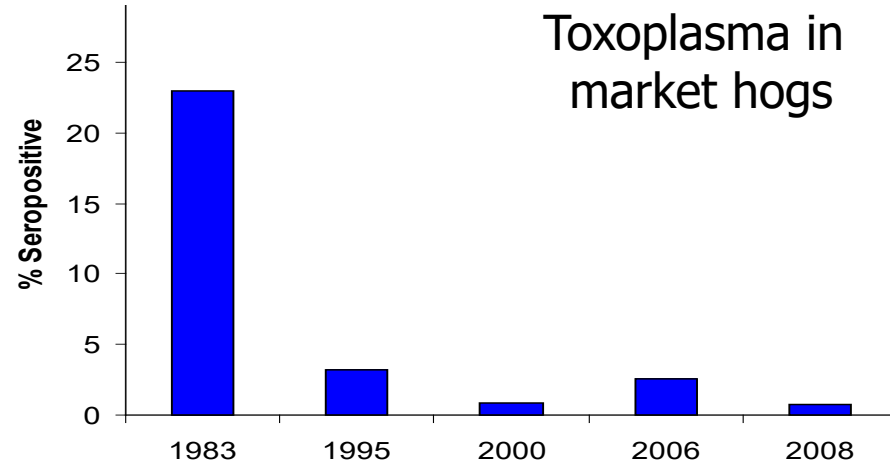
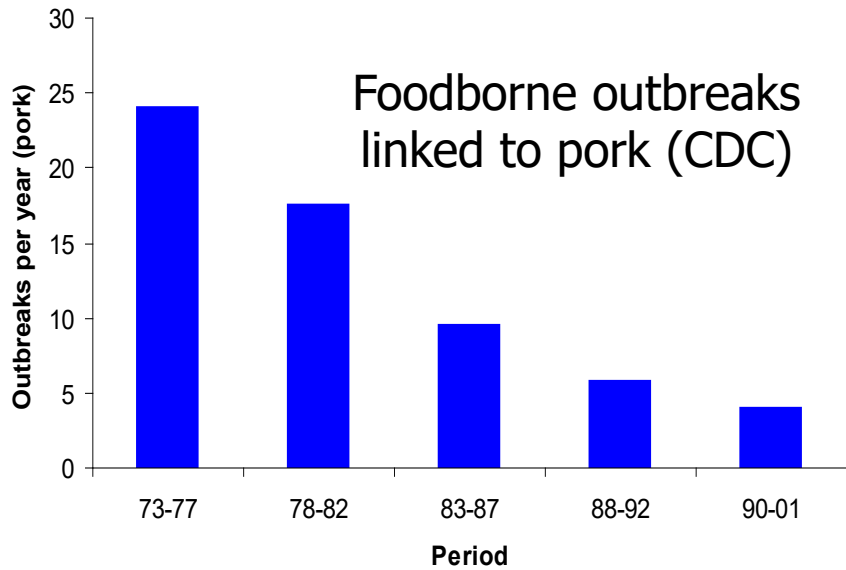
Communicate successes

Reduced incidence of key foodborne pathogens



- ~20-30% reduction in *Listeria*, *Campylobacter*, STEC O157
- ~ 50% reduction in *Yersinia*
- ~ 0% change in *Salmonella*

Improved pork safety





AMR - what really matters?

- Are food animal industries doing harm, and how much?
- How are antibiotics used in food animals?
 - What is effective and what is necessary?
 - What is philosophically defensible?
- How good is the evidence?
- How to do better, regardless of impact
- How to measure and communicate progress



Reducing the impact of antibiotic use in food animals on human health

What are the alternatives?

- Reduce consumption of animal products
- Reduce bacterial contamination of animal food products
- Preharvest (on-farm) control of bacteria of concern
- Reducing selection pressures for AMR in food animals
 - Restrict antibiotic use in food animal populations
 - Optimize antibiotic use in food animals
 - Reduce the need for antibiotic use in food animals

Reduce consumption of animal foods

- “As a society, if we want to reduce the selection of antibiotic-resistant bacteria, and thereby reduce the risk of antibiotic-resistant infections, we should be consuming less meat”
- “This real, transformative opportunity has had insufficient attention at the level of national health and commerce policy” (Spellberg et al, 2016)



PRODUCT CATEGORIES > MEAT

Meat and poultry hold their own, despite new trends and alternatives

Total sales of meat, poultry and meat substitutes to near \$100 billion in 2021, says Packaged Facts report

Michael Browne | Jul 02, 2018

FOOD TREND

Global Meat Substitutes Market To Exceed \$6 Billion By 2023

The increasing vegan population is one factor in the market's growth

Maria Chiorando



Jul 4, 2018 5:25 PM

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More people are turning away from traditional animal meat towards plant meat



Reduce contamination of animal food products

Sohaib et al., Food Sci Technol 53:19–30, 2016

- Multiple hurdle technologies
 - CO₂
 - Peroxyacetic acid
 - Acidic calcium sulfate
 - Activated lactoferrin
 - Cetylpyridium chloride
 - Ozone
 - Essential oils and plant extracts
 - Bacteriophages, parasitic bacteria, bacteriocins
- ‘Intelligent packaging’, high pressure processing, ...



Preharvest control of bacterial pathogens and/or commensals

- Easier said than done
- Control of normal flora and common commensals unlikely with facile interventions in management
- *Salmonella* remains the premier concern in most industries (monogastrics)
- Holy grail of preharvest control
 - Perennial opportunity for alternative products
 - Efficacy to, or at, point of slaughter
 - Reproducibility, generalizability



Reducing selection pressures for AMR bacteria in food animals

- Restrict/ban antibiotic use in food animals
 - Need for alternative products
 - Alternatives need to mitigate resistance (zinc and MRSA)
- Optimize antibiotic use for clinical benefits in animals
 - Reduction vs. Antibiotic stewardship
- Reduce the need for antibiotic use in food animals



Reduce the need for antibiotic use in food animals

- Improvement of housing and management
 - Biosecurity, pig flow, hygiene,...
 - Big data, monitoring
- Improve host resistance to infection
 - Genetics, gene editing,....
 - Vaccination, nutrition
- Products that promote health ('alternatives') particularly in vulnerable populations
 - Neonates, recently weaned, stressed (transport)



What does the future look like?

- “The past is a foreign country: they do things differently there”

L.P. Hartley

- So, therefore, is the future

- “The future is already here – just unevenly distributed”

William Gibson