



# The Economic and Social Contributions of the Animal Health Industry

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# Report Highlights

The U.S. animal health industry is a global leader in developing and producing medicines for companion and food-producing animals. In the U.S., the industry’s products improve the health of nearly 10 billion companion and food-producing animals, resulting in significant economic and social benefits for Americans. Below are the highlights of the report:

- Direct Economic Impact:** In 2016, the U.S. animal health industry produced \$11.4 billion of medicine. With exports of over \$2.4 billion and imports of \$900 million, total sales to U.S. consumers totaled \$9.9 billion. The industry employed 21,257 workers and paid over \$1.2 billion in wages and \$1.2 billion in taxes.
- Industry Performance:** The animal health industry is one of the most innovative industries, investing 8.5% of sales and over \$970 million in research and development in 2016. It outperforms the average manufacturing industry across economic indicators including wage, output, and exports per worker.
- Broader Economic Impact:** Animal health products contribute to the economic activity of other industries including veterinary services, animal production, meat and dairy production, and pet services. Combined, these four industries generated \$548 billion in output, created over 1.3 million jobs, and paid \$52 billion in wages in 2016.
- Public Health and Food Safety:** Animal health products advance public health. Vaccines have improved food safety and availability by reducing disease outbreaks in food-producing animals and reducing instances of foodborne illnesses. In companion animals, vaccines have kept animals and their human families safe from health issues such as rabies while flea and tick products reduce human exposure to pests carrying Lyme disease.
- Human Health and Well-being:** Healthy animals improve human mental and physical well-being. Animal-assisted therapy reduces anxiety and depression and improves cardiovascular health by reducing the risk of heart disease or a heart attack. Also, discoveries in animal health research can be applied to human health research to advance the development of new cures.

<p><b>\$11.4</b> BILLION</p> <p>Economic output generated by the U.S. animal health industry</p>	 <p>The industry prevents, treats, and eradicates disease, protecting animal and human health</p>	<p><b>\$548</b> BILLION</p> <p>Economic output from industries that rely on animal health</p>
 <p>Animal health outperforms other industries because of its high investment in R&amp;D</p>	<p><b>10</b> BILLION</p> <p>Food-producing and companion animals in the U.S.</p>	<p><b>SOCIAL IMPACT</b></p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="950 1795 1079 1942">  <p>Food Safety &amp; Availability</p> </div> <div data-bbox="1136 1795 1242 1942">  <p>Public Health</p> </div> <div data-bbox="1307 1795 1437 1942">  <p>Mental &amp; Physical Wellbeing</p> </div> </div>



# The Economic and Social Contributions of the Animal Health Industry

*The animal health industry is an integral part of the U.S. economy. Manufacturers produce medicine – pharmaceuticals, vaccines, and flea and tick products – that keep companion and food-producing animals healthy and create jobs in the United States. In addition to the direct impact, other industries rely on healthy animals to generate economic activity. The role of these industries in the U.S. economy is significant. Healthy animals also create significant social benefits. Importantly, they maintain the health of food-producing animals and prevent diseases that affect the food availability and safety for consumers. They also ensure the health of companion animals who improve the mental and physical wellbeing of their human families, serve as aides, and assist with therapy for those in need. Finally, discoveries in animal health research can inform and advance research and development of medicines for human health. While all these benefits cannot truly be quantified, the improved health and prolonged lifespans of animals are an important contribution of the animal health industry.*

# The Animal Health Industry: Direct Economic Contributions

*Animal health manufacturers are biopharmaceutical companies that invest in research and development (R&D) and create innovative medicines for food-producing and companion animals. These products range from cancer therapies to vaccines and medicines that prevent and treat diseases such as foot and mouth disease (FMD), rabies, and Lyme disease. The animal health industry collaborates with farmers and ranchers, government agencies, veterinarians and other groups to ensure the health and safety of food-producing and companion animals.*

## **The Animal Health Industry Marketplace**

The animal health industry is growing. Global markets are estimated to be between \$26 billion and \$36 billion in 2016 and are expected to grow by about 5% annually. The U.S. animal health market is estimated to be one-third of the global market and generates nearly \$10 billion of sales per year.

The U.S. animal health market makes up about 2% of the total U.S. pharmaceutical market (\$9.9 billion animal compared to \$450 billion human medicines). The animal health industry serves companion animals including domestic pets, service animals, and horses as well as food-producing animals such as cattle, pigs, and chickens. Nearly 60% of animal health sales in the U.S. are companion animal products and about 40% are food-producing animal products (Figure 1).



### THE ANIMAL HEALTH INDUSTRY

*The animal health industry develops and manufactures*

**innovative medicines  
and vaccines**

*for companion and food-producing animals*



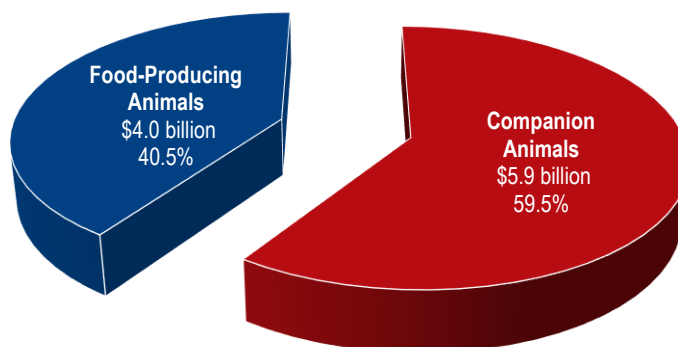
### U.S. SALES

**\$9.9 billion**

*Accounting for one third of global sales in 2016*

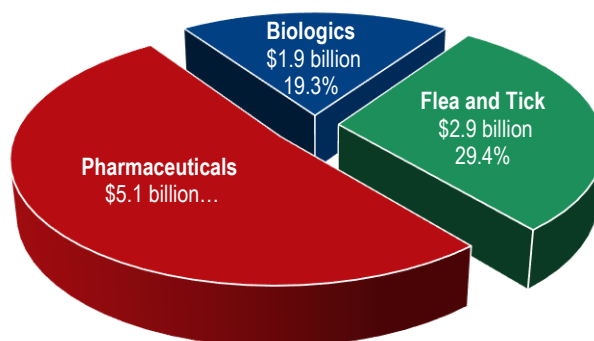


Figure 1.  
U.S. Animal Health Market by Type of Animal, 2016<sup>1</sup>



The animal health industry produces three types of medicine: pharmaceuticals, biologics (which are predominately vaccines), and flea and tick medications. Pharmaceuticals account for more than half of sales. Flea and tick medications make up the second largest segment, about 29% of the industry. Biologics account for just over 19% of the industry (Figure 2).

Figure 2.  
U.S. Animal Health Market Type of Product, 2016<sup>2</sup>



<sup>1</sup> ndp | analytics; Axiom Consulting. 2017. US Animal Health Market Insights 2016 & 2017 YTD.

<sup>2</sup> ndp | analytics.

## U.S. Production

Using research and development (R&D) investment and intellectual property (IP) protections as measurements, the animal health industry is one of the most innovative industries in the United States. Innovative industries invest in R&D and protect their IP with patents, trademarks, and copyrights. Evidence shows that IP-intensive manufacturing industries, such as the animal health industry, outperform their counterparts who invest less in R&D across all key economic indicators.<sup>3</sup>

The industry's direct economic contribution comes from developing and manufacturing medicines for sale in domestic and foreign markets. In 2016, animal health companies produced \$11.4 billion of medicines, of which nearly \$9.0 billion was sold domestically and \$2.4 billion was exported (Table 1). Nearly all animal pharmaceuticals manufactured in the U.S. are sold domestically (only 11% are exported) while over 45% of animal biologics are exported.

### ECONOMIC IMPACT

*In brief*

Jobs	21K
Wages	\$1.2B
Output	\$11.4B
Exports	\$2.4B
R&D	\$972.2M
Taxes	\$1.2B

Table 1.  
Domestic Consumption and Production, 2016<sup>4</sup>

	A	B	C	D	E
	Domestic Consumption (\$ millions)	Imports (\$ millions)	Domestic Production for Consumption (A-B) (\$ millions)	Exports (\$ millions)	Total Domestic Production (C+D) (\$ millions)
Medicines	\$8,024.7	\$952.5	\$7,072.2	\$886.5	\$7,958.7
Biologics	\$1,915.4	\$9.5	\$1,905.9	\$1,569.4	\$3,475.4
<b>Total</b>	<b>\$9,940.1</b>	<b>\$962.0</b>	<b>\$8,978.1</b>	<b>\$2,456.0</b>	<b>\$11,434.1</b>

<sup>3</sup> ndp | analytics; Pham, Nam. 2017. IP-Intensive Industries drive Economic Growth. ndp | analytics.

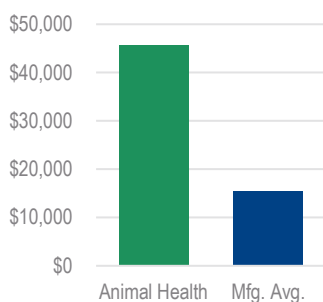
<sup>4</sup> ndp | analytics; Axxiom Consulting. 2017. US Animal Health Market Insights 2016 & 2017 YTD; U.S. Census Foreign Trade Data. Numbers may not add due to rounding.

Animal health companies hire employees of all skill levels to maintain and operate manufacturing plants, R&D facilities, and corporate offices across the U.S. In 2016, the industry employed 21,257 workers in the U.S. and paid over \$1.2 billion in wages (Table 2). The industry reinvests part of its revenue to develop innovative products to treat and prevent disease. In 2016, animal health companies invested nearly \$1 billion in R&D. These companies also paid \$1.2 billion in taxes to federal and state governments.

Table 2.  
**Key Economic Indicators for the Animal Health Industry, 2016<sup>5</sup>**

	Employment	Wages (\$ millions)	Output (\$ millions)	Exports (\$ millions)	R&D (\$ millions)	Taxes (\$ millions)
Animal Health	21,257	\$1,224.5	\$11,434.1	\$2,456.0	\$972.2	\$1,200.9

### R&D PER WORKER



*The animal health industry invested over \$30,000 more R&D per worker than the average manufacturing industry.*

Animal health manufacturers invest an average of 8.5% of sales in R&D, 2.5 times that of the overall U.S. manufacturing average of 3.4%.<sup>6</sup> As a result, the economic performance of animal health manufacturers far exceeds non-IP-intensive industries and the average for manufacturing industries overall. In 2016, animal health manufacturers invested \$45,695 in R&D per worker compared to \$3,887 in the non-IP-intensive industries and \$15,520 in the total manufacturing sector. Workers in the industry earned a nearly 25% premium (\$57,556 per year compared to \$46,248). The productivity of animal health manufacturers was 26% higher than in non-IP-intensive industries (\$537,444 gross output per worker per year compared to \$425,566). Exports per worker in the animal health industry were nearly 2 times than that in the non-IP-intensive industries (\$115,439 per worker per year compared to \$64,325) (Table 3).

<sup>5</sup> ndp | analytics; Axiom Consulting. 2017. US Animal Health Market Insights 2016 & 2017 YTD; U.S. Census Foreign Trade Data; Company Security and Exchange Commission 2016 10K and 20F Filings.

<sup>6</sup> ndp | analytics; Pham, Nam. 2017. IP-Intensive Industries drive Economic Growth. ndp | analytics.

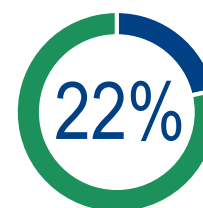


Table 3.  
**Animal Health Industry Performance, 2016<sup>7</sup>**

	R&D as % of Sales	Value Per Worker			
		R&D	Wages	Output	Exports
All Manufacturing	3.4%	\$15,520	\$52,263	\$471,072	\$92,869
<b>Animal Health</b>	<b>8.5%</b>	<b>\$45,695</b>	<b>\$57,556</b>	<b>\$537,444</b>	<b>\$115,439</b>
Non-IP-Intensive	0.9%	\$3,887	\$46,248	\$425,566	\$64,325

Furthermore, the investment in R&D makes the U.S. animal health industry a global leader in developing and producing medicines. As a result, there is strong demand for U.S. products in foreign markets. In 2016, U.S. animal health exports totaled more than \$2.4 billion. This production supports 4,570 direct jobs or 21.5% of all animal health manufacturing employment. The industry stands out from other manufacturing industries; while the U.S. manufacturing sector runs trade deficits, the U.S. animal health manufacturers realize a trade surplus of nearly \$1.5 billion (Table 4).

**JOBS CREATED BY EXPORTS**



*Animal health exports create 4,570 jobs accounting for nearly 22% of the industry's employment.*

Table 4.  
**Veterinary Vaccines and Medicines Trade Balance, 2016<sup>8</sup>**

	Exports (\$ millions)	Imports (\$ millions)	Trade Balance (\$ millions)
Veterinary Vaccines	\$1,569.4	\$9.5	\$1,560.0
Veterinary Pharmaceuticals	\$886.5	\$952.5	-\$65.9
<b>Total</b>	<b>\$2,456.0</b>	<b>\$961.9</b>	<b>\$1,494.0</b>

<sup>7</sup> Pham, Nam. 2017. IP-Intensive Industries drive Economic Growth. ndp | analytics.

<sup>8</sup> US Census. USA Trade Database. 2016 General Imports and Total Exports for HTS Codes 3002300000, 3004101010, 3004200010, 3004390010, and 3004909103.

## Animal Health Products for Companion and Food-Producing Animals

*The animal health industry creates innovative products to support companion and food-producing animals across the country. American households are home to nearly 400 million domestic pets, including dogs, cats, horses, birds, fish, and other animals. Additionally, American farmers and ranchers raise more than 9 billion food-producing animals.*

### Companion Animals

Companion animals are defined as domestic pets, including cats, dogs, birds, horses, and other animals. This also includes service and therapy animals, such as Seeing Eye dogs, and performance animals, like race horses.

Over 67% of U.S. households own pets, with nearly half owning a dog and over one-third owning a cat. In total, American households own approximately 89.7 million dogs and 94.2 million cats (Table 5). These households rely on routine veterinary care and animal health products to keep pets healthy. Animal owners can enjoy their companions without the fear of exposure to diseases like rabies or pests like fleas and ticks.

Table 5.  
**U.S. Households with Pets by Type, 2016<sup>9</sup>**

	Households with Pets (millions)	Share of Households with Pets	Average Number of Pets Per Household	Total Number of Pets (millions)
Dog	60.2	47.8%	1.5	89.7
Cat	47.1	37.4%	2.0	94.2
Freshwater Fish	12.5	9.9%	11.1	139.3
Bird	7.9	6.3%	2.6	20.3
Small Animal	6.7	5.3%	2.1	14.0
Reptile	4.7	3.7%	2.0	9.4
Horse	2.6	2.1%	2.9	7.6
Saltwater Fish	2.5	2.0%	7.5	18.8
Any Pet	84.6	67.2%		393.3

<sup>9</sup> American Pet Products Association. 2016. U.S. Pet Industry Spending Figures & Future Outlook.

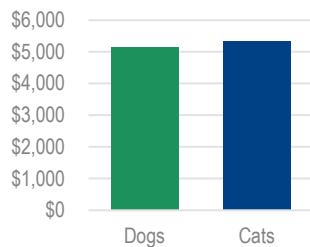
## PETS AS FAMILY



*Dog and cat owners that view their pet as part of the family*

Americans view pets as more than just companion animals. Almost all dog and cat owners view their pets as members of their family (95%) and about 12% have pet health insurance.<sup>10</sup> This perspective is reflected in consumer spending. In 2016, Americans spent over \$75.5 billion on their pets, according to the Bureau of Labor Statistics.<sup>11</sup> With 84.6 million households owning pets, the average household spends \$892 per year on pets, with about \$313 of that spent on pet food and the remainder on veterinary services (such as routine visits, surgery, treatments, and vaccinations), medicine, supplies, pet purchase, and other services<sup>12</sup> (Table 6).

## SPENDING ON PET MEDICINE



*Median expenditures for medicines over the lifespan of a dog and cat (\$5,154 and \$5,325, respectively)*

As pet owners look for solutions to increase the length and quality of life for their pets, cutting edge treatments for pet health problems, such as arthritis and cancer, are becoming more common. With the average lifespan of 10 years for a dog and 15 years for a cat, households spend between \$9,106 and \$13,391 over their pets' lifetime. During this period, the median expenditures for medicines are \$5,154 for a dog and \$5,325 for a cat.<sup>12</sup> These expenses both treat and prevent diseases in pets and keep families safe by preventing the transfer of disease from pets to humans.

Table 6.  
**Aggregate and Average Annual Pet Expenditures, 2016<sup>13</sup>**

	Total Expenditures (\$ millions)	Expenditures Per Household	Share
Pet food	\$26,507.4	\$313.3	35.1%
Vet services	\$26,354.6	\$311.5	34.9%
Pet purchase, supplies, medicine	\$15,829.9	\$187.1	21.0%
Pet services	\$6,833.1	\$80.8	9.0%
<b>Total</b>	<b>\$75,525.0</b>	<b>\$892.7</b>	<b>100.0%</b>

<sup>10</sup> The Harris Poll. 2015. More than Ever, Pets are Members of the Family.

<sup>11</sup> Bureau of Labor Statistics. Annual Consumer Expenditures Survey. Annual Average Expenditures by Income Quartile, 2016.

<sup>12</sup> Simple Dollar. 2017. Pet Ownership Costs for 2017.

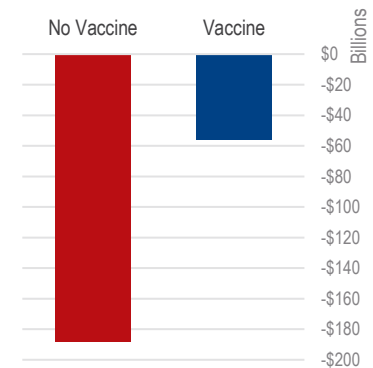
<sup>13</sup> Bureau of Labor Statistics. Annual Consumer Expenditures Survey. Annual Average Expenditures, 2013 and 2016.

## Food-Producing Animals

Agriculture is an important sector of the U.S. economy. In 2015, agriculture and food related industries directly contributed almost \$1 trillion to the economy and employed 21 million workers.<sup>14</sup> Family and commercial farms across the nation raise cattle, pigs, sheep, chickens, and other animals for consumption, including meat and dairy products. In 2015, U.S farmers and ranchers raised over 9 billion animals, valued at \$180 billion (Table 7). Farmers and ranchers rely on animal health products to keep food-producing animals safe and healthy for human consumption.

Continued innovation in animal health products helps farmers minimize losses from disease, illness, or other causes of death. In 2015, 3,880 cattle and calves were reported as death loss, totaling \$6.1 million in losses for U.S. farmers and ranchers for cattle alone. These losses become substantially higher during disease outbreaks. The animal health industry develops innovative solutions to curb the number of premature deaths of food-producing animals. For example, vaccines can prevent \$132 billion in losses from an outbreak of foot and mouth disease (FMD); losses from FMD could be as high as \$188 billion, but with an emergency vaccine strategy, they can be reduced to \$56 billion.<sup>15</sup>

### REDUCED LOSSES



*An emergency vaccine strategy could reduce losses from \$188 billion to \$56 billion in the event of an outbreak of foot and mouth disease. Industry and government agencies work closely together to have procedures in place to prevent and mitigate disease outbreaks in food-producing animals.*

Table 7.

### Inventory of Food-Producing Animals in the United States, 2015<sup>16</sup>

	Inventory (Thousands)	Value per Head (\$)	Value Total (\$ millions)
Cattle and Calves (Dairy and Milk)	89,143	\$1,584	\$141,211.1
Pigs	68,919	\$96	\$6,626.6
Sheep	5,280	\$214	\$1,129.4
Chickens (Broilers, Layers & Pullets)	9,163,581	\$3	\$30,795.0
<b>Total</b>	<b>9,326,923</b>		<b>\$ 179,762.1</b>

<sup>14</sup> USDA Economic Research Service. 2017. Ag and Food Sectors and the Economy.

<sup>15</sup> Schroeder, Ted, et al. 2015. Economic Impact of Alternative FMD Emergency Vaccination Strategies in the Midwestern United States. *Journal of Agricultural and Applied Economics*, 47(1) 47–76.

<sup>16</sup> USDA. *Agricultural Statistics*, 2016.

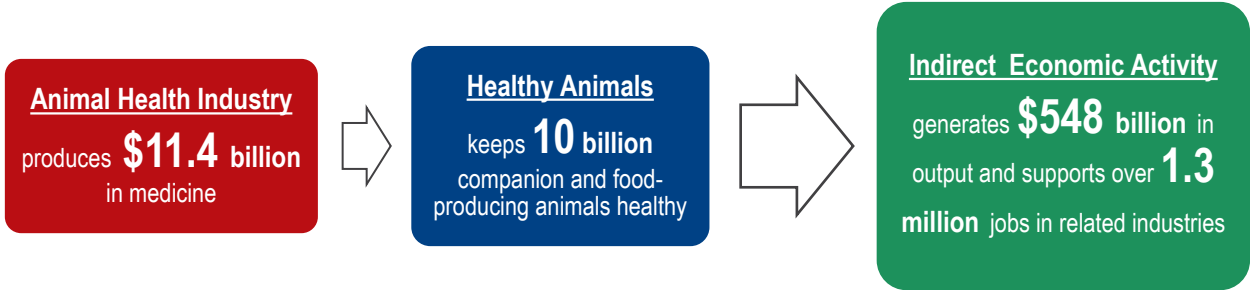
# Expanded Contributions: Indirect Economic Impact, Public Health, & Social Benefits

*In addition to the animal health industry’s direct economic contributions through jobs, wages, exports, and taxes, the benefits of its products support and enable other industries and enhance the quality of life for millions of Americans. Animal medicines enable a robust and essential livestock industry by keeping food-producing animals healthy. When food-producing animals are healthy, it keeps the food supply safe and protects public health from disease and outbreaks. Healthy companion animals are the cornerstone of the multi-faceted animal services sector. Finally, healthy pets provide physical and emotional benefits to their human owners.*

## **The Economic Impact of Keeping Food-Producing and Companion Animals Healthy**

Animal health products are used on a daily basis to treat and prevent diseases of almost 400 million domestic animals in American households and over 9 billion food-producing animals in large and small farms across the country. As a result, the industry supports the expenditure of more than \$548 billion in products and services and supports over 1.3 million jobs in industries that rely on the health of companion and food-producing animals<sup>17</sup> (Figure 3).

Figure 3.  
**The Indirect Economic Impact of the Animal Health Industry**



<sup>17</sup> North American Industry Classification System (NAICS) for industries used are as follows: Veterinary Services: NAICS 54194; Animal Production, NAICS 112; Food Production, NAICS 3315 and 3316; Pet Services, NAICS 81291.

The following industries directly rely on companion and food-producing animals:

- **Veterinary services** provide routine and emergency care for all types of animals, including companion and food-producing animals. Veterinarians examine an animal's health, prescribe treatments, and perform surgeries. These professionals use animal health products to treat their patients.
- **Animal production** includes ranches, farms, and feedlots that raise, feed, or keep animals for eventual sale or food production. These businesses use animal health products to prevent or treat diseases in food-producing animals.
- **Meat and dairy production** includes businesses that process and package meat and dairy products. These manufacturers rely on healthy animals raised by farmers and ranchers to maximize production and ensure food safety.
- **Pet services** include businesses such as groomers, boarding facilities, and animal trainers that work with domestic pets and services or therapy animals. They rely on animal health products to ensure companion and service animals are free from disease, which could impact human health, and to prevent the spread of disease to other animals in their care.

## Veterinary Services

Veterinary services play an important role in ensuring the health of food-producing and companion animals. Veterinarians conduct routine exams, perform surgeries and other procedures, and diagnose illnesses and diseases. Animal health products are used or prescribed to ease pain, manage chronic conditions, and prevent and treat diseases.

This industry employs all types of workers. Of the 359,103 workers employed in veterinary services, 79,600 (22.2%) are veterinarians; the remainder includes technical and administrative staff that assist veterinarians and manage the businesses.<sup>18</sup> In total, the industry pays \$13.4 billion in wages annually and generates \$41.5 billion in output. Nearly two-thirds of this output is generated by routine and emergency services for domestic pets, with Americans spending \$26.4 billion on veterinary services for their pets.

## Animal Production

The farmers and ranchers involved in raising and keeping livestock use medicines to ensure the health of the food-producing animals, protect public health, and protect the food supply. The animal health industry, farmers and ranchers, food producers, and government agencies including USDA and FDA work together to maximize food safety and minimize the impact of a disease outbreak. The FDA, USDA, and EPA must

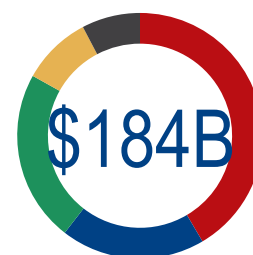
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<sup>18</sup> Bureau of Labor Statistics. Occupational Employment Statistics, 2016.

approve pharmaceuticals, vaccines, and flea and tick products, respectively. The agencies routinely monitor and inspect animal health companies and animal producers to ensure that these medicines are safely produced and appropriately used.

The animal production industry is made up of commercial and family farmers and ranchers who raise and keep livestock. In 2016, farmers and ranchers generated over \$184 billion in output, raising cattle, pigs, chickens and other animals (Table 8). The U.S. beef cattle ranching and farming accounts for 41.5% of total animal production output, followed by poultry and egg production (22.6%), dairy cattle and milk production (19.0%), and hog and pig farming (9.2%), while other animal production comprises the rest (7.7%).<sup>19</sup>

## ANIMAL PRODUCTION



*Farmers and ranchers generated \$184 billion in output in 2016*

Table 8.  
**U.S. Animal Production Industry, 2016<sup>20</sup>**

	Output (\$ billions)	Employment	Wages (\$ billions)
Beef cattle ranching and farming	\$76.5	51,674	\$1.9
Dairy cattle and milk production	\$35.1	104,386	\$3.5
Poultry and egg production	\$41.6	43,109	\$1.8
Hog and pig farming	\$17.0	32,556	\$1.2
Other animal production	\$14.2	27,151	\$1.1
<b>Total</b>	<b>\$184.4</b>	<b>258,876</b>	<b>\$9.4</b>

## Meat and Dairy Production

Livestock raised by farmers and ranchers are used to produce meat and dairy products that are purchased by consumers in the U.S. and abroad. The meat and dairy industries are important contributors to the U.S.

<sup>19</sup> Beef cattle ranching and farming (NAICS 11211) includes establishments where cattle are raised for beef and/or dairy cow replacements and cattle feedlots. Dairy cattle and milk production (NAICS 11212) includes establishments that primarily milk dairy cows. Poultry and egg production (NAICS 1123) includes establishments that raise chickens for table or egg production. Other production includes pig farming (NAICS 1122), sheep farming (NAICS 1124), aquaculture (NAICS 1125), and other animal production (NAICS 1129).

<sup>20</sup> Bureau of Economic Analysis. GDP by Industry Accounts. Gross Output by Industry, 2016; Bureau of Labor Statistics. Quarterly Census of Employment and Wages by NAICS, 2016. Numbers may not add due to rounding.

economy and supply consumers with healthy, safe, and affordable food. These industries generate \$317.5 billion in output, directly support 634,048 jobs, and generate \$27.0 billion in wages (Table 9).

Table 9.  
**U.S Meat and Dairy Production Industries, 2016<sup>21</sup>**

	Output (\$ billions)	Jobs	Wages (\$ billions)
Meat Production	\$208.3	493,956	\$18.9
Dairy Production	\$109.2	140,092	\$8.0
<b>Total</b>	<b>\$317.5</b>	<b>634,048</b>	<b>\$27.0</b>

Foreign markets rely on U.S. meat and dairy exports. Unlike many manufacturing industries, both the meat production and dairy production industries realize a combined \$11.9 billion trade surplus (Table 10). Mexico and Canada are two of the U.S.'s largest export markets for meat and dairy products. Nearly half (48.8%) of U.S. meat exports go to Mexico (\$3.85 billion), Japan (\$3.25 billion), and Canada (\$2.45 billion). Similarly, 49.0% of dairy exports go to Mexico (\$1.4 billion), Canada (\$0.7 billion), and China (\$0.4 billion).

Table 10.  
**Meat and Dairy Products Trade Balance, 2016<sup>22</sup>**

	Exports (\$M)	Imports (\$M)	Balance (\$M)
Meat Production	\$19,547.8	\$9,625.0	\$9,922.8
Dairy Production	\$4,899.9	\$2,913.5	\$1,986.5
<b>Total</b>	<b>\$24,447.7</b>	<b>\$12,538.5</b>	<b>\$11,909.2</b>

## Pet Services

The pet services industry includes businesses such as animal trainers, groomers, pet boarding facilities, and other companion animal support services. The industry relies on healthy companion animals to provide

<sup>21</sup> Bureau of Economic Analysis. GDP by Industry Accounts. Gross Output by Industry, 2016; Bureau of Labor Statistics. Quarterly Census of Employment and Wages by NAICS, 2016.

<sup>22</sup> Census. USA Trade Foreign Trade Statistics, 2016.



services that help care for pets. In total, the pet services industry employs 105,262 workers, pays \$2.2 billion in wages, and generates \$4.8 billion in revenue.

One important role of pet services is training companion animals for service jobs. These include animal assisted therapy and animals that serve as medical assistants for individuals with disabilities or health issues such as vision impairments and epilepsy. Thousands of companion animals are trained each year for human health and safety services including search and rescue, law and drug enforcement, and assistance for the blind and disabled. There are between 100,000 and 200,000 service animals (not including police, forensic, or military dogs) in the U.S., of which about 10,000 are trained as Seeing Eye dogs.<sup>23</sup>

### Total Economic Impact

The total economic impact of the animal health industry plus the industries that depend on animal health is significant. In total, these industries generated about \$560 billion in output and created nearly 1.4 million jobs that paid \$53.2 billion in wages in 2016 (Table 11). To put this in context, these five industries combined account for 2% of total U.S. output and employ about the same number of workers as the population of Kansas.

#### TOTAL IMPACT

\$560 BILLION

Table 11.  
Total Economic Impact, 2016<sup>24</sup>

	Output (\$ millions)	Employment	Wages (\$ millions)
<b>Animal Health</b>	<b>\$11,434.1</b>	<b>21,257</b>	<b>\$1,224.5</b>
<b>Related Industries</b>	<b>\$548,250.0</b>	<b>1,357,288</b>	<b>\$51,995.5</b>
Veterinary Services	\$41,578.0	359,103	\$13,438.5
Animal Production	\$184,369.0	258,875	\$9,394.0
Meat and Dairy Production	\$317,535.0	634,048	\$26,974.1
Pet Services <sup>25</sup>	\$4,768.0	105,262	\$2,188.9
<b>Total</b>	<b>\$559,684.1</b>	<b>1,378,545</b>	<b>\$53,220.0</b>

<sup>23</sup> Service Dog Central. 2017; Guiding Eyes for the Blind. 2017.

<sup>24</sup> Bureau of Economic Analysis. GDP by Industry Accounts. Gross Output by Industry, 2016; Bureau of Labor Statistics. Quarterly Census of Employment and Wages by NAICS, 2016. Census. Annual Services Survey, 2015.

<sup>25</sup> Pet Services Output data from 2015.

## The Social Benefits of Healthy Animals

The animal health industry's ability to keep animals safe and healthy has important social impacts. Animal health products improve public health by ensuring food-producing animals are healthy and the dairy and meat products are safe for consumers. Furthermore, companion animals have the unique ability to improve mental and physical health of individuals and families, resulting in a positive impact on communities. Finally, discoveries and breakthroughs in animal health can be applied to research and development to advance human health research.

### Public Health

Animal medicines, including vaccines, are critical for not only keeping animals healthy but also preventing the transmission of disease from animals to humans. For example, pets receive vaccines for infectious diseases such as rabies, a fatal disease caused by a virus that is transmitted via bites from infected animals. Humans are not routinely vaccinated against rabies, however the vaccine used in pets creates a protective barrier since they are more likely to come into contact with wildlife than humans. Rabies is very well-controlled in the United States where effective vaccination programs have all but eliminated cases in humans; however, in less developed countries the virus still causes about 59,000 deaths worldwide every year.<sup>26</sup>

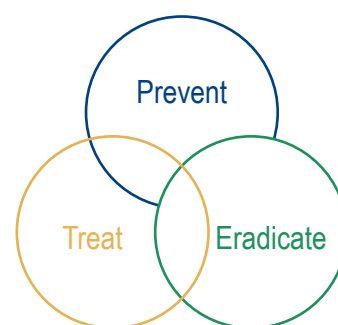
### Food Safety and Availability

Vaccines are innovative agents capable of improving the safety of food in the United States as it travels from farm to fork by reducing the prevalence of harmful foodborne pathogens like E. coli, campylobacter, and salmonella. Medicines and vaccines have contributed greatly to food safety and availability through preventing, curing and even eradicating disease in food-producing animals. Highly effective vaccination programs protect humans from diseases that can be spread through contaminated food. Several examples of the impact animal health products have had on food safety are:

- **Brucellosis**, a bacterial disease that can be transmitted via ingestion of infected animal products, causes spontaneous miscarriages in pregnant women and is a major threat to human health worldwide. Animals are vaccinated against the disease to provide a protective barrier since there is no approved human vaccine.<sup>27</sup>

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#### ANIMAL HEALTH PRODUCTS



*Animal health products are used to prevent food-producing animals from catching diseases, to treat animals who become ill, and, if possible, to eradicate diseases over time resulting in greater food safety and availability.*

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<sup>26</sup> U.S. Center for Disease Control and Prevention. 2017. CDC Features: Take a Bite Out of Rabies! September 28.

<sup>27</sup> University of Iowa, Center for Food Security and Public Health. Brucellosis Factsheet, July 2009.

- **E.Coli** is a foodborne illness that can come from meat, dairy products, vegetables, and other food sources. In 2009, the first E.Coli vaccine was approved for cattle. This vaccine has the potential to reduce instances of E.Coli cases in humans by 85%.<sup>28</sup>
- **Rinderpest**, a disease similar to measles, historically has had devastating impacts on the cattle population resulting in insufficient food supply. However, due to innovations in vaccines and large-scale interventions, the disease is now eradicated.<sup>29</sup>

The ability of farmers and ranchers to keep food-producing animals healthy and prevent disease increases the amount of food available and improves the affordability of meat and dairy products for consumers in the United States. This is especially important for consumers because of our reliance on animal products in our everyday lives. Each year, Americans consume 23.1 billion pounds of red meat, 19.1 billion pounds of poultry, and 6.3 billion pounds of eggs (Table 12). With a growing global population, food production will need to increase by 70% from the 2009 level in order to feed the global population in 2050.<sup>30</sup> Animal health products are absolutely necessary to achieve increased levels of production.

Table 12.  
Annual Food Consumption in the United States, 2015<sup>31</sup>

	Lbs. Per Capita	Total Availability (Millions of Lbs.)
<b>Red Meat</b>	<b>71.4</b>	<b>23,059.7</b>
Beef	39.3	12,706.7
Veal	0.1	36.2
Pork	31.4	10,151.0
Lamb	0.5	165.8
<b>Poultry</b>	<b>59.0</b>	<b>19,051.3</b>
Chicken	51.1	16,499.7
Turkey	7.9	2,551.5
<b>Fish</b>	<b>9.4</b>	<b>3,025.8</b>
<b>Eggs</b>	<b>19.5</b>	<b>6,308.5</b>
<b>Dairy (milk equivalent)</b>	<b>628.2</b>	<b>202,971.4</b>

<sup>28</sup> Matthews, Louis, et al. 2013. Predicting the public health benefit of vaccinating cattle against Escherichia coli O157. Proceedings of the National Academy of Sciences of the United States of America (PNAS) V110, 40.

<sup>29</sup> Roeder, Peter, Jeffrey Mariner, and Richard Kock. 2013. Rinderpest: the veterinary perspective on eradication.

<sup>30</sup> Roth, James. 2010. Veterinary vaccines and their importance to animal health and public health. International Workshop on Alternative Methods to Reduce, Refine, and Replace the Use of Animals in Vaccine Potency and Safety Testing: State of the Science and Future Directions Bethesda, Maryland, USA, 14-16 September 2010.

<sup>31</sup> USDA. Food Availability (per Capita) Database, 2016.

## Companionship & Communities

Companion animals have proven to have a positive impact on individuals and communities. Research shows that pets improve the lives of their owners, and may help them live longer. Pet owners are more likely to get to know people in their neighborhood than those without pets and to get more involved in their communities.<sup>32</sup>

These activities increase an individual's sense of purpose and improves relationships among community members. Many companion animals are used for Animal-Assisted Therapy (ATT) and Animal-Assisted Interventions (AAI) to improve mental and physical health in humans. Some mental health benefits include reduced anxiety, improved comfort, and increased mental stimulation.<sup>33</sup> Importantly, Animal-Assisted Interventions (AAI) can help individuals with severe mental health issues. For example, research shows that AAI reduces the severity of Post-Traumatic Stress Disorder, a condition that impacts over 250,000 U.S. veterans and results in 22 suicides per day.<sup>34</sup>

### ANIMAL COMPANIONSHIP

Mental Health	Physical Health
<ul style="list-style-type: none"> <li>• Reduce anxiety, depression &amp; PTSD</li> <li>• Improve coping skills</li> <li>• Improve social skills</li> <li>• positively impact child development</li> </ul>	<ul style="list-style-type: none"> <li>• Improve cardiovascular health</li> <li>• Increase physical activity</li> <li>• Increase lifespan</li> </ul>

*Research shows that animal companionship positively impacts mental and physical health*

AAI and AAT improve physical health including lowering blood pressure, reducing an individual's medication needs, and helping children cope with autism. AAT helps children with autism better engage in social interactions and participate in everyday activities.<sup>35</sup> For adults hospitalized for heart failure, patients reported 24% lower anxiety if they received a visit from a volunteer dog team.<sup>36</sup> Animal companionship can even increase human lifespan; research shows the individuals that own dogs had a 36% lower risk of dying from cardiovascular diseases, and 11% lower risk of a heart attack.<sup>37</sup>

## Impact on Human Health Research

Animal health companies invest millions of dollars in R&D. Discoveries and advancements in animal health can also be applied to human health. Animal health research can contribute significantly to human vaccine

<sup>32</sup> Wood, Lisa, et al. 2016. The Pet Factor - Companion Animals as a Conduit for Getting to Know People, Friendship Formation and Social Support. PLOS. April 29.

<sup>33</sup> University of California Los Angeles. 2017. Animal-Assisted Therapy Research Findings.

<sup>34</sup> Human Animal Bond Research Center. Mental Health and Wellness: PTSD and Trauma.

<sup>35</sup> Solomon, Olga. 2010. What a Dog Can Do: Children with Autism and Therapy Dogs in Social Interaction. ETHOS Journal of the Society for Psychological Anthropology. Volume 38.1, 143-166.

<sup>36</sup> Gawlinski, Anna, and Neil Steers. 2005. Abstract 2513: Dogs ease anxiety, improve health status of hospitalized heart failure patients. American Heart Association.

<sup>37</sup> Mubanga, Mwenya, et al. 2017. Dog ownership and the risk of cardiovascular disease and death – a nationwide cohort study. Scientific Reports, Volume 7, Article 15821.

development. Findings from animal research can bridge the gap between results obtained in discovery phases of human health research and advanced research phases that lead to clinical trials. The discovery phase often focuses on research findings in rodents, which are not directly translatable to humans. Since companion and food-producing animals have more similar physical attributes to humans than rodents, discoveries in animal health research can be applied to human health, resulting in important advancements in medicines and vaccines for humans.<sup>38</sup> Some areas where animal health research can be leveraged to expedite research and development for human health include heart disease, cancer, allergies, and arthritis.

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## ANIMAL HEALTH ADVANCES HUMAN HEALTH RESEARCH

*Discoveries in animal health can advance human research for issues including:*



Cancer  
Arthritis  
Heart Disease  
Allergies

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## Conclusion

Animal health products are indispensable to the American economy and communities in direct and indirect ways. Economically, the impact of the animal health industry goes beyond manufacturing. Related industries such as veterinary services, animal production, food production, and pet services all rely on animals that stay healthy because of animal medicines. Although the \$11.4 billion animal health industry is relatively small, it generates a total, cumulative impact of \$560 billion in benefits to the economy. This output creates nearly 1.4 million jobs and \$53.2 billion in wages to support nearly ten billion companion and food-producing animals across the country.

The social benefits of animal health products are far reaching. Importantly, animal health products improve public health and food safety. Vaccines prevent and cure diseases in food-producing animals, improving the quality and quantity of meat and dairy products. Vaccines have also helped to protect animals and humans from fatal diseases carried by wild animals such as rabies. Animal health products allow Americans to safely interact with companion animals and raise pets to become part of their family. As a result, they can reap the many mental and physical health benefits associated with pet ownership and service animals. While this impact cannot fully be quantified, it is clear that improvements in human health and quality of life due to interactions with animals are invaluable.

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<sup>38</sup> Meeusen, Els, et al. 2007, Current Status of Veterinary Vaccines. American Society for Microbiology. V.20 (3). 489-510.

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## Appendices

1. Households with Pets, and Number of Cats and Dogs by State, 2016
2. Household Expenditures on Pet Vaccines and Supplies, incl. Medicine, by State, 2016
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4. Veterinary Industry Statistics by State, 2016
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7. Pet Services Statistics by State, 2016
8. Consumption of Meat and Dairy Products by State, 2016



## Appendix 1.

### Households with Pets, and Number of Cats and Dogs by State, 2016<sup>39</sup>

State	Number of Households with Any Pets	Total Number of Cats	Total Number of Dogs
Alabama	1,334,031	1,485,410	1,414,451
Alaska	176,167	196,158	186,787
Arizona	1,764,363	1,964,575	1,870,725
Arkansas	814,270	906,669	863,357
California	9,353,679	10,415,090	9,917,554
Colorado	1,493,388	1,662,851	1,583,415
Connecticut	961,524	1,070,633	1,019,488
Delaware	268,285	298,729	284,459
District of Columbia	215,839	240,331	228,850
Florida	5,553,978	6,184,217	5,888,793
Georgia	2,688,905	2,994,030	2,851,003
Hawaii	317,370	353,384	336,502
Idaho	435,712	485,154	461,978
Illinois	3,454,763	3,846,793	3,663,029
Indiana	1,795,293	1,999,014	1,903,520
Iowa	872,768	971,806	925,382
Kansas	763,840	850,517	809,887
Kentucky	1,260,067	1,403,054	1,336,029
Louisiana	1,241,913	1,382,839	1,316,780
Maine	407,471	453,709	432,035
Maryland	1,520,284	1,692,798	1,611,932
Massachusetts	1,824,879	2,031,957	1,934,889
Michigan	2,737,318	3,047,936	2,902,334
Minnesota	1,502,129	1,672,584	1,592,683
Mississippi	775,271	863,245	822,007
Missouri	1,625,177	1,809,595	1,723,149
Montana	292,492	325,682	310,124
Nebraska	494,882	551,039	524,716
Nevada	754,427	840,035	799,906
New Hampshire	337,542	375,845	357,890
New Jersey	2,295,555	2,556,043	2,433,939
New Mexico	535,226	595,961	567,491
New York	5,277,624	5,876,504	5,595,779

<sup>39</sup> American Pet Products Association. U.S. Pet Industry Spending Figures & Future Outlook, 2016. Census. Current Population Survey, 2016.

North Carolina	2,704,371	3,011,249	2,867,400
North Dakota	220,545	245,572	233,841
Ohio	3,148,151	3,505,388	3,337,933
Oklahoma	1,067,090	1,188,178	1,131,418
Oregon	1,079,866	1,202,403	1,144,964
Pennsylvania	3,439,970	3,830,321	3,647,344
Rhode Island	302,578	336,913	320,818
South Carolina	1,346,134	1,498,886	1,427,284
South Dakota	239,372	266,535	253,803
Tennessee	1,839,671	2,048,428	1,950,573
Texas	6,794,546	7,565,558	7,204,146
Utah	681,808	759,176	722,910
Vermont	178,185	198,404	188,926
Virginia	2,222,936	2,475,184	2,356,943
Washington	1,912,290	2,129,287	2,027,570
West Virginia	507,658	565,264	538,261
Wisconsin	1,606,350	1,788,631	1,703,187
Wyoming	161,375	179,687	171,103

## Appendix 2.

### Household Expenditures on Pet Vaccines and Supplies, incl. Medicine, by State, 2016<sup>40</sup>

State	Households with Pets	Vet Services (\$M)	Pet purchase, supplies and medicine (\$M)	Total Costs (\$M)
Alabama	1,334,031	\$415.6	\$249.6	\$665.2
Alaska	176,167	\$54.9	\$33.0	\$87.8
Arizona	1,764,363	\$549.6	\$330.1	\$879.8
Arkansas	814,270	\$253.7	\$152.4	\$406.0
California	9,353,679	\$2,913.9	\$1,750.2	\$4,664.1
Colorado	1,493,388	\$465.2	\$279.4	\$744.7
Connecticut	961,524	\$299.5	\$179.9	\$479.4
Delaware	268,285	\$83.6	\$50.2	\$133.8
District of Columbia	215,839	\$67.2	\$40.4	\$107.6
Florida	5,553,978	\$1,730.2	\$1,039.2	\$2,769.4
Georgia	2,688,905	\$837.6	\$503.1	\$1,340.8
Hawaii	317,370	\$98.9	\$59.4	\$158.3
Idaho	435,712	\$135.7	\$81.5	\$217.3
Illinois	3,454,763	\$1,076.2	\$646.4	\$1,722.7
Indiana	1,795,293	\$559.3	\$335.9	\$895.2
Iowa	872,768	\$271.9	\$163.3	\$435.2
Kansas	763,840	\$238.0	\$142.9	\$380.9
Kentucky	1,260,067	\$392.5	\$235.8	\$628.3
Louisiana	1,241,913	\$386.9	\$232.4	\$619.3
Maine	407,471	\$126.9	\$76.2	\$203.2
Maryland	1,520,284	\$473.6	\$284.5	\$758.1
Massachusetts	1,824,879	\$568.5	\$341.5	\$909.9
Michigan	2,737,318	\$852.7	\$512.2	\$1,364.9
Minnesota	1,502,129	\$467.9	\$281.1	\$749.0
Mississippi	775,271	\$241.5	\$145.1	\$386.6
Missouri	1,625,177	\$506.3	\$304.1	\$810.4
Montana	292,492	\$91.1	\$54.7	\$145.8
Nebraska	494,882	\$154.2	\$92.6	\$246.8
Nevada	754,427	\$235.0	\$141.2	\$376.2
New Hampshire	337,542	\$105.2	\$63.2	\$168.3
New Jersey	2,295,555	\$715.1	\$429.5	\$1,144.6

<sup>40</sup> Bureau of Labor Statistics. Consumer Expenditures Survey, 2016; American Pet Products Association. U.S. Pet Industry Spending Figures & Future Outlook, 2016. Census. Current Population Survey, 2016.

New Mexico	535,226	\$166.7	\$100.1	\$266.9
New York	5,277,624	\$1,644.1	\$987.5	\$2,631.6
North Carolina	2,704,371	\$842.5	\$506.0	\$1,348.5
North Dakota	220,545	\$68.7	\$41.3	\$110.0
Ohio	3,148,151	\$980.7	\$589.1	\$1,569.8
Oklahoma	1,067,090	\$332.4	\$199.7	\$532.1
Oregon	1,079,866	\$336.4	\$202.1	\$538.5
Pennsylvania	3,439,970	\$1,071.6	\$643.7	\$1,715.3
Rhode Island	302,578	\$94.3	\$56.6	\$150.9
South Carolina	1,346,134	\$419.3	\$251.9	\$671.2
South Dakota	239,372	\$74.6	\$44.8	\$119.4
Tennessee	1,839,671	\$573.1	\$344.2	\$917.3
Texas	6,794,546	\$2,116.6	\$1,271.4	\$3,388.0
Utah	681,808	\$212.4	\$127.6	\$340.0
Vermont	178,185	\$55.5	\$33.3	\$88.8
Virginia	2,222,936	\$692.5	\$415.9	\$1,108.4
Washington	1,912,290	\$595.7	\$357.8	\$953.5
West Virginia	507,658	\$158.1	\$95.0	\$253.1
Wisconsin	1,606,350	\$500.4	\$300.6	\$801.0
Wyoming	161,375	\$50.3	\$30.2	\$80.5

## Appendix 3.

### Food-Producing Animal Inventory by State, 2015<sup>41</sup>

	Cattle (Thousands)	Pigs (Thousands)	Chicken (Thousands)	Sheep (Thousands)	Total (Thousands)
Alabama	1,200	100	1,098,934	-	1,100,234
Alaska	10	1	-	-	11
Arizona	880	132	-	-	1,012
Arkansas	1,630	166	985,500	-	987,296
California	5,100	95	16,116	600	21,911
Colorado	2,550	700	5,820	420	9,490
Connecticut	47	3	-	-	50
Delaware	17	3	244,300	-	244,320
Florida	1,680	16	76,800	-	78,496
Georgia	1,030	160	1,367,716	-	1,368,906
Hawaii	133	9	-	-	142
Idaho	2,280	(D)	-	260	2,540
Illinois	1,120	5,100	5,314	57	11,591
Indiana	870	3,850	40,300	50	45,070
Iowa	3,850	20,900	51,910	175	76,835
Kansas	5,900	1,940	-	66	7,906
Kentucky	2,050	425	315,244	48	317,767
Louisiana	790	8	2,896	-	3,694
Maine	85	5	-	-	90
Maryland	185	21	307,262	-	307,468
Massachusetts	38	11	160	-	209
Michigan	1,120	1,120	16,953	76	19,269
Minnesota	2,320	8,100	59,404	130	69,954
Mississippi	900	515	732,324	-	733,739
Missouri	4,000	3,050	310,342	85	317,477
Montana	2,500	175	589	215	3,479
Nebraska	6,250	3,300	9,442	81	19,073
Nevada	430	1	-	69	500
New Hampshire	30	4	-	-	34
New Jersey	28	12	-	-	40
New Mexico	1,330	2	-	90	1,422
New York	1,440	76	7,385	80	8,981
North Carolina	800	8,900	845,645	30	855,375

<sup>41</sup> USDA. Agricultural Statistics, 2015.

North Dakota	1,640	137	-	64	1,841
Ohio	1,240	2,500	123,109	121	126,970
Oklahoma	4,550	2,110	221,137	53	227,850
Oregon	1,300	10	2,915	195	4,420
Pennsylvania	1,530	1,160	222,359	86	225,135
Rhode Island	5	2	-	-	7
South Carolina	335	235	248,673	-	249,243
South Dakota	3,700	1,360	2,051	255	7,366
Tennessee	1,720	220	187,695	44	189,679
Texas	11,700	860	635,483	720	648,763
Utah	780	680	5,860	290	7,610
Vermont	260	4	127	-	391
Virginia	1,470	270	266,987	75	268,802
Washington	1,150	(D)	9,397	52	10,599
West Virginia	370	5	95,812	33	96,220
Wisconsin	3,500	320	60,266	77	64,163
Wyoming	1,300	96	-	345	1,741
<i>USDA Aggregated Geographies</i>					
Idaho & Washington	-	52	-	-	52
New England	-	-	-	43	43
Other States	-	-	581,354	145	581,499

## Appendix 4.

### Veterinary Industry Statistics by State<sup>42</sup>

	Employment	Wage	Output
Alabama	5,462	\$160,488,945	\$632,406,402
Alaska	782	\$29,825,735	\$90,542,257
Arizona	7,195	\$277,282,644	\$833,058,231
Arkansas	2,666	\$81,913,283	\$308,677,310
Arkansas	2,666	\$81,913,283	\$308,677,310
California	37,891	\$1,624,475,613	\$4,387,131,263
Colorado	8,630	\$328,287,361	\$999,206,746
Connecticut	4,483	\$193,069,533	\$519,054,906
Delaware	1,100	\$45,887,786	\$127,361,231
District of Columbia	425	\$27,859,925	\$49,207,748
Florida	24,829	\$920,726,314	\$2,874,774,541
Georgia	11,497	\$381,639,019	\$1,331,156,426
Hawaii	1,113	\$45,127,293	\$128,866,409
Idaho	2,085	\$60,224,634	\$241,407,423
Illinois	13,212	\$495,082,586	\$1,529,724,163
Indiana	7,499	\$248,814,800	\$868,256,244
Iowa	3,979	\$133,411,360	\$460,700,306
Kansas	4,109	\$124,976,664	\$475,752,088
Kentucky	5,138	\$186,495,094	\$594,892,730
Louisiana	4,959	\$153,435,196	\$574,167,584
Maine	1,923	\$71,520,548	\$222,650,588
Maryland	7,301	\$289,144,681	\$845,331,223
Massachusetts	7,525	\$332,440,817	\$871,266,600
Michigan	10,481	\$368,181,848	\$1,213,520,962
Minnesota	6,252	\$228,281,828	\$723,874,922
Mississippi	2,588	\$77,613,501	\$299,646,241
Missouri	6,878	\$222,186,706	\$796,355,040
Montana	1,803	\$53,457,575	\$208,756,635
Nebraska	2,647	\$87,208,698	\$306,477,434
Nevada	3,231	\$130,664,412	\$374,094,669
New Hampshire	2,204	\$88,435,155	\$255,185,593
New Jersey	8,516	\$379,330,668	\$986,007,491
New Mexico	2,180	\$75,140,684	\$252,406,803

<sup>42</sup> Bureau of Labor Statistics. Quarterly Census of Employment and Wages by NAICS, 2016; Bureau of Economic Analysis. GDP by Industry Accounts. Gross Output by Industry, 2016.

New York	16,975	\$725,390,182	\$1,965,415,354
North Carolina	13,205	\$452,242,801	\$1,528,913,682
North Dakota	771	\$30,742,847	\$89,268,644
Ohio	13,401	\$465,347,767	\$1,551,607,138
Oklahoma	4,792	\$147,589,167	\$554,831,834
Oregon	6,383	\$231,648,569	\$739,042,486
Pennsylvania	13,641	\$540,633,992	\$1,579,395,043
Rhode Island	1,115	\$48,427,284	\$129,097,975
South Carolina	5,289	\$188,647,505	\$612,375,953
South Dakota	1,028	\$35,642,609	\$119,024,859
Tennessee	7,935	\$264,128,215	\$918,737,605
Texas	28,480	\$1,088,805,054	\$3,297,498,044
Utah	2,502	\$80,741,539	\$289,688,908
Vermont	1,133	\$41,600,201	\$131,182,068
Virginia	12,167	\$454,961,922	\$1,408,730,994
Washington	9,746	\$364,499,778	\$1,128,420,503
West Virginia	1,742	\$55,755,134	\$201,693,876
Wisconsin	7,328	\$270,438,286	\$848,457,362



## Appendix 5.

### Animal Production Industry Statistics by State, 2016<sup>43</sup>

	Employment	Wage	Output
Alabama	1,986	\$83,565,057	\$1,414,415,583
Alaska	327	\$13,455,185	\$232,887,158
Arizona	4,425	\$147,426,974	\$3,151,454,660
Arkansas	3,178	\$148,266,713	\$2,263,349,810
Arkansas	3,178	\$148,266,713	\$2,263,349,810
California	28,476	\$1,064,181,271	\$20,280,411,952
Colorado	6,505	\$242,852,986	\$4,632,816,398
Connecticut	1,105	\$44,670,550	\$786,973,423
Delaware	220	\$8,585,784	\$156,682,492
Florida	6,132	\$220,099,049	\$4,367,168,355
Georgia	4,354	\$169,464,202	\$3,100,888,946
Hawaii	854	\$39,719,864	\$608,212,944
Idaho	10,376	\$347,430,780	\$7,389,716,056
Illinois	4,960	\$181,253,903	\$3,532,477,991
Indiana	6,843	\$249,312,184	\$4,873,537,680
Iowa	11,256	\$426,787,401	\$8,016,446,022
Kansas	6,982	\$284,939,207	\$4,972,532,527
Kentucky	2,715	\$96,618,423	\$1,933,604,384
Louisiana	719	\$27,338,504	\$512,066,870
Maine	996	\$30,765,114	\$709,344,371
Maryland	1,169	\$41,342,464	\$832,553,785
Massachusetts	1,930	\$161,464,117	\$1,374,532,767
Michigan	8,909	\$289,818,140	\$6,344,928,715
Minnesota	10,736	\$399,131,076	\$7,646,105,588
Mississippi	3,196	\$116,369,572	\$2,276,169,286
Missouri	4,731	\$156,530,133	\$3,369,385,761
Montana	2,737	\$93,757,213	\$1,949,272,634
Nebraska	7,326	\$279,184,639	\$5,217,526,969
Nevada	1,166	\$37,163,837	\$830,417,205
New Hampshire	504	\$15,119,106	\$358,945,344
New Jersey	592	\$18,244,330	\$421,618,341
New Mexico	5,434	\$176,411,464	\$3,870,057,541
New York	10,204	\$366,444,605	\$7,267,218,835

<sup>43</sup> Bureau of Labor Statistics. Quarterly Census of Employment and Wages by NAICS, 2016; Bureau of Economic Analysis. GDP by Industry Accounts. Gross Output by Industry, 2016.

North Carolina	8,709	\$323,157,851	\$6,202,490,086
North Dakota	681	\$27,278,657	\$485,003,531
Ohio	6,090	\$203,853,930	\$4,337,256,243
Oklahoma	6,973	\$272,906,971	\$4,966,122,789
Oregon	3,846	\$131,465,647	\$2,739,094,830
Pennsylvania	7,040	\$241,026,139	\$5,013,839,730
Rhode Island	145	\$3,757,701	\$103,268,006
South Carolina	1,517	\$51,193,601	\$1,080,396,999
South Dakota	3,325	\$124,704,033	\$2,368,042,202
Tennessee	1,451	\$50,839,140	\$1,033,392,251
Texas	24,801	\$896,949,945	\$17,663,102,150
Utah	2,576	\$82,691,982	\$1,834,609,537
Vermont	1,853	\$59,178,266	\$1,319,693,895
Virginia	3,241	\$109,048,128	\$2,308,217,978
Washington	6,951	\$238,656,757	\$4,950,454,540
West Virginia	278	\$8,679,709	\$197,989,694
Wisconsin	16,528	\$528,670,112	\$11,771,128,274

## Appendix 6.

### Meat and Dairy Processing Industry Statistics by State, 2016<sup>44</sup>

	Employment	Wages	Output
Alabama	23,482	\$721,706,767	\$10,239,932,040
Alaska	79	\$2,581,722	\$33,314,101
Arizona	4,623	\$247,671,951	\$2,962,044,911
Arkansas	30,890	\$964,142,575	\$13,219,218,756
Arkansas	30,890	\$964,142,575	\$13,219,218,756
California	39,727	\$2,129,075,872	\$23,202,510,509
Colorado	9,717	\$469,126,385	\$4,922,200,805
Connecticut	1,315	\$64,508,794	\$913,646,427
Delaware	8,140	\$293,444,497	\$3,432,617,480
Florida	5,352	\$204,210,728	\$3,066,453,624
Georgia	37,487	\$1,270,360,711	\$16,272,909,478
Hawaii	852	\$35,650,440	\$505,008,582
Idaho	5,648	\$237,605,840	\$3,729,410,381
Illinois	23,008	\$1,165,045,501	\$11,685,241,795
Indiana	14,384	\$648,628,662	\$7,478,164,821
Iowa	31,913	\$1,484,220,603	\$14,694,302,232
Kansas	17,821	\$744,903,765	\$7,640,026,778
Kentucky	11,977	\$484,237,927	\$5,701,587,649
Louisiana	5,265	\$159,499,838	\$2,430,048,739
Maine	901	\$43,257,276	\$549,302,406
Maryland	4,757	\$211,645,361	\$2,677,698,177
Massachusetts	4,490	\$250,346,954	\$2,755,224,255
Michigan	10,034	\$501,831,868	\$5,677,436,558
Minnesota	21,807	\$1,025,746,654	\$11,164,103,477
Mississippi	16,900	\$499,200,683	\$7,126,687,397
Missouri	22,459	\$968,162,761	\$11,338,440,959
Montana	721	\$24,140,792	\$377,442,107
Nebraska	26,892	\$1,109,158,216	\$11,566,928,006
Nevada	1,024	\$55,831,336	\$703,570,671
New Hampshire	659	\$49,678,698	\$476,610,906
New Jersey	5,126	\$266,383,653	\$2,893,097,247
New Mexico	1,580	\$75,434,175	\$1,187,230,394
New York	13,403	\$737,403,735	\$9,230,264,291

<sup>44</sup> Bureau of Labor Statistics. Quarterly Census of Employment and Wages by NAICS, 2016; Bureau of Economic Analysis. GDP by Industry Accounts. Gross Output by Industry, 2016.

North Carolina	32,563	\$1,097,142,868	\$14,013,870,629
North Dakota	724	\$34,299,159	\$384,077,802
Ohio	18,670	\$993,398,323	\$10,450,622,773
Oklahoma	8,986	\$326,897,582	\$4,116,264,179
Oregon	4,083	\$188,707,840	\$2,555,308,211
Pennsylvania	22,583	\$1,064,645,347	\$11,807,490,149
Rhode Island	775	\$32,472,405	\$387,682,367
South Carolina	10,926	\$369,726,163	\$4,770,732,953
South Dakota	7,220	\$319,458,644	\$3,488,983,591
Tennessee	13,654	\$563,944,143	\$6,681,958,935
Texas	42,433	\$1,707,085,749	\$19,930,063,305
Utah	7,005	\$312,903,460	\$4,137,313,444
Vermont	2,207	\$113,903,206	\$1,641,754,018
Virginia	15,457	\$599,731,845	\$7,223,516,975
Washington	6,668	\$284,482,945	\$3,348,580,934
West Virginia	2,145	\$67,800,650	\$904,541,093
Wisconsin	34,718	\$1,719,998,585	\$21,274,260,458

## Appendix 7.

### Pet Services Statistics by State, 2016<sup>45</sup>

	Employment	Wages	Output
Alabama	873	\$16,566,293	\$39,543,843
Alaska	274	\$5,592,118	\$12,411,241
Arizona	1,947	\$45,390,550	\$88,192,282
Arkansas	572	\$11,219,574	\$25,909,597
Arkansas	572	\$11,219,574	\$25,909,597
California	11,517	\$296,449,340	\$521,679,770
Colorado	3,538	\$78,197,502	\$160,259,011
Connecticut	1,595	\$34,691,227	\$72,247,915
Delaware	313	\$5,248,649	\$14,177,804
District of Columbia	200	\$4,442,966	\$9,059,300
Florida	5,857	\$137,613,355	\$265,301,590
Georgia	2,708	\$53,095,262	\$122,662,917
Hawaii	240	\$4,313,080	\$10,871,160
Idaho	628	\$9,647,580	\$28,446,201
Illinois	4,610	\$90,215,449	\$208,816,857
Indiana	2,193	\$39,704,482	\$99,335,221
Iowa	916	\$14,344,933	\$41,491,592
Kansas	904	\$14,742,937	\$40,948,034
Kentucky	1,014	\$18,420,156	\$45,930,649
Louisiana	842	\$14,388,521	\$38,139,652
Maine	579	\$9,815,910	\$26,226,672
Maryland	2,392	\$50,297,317	\$108,349,224
Massachusetts	3,576	\$79,894,996	\$161,980,278
Michigan	2,667	\$50,156,414	\$120,805,761
Minnesota	2,089	\$36,932,041	\$94,624,385
Mississippi	356	\$6,007,316	\$16,125,553
Missouri	2,459	\$43,072,351	\$111,384,089
Montana	353	\$6,344,868	\$15,989,664
Nebraska	553	\$9,575,891	\$25,048,964
Nevada	908	\$20,968,219	\$41,129,220
New Hampshire	818	\$15,751,306	\$37,052,536
New Jersey	2,985	\$59,810,184	\$135,210,047
New Mexico	728	\$16,591,606	\$32,975,851

<sup>45</sup> Bureau of Labor Statistics. Quarterly Census of Employment and Wages by NAICS, 2016; Census. Annual Services Survey, 2015.

New York	5,629	\$135,107,105	\$254,973,989
North Carolina	3,779	\$74,524,156	\$171,175,467
North Dakota	261	\$3,927,536	\$11,822,386
Ohio	3,946	\$71,212,042	\$178,739,982
Oklahoma	902	\$17,154,772	\$40,857,441
Oregon	1,578	\$33,057,202	\$71,477,874
Pennsylvania	4,185	\$76,296,549	\$189,565,845
Rhode Island	333	\$6,917,393	\$15,083,734
South Carolina	1,489	\$28,332,339	\$67,446,486
South Dakota	192	\$3,772,767	\$8,696,928
Tennessee	1,607	\$31,234,341	\$72,791,473
Texas	8,740	\$192,596,680	\$395,891,395
Utah	903	\$16,025,153	\$40,902,738
Vermont	294	\$5,570,350	\$13,317,170
Virginia	3,974	\$78,502,914	\$180,008,284
Washington	3,171	\$65,666,337	\$143,635,196
West Virginia	313	\$5,479,232	\$14,177,804
Wisconsin	2,528	\$39,865,846	\$114,509,548

## Appendix 8.

### Consumption of Meat and Dairy Products by State, 2016<sup>46</sup>

	Red Meat (Million lbs.)	Poultry (Million lbs.)	Eggs (Million lbs.)	Dairy (Million lbs.)	Total (Million lbs.)
Alabama	347.2	286.9	94.8	3,055.1	3,784.0
Alaska	53	43.8	14.5	466.1	577.4
Arizona	494.9	408.9	135.2	4,354.10	5,393.1
Arkansas	213.4	176.3	58.3	1,877.20	2,325.2
California	2,802.50	2,315.80	765.4	24,656.90	30,540.6
Colorado	395.6	326.9	108	3,480.60	4,311.1
Connecticut	255.4	211	69.7	2,246.7	2,782.8
Delaware	68	56.2	18.6	598.1	740.9
District of Columbia	48.6	40.2	13.3	427.9	530.0
Florida	1,471.70	1,216.10	401.9	12,948.7	16,038.4
Georgia	736.2	608.3	201.1	6,477.0	8,022.6
Hawaii	102	84.3	27.9	897.4	1,111.6
Idaho	120.2	99.3	32.8	1,057.3	1,309.6
Illinois	914	755.3	249.6	8,041.9	9,960.8
Indiana	473.6	391.4	129.3	4,166.9	5,161.2
Iowa	223.8	184.9	61.1	1,969.2	2,439.0
Kansas	207.6	171.5	56.7	1,826.4	2,262.2
Kentucky	316.8	261.8	86.5	2,787.3	3,452.4
Louisiana	334.3	276.2	91.3	2,941.0	3,642.8
Maine	95.1	78.6	26	836.4	1,036.1
Maryland	429.6	355	117.3	3,779.5	4,681.4
Massachusetts	486.4	401.9	132.8	4,279.2	5,300.3
Michigan	708.9	585.8	193.6	6,237.0	7,725.3
Minnesota	394.1	325.7	107.6	3,467.6	4,295.0
Mississippi	213.4	176.3	58.3	1,877.5	2,325.5
Missouri	435	359.5	118.8	3,827.6	4,740.9
Montana	74.4	61.5	20.3	654.9	811.1
Nebraska	136.2	112.5	37.2	1,198.1	1,484.0
Nevada	209.9	173.5	57.3	1,846.9	2,287.6
New Hampshire	95.3	78.8	26	838.5	1,038.6
New Jersey	638.6	527.7	174.4	5,618.9	6,959.6
New Mexico	148.6	122.8	40.6	1,307.3	1,619.3

<sup>46</sup> Department of Agriculture. Food Availability (Per Capita) Data System, 2016. Census. Current Population Survey, 2016.

New York	1,409.80	1,165.00	385	12,404.0	15,363.8
North Carolina	724.5	598.7	197.9	6,374.2	7,895.3
North Dakota	54.1	44.7	14.8	476.1	589.7
Ohio	829.3	685.2	226.5	7,296.1	9,037.1
Oklahoma	280.1	231.5	76.5	2,464.8	3,052.9
Oregon	292.3	241.5	79.8	2,571.5	3,185.1
Pennsylvania	912.8	754.3	249.3	8,031.1	9,947.5
Rhode Island	75.4	62.3	20.6	663.6	821.9
South Carolina	354.2	292.7	96.7	3,116.6	3,860.2
South Dakota	61.8	51.1	16.9	543.7	673.5
Tennessee	474.9	392.4	129.7	4,178.3	5,175.3
Texas	1,989.40	1,643.90	543.3	17,503.3	21,679.9
Utah	217.9	180	59.5	1,916.8	2,374.2
Vermont	44.6	36.9	12.2	392.4	486.1
Virginia	600.6	496.3	164	5,284.3	6,545.2
Washington	520.4	430	142.1	4,578.3	5,670.8
West Virginia	130.7	108	35.7	1,150.3	1,424.7
Wisconsin	412.6	340.9	112.7	3,630.2	4,496.4
Wyoming	41.8	34.5	11.4	367.8	455.5



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