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**Destination 2025 is an initiative of The BioBusiness Alliance of Minnesota in collaboration with Deloitte Consulting LLP to develop a roadmap for the bioscience markets in Minnesota.**



The Destination 2025 project examines six markets of the bioscience industry: Animal Health, Food, Medical Device, Biologics and Biopharmaceutical, Renewable Materials, and Renewable Energy.

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## Destination 2025 Focus on the Future of the Animal Health Industry

**We have identified leading trends and technologies that are expected to significantly affect the animal health industry globally over the next two decades.**

### Executive Summary February 2009

Destination 2025 - a collaboration between The BioBusiness Alliance of Minnesota and Deloitte Consulting LLP



### Executive summary

The trends and technologies identified, and opportunities in the industry, are likely to realign to different levels of importance over time.

Using the Strategic Flexibility Framework, we performed a scenario-based planning exercise to evaluate a range of different future scenarios. This allowed us to determine which of these trends and technologies are likely to have the greatest impact in the development of the industry.

The review of trends and technologies suggests that opportunities exist to develop new products and solutions. Moreover, existing markets and products may experience flux due to new trends and technologies. Strategies must evolve to benefit from opportunities and threats. Decision makers in academia, government, and industry can use the Strategic Flexibility Framework to develop strategies based on individual constraints and objectives.

### Market definition

The world animal health and nutrition market encompasses a broad spectrum of products — mechanical, electrical, chemical, biological, software, and veterinary — used to prevent, diagnose, treat, or cure animal diseases. Among these are feed additives, vaccines, pharmaceuticals, antimicrobials, parasiticides, topical solutions, imaging software and equipment, devices, and diagnostics.

The full white paper on the future of the biologic and biopharmaceutical industry is available for download at [www.deloitte.com/us/d2025](http://www.deloitte.com/us/d2025)

# Focus on the Future of the Animal Health Industry

## Emerging and future trends

The following trends are expected to influence the industry in the next 20 years.

### Market trends

The global animal health market has shown consistent growth over the past several years and is expected to be influenced by significant market forces. In recent decades, for example, the number of farms producing animals in the United States declined, while the average size of the farms increased.

Global markets are placing increasing emphasis on reliable and adequate supply of low-cost, safe food products, including animal products. This dynamic is expected to fuel the global quest for new technologies to improve production efficiency.

The growing demand for organic, hormone-free, antibiotic-free animal products is likely to continue, even though the current economic downturn may slow this demand in the short term. Organic farming is moving steadily into the mainstream, as demand for organic produce has surged. Global consumer pressures are creating regulatory conditions that favor organic operations, which could stimulate that market. As pressure mounts to reduce antibiotic use, the market for nutraceuticals is likely to experience growth. Probiotics are playing an increasing role in several industries, including animal health operations, with an estimated value in 2007 of \$185 million in the food and beverage market, \$1 billion in the dietary supplement market, and \$9 billion in the animal feed market.

The scarcity of new vaccines, diagnostic aids, and drugs to prevent, detect, and treat resistant infections, is becoming a major problem in the animal health industry. Demand for vaccines is likely to increase as an alternative to pharmaceuticals and as a way to improve production, food safety, animal health, and human health. The nature and rate of zoonoses, new and emerging diseases that can

spread from animals to humans, mean existing laboratory tests must constantly be improved and new ones must be developed.

The livestock sector has faced mounting pressure to meet rising demand for high-value animal protein, particularly in the developing world. The world's livestock sector is growing at a brisk pace, driven by population growth, rising incomes, and urbanization. With increased pet ownership come opportunities for animal health services, products, and other infrastructure, some of which are lacking in many emerging economies.

Increasing public awareness of the potential impact of biosecurity threats is causing considerable infrastructural change globally. Increased travel and trade practices create more biosecurity risks. Global markets are increasingly demanding methods to detect and stop the spread of pests and diseases by requiring "evidence of absence" and process certification before products enter the market. Industry needs low-cost diagnostic tools to develop and implement collective surveillance systems regarding biohazards.

### Cultural and demographic trends

Debate about the ethics and merits of using genetic modification and other modern biotechnologies is expected to continue, even in the face of increasing signs of its promise and achievements. Many aspects of animal health and food animal productivity are likely to be affected by concerns over animal welfare, whether through industry-imposed standards or government regulation. Social pressures are focusing on the management of odor and waste products from animal farm production, and regulations are likely to tighten over contamination of limited water resources, creating a higher demand for animal health products to monitor and treat water contamination.

### Environmental trends

New strains of existing and emerging microorganisms are expected to spread more quickly. This is expected to increase the need for innovative ways of controlling infectious agents. Animal health companies or research institutions may also need to devise new ways of monitoring, testing, and treating animals for outbreaks. Many of the human diseases that have been emerging and re-emerging at the beginning of the 21st century are "zoonotic," or human infections caused by pathogens originating from animals or animal products. The complexity of the interactions between agents, animals, host species, and the environment represent a challenge for effective forecasting, surveillance, prevention, and control. Changes in regional climate patterns caused by long-term global warming could affect the geographic range of many infectious diseases, causing some regions to become more suitable for transmission.

### Workforce trends

The number of food animal veterinarians is projected to fall short of demand by 4 percent to 5 percent annually through 2016, in part due to the high cost of training. Employment of agricultural and food science technicians is projected to grow by as much as 7 percent to 13 percent in the near future. The government workforce in the United States, including those who work in agencies dealing directly with animal health regulations, such as the U.S. Department of Agriculture (USDA), the Food and Drug Administration (FDA), and the Environmental Protection Agency (EPA), is aging faster than other sectors because of lower turnover on average among those workers.

### Economic and trade trends

Water is the major limiting factor for expanding world agricultural and animal production. Food safety and animal health standards have begun to change rapidly; new standards are being applied to previously unknown or unregulated hazards. The regulatory changes can create new demand for animal health products and processing systems in developing countries.

During the past three decades, producers have consolidated their operations, a trend that has been rapid for animal industries resulting in fewer producers of animal health products, as well as merged market locations and processors. Technological advances are likely to continue in nutrition, genetics, and production techniques and affect animal production systems.

### Next steps

The review of trends and technologies suggests that opportunities exist to develop new products and solutions. Moreover, existing markets and products may experience flux due to new trends and technologies. Strategies must evolve to benefit from opportunities and threats. Decision makers in academia, government, and industry can use the Strategic Flexibility Framework to develop strategies based on individual constraints and objectives.

## Emerging and future technologies

Market segment	Technologies
Livestock track and trace	<ul style="list-style-type: none"> <li>Livestock surveillance, diagnostics, traceability, and testing kits</li> </ul>
Companion animal health and wellness	<ul style="list-style-type: none"> <li>Feeds and additives</li> <li>Drug development</li> <li>Vaccine development</li> </ul>
Proteomics and metabolomics	<ul style="list-style-type: none"> <li>Protein manipulation at the molecular level</li> </ul>
Genetic engineering	<ul style="list-style-type: none"> <li>Transgenics to improve animal food product quality, animal health, reproduction, and conversion of grain into animal products</li> <li>Xenoproducts including xenotransplants and xenobiotics developed through genetic engineering</li> </ul>
Delivery of immunization/treatments for animal health conditions	<ul style="list-style-type: none"> <li>Development and mass delivery of immunization/treatments</li> <li>Lifetime treatments/vaccines</li> </ul>
Environmental sustainability	<ul style="list-style-type: none"> <li>Bioengineering for improved functionality</li> </ul>
Metabolic modifiers	<ul style="list-style-type: none"> <li>Enhancement of animal food product through feeding techniques</li> </ul>
Food Supply chain information systems	<ul style="list-style-type: none"> <li>Bioinformatics systems and solutions</li> <li>Supply chain technology infrastructure and monitoring tools</li> </ul>
Food safety and containment	<ul style="list-style-type: none"> <li>Food safety systems, technology, and monitoring tool</li> </ul>
Nanotechnology	<ul style="list-style-type: none"> <li>Food protection additives using nanotech and materials science</li> <li>Packaging utilizing nanotech and materials science</li> </ul>
Animal product processing and sterilization	<ul style="list-style-type: none"> <li>Sterilization from pasteurization or irradiation</li> </ul>
High nutrition and environmentally sustainable food products	<ul style="list-style-type: none"> <li>Proteomics and nutrigenomics</li> </ul>