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## **Potential Health Effects of Changes to the Kansas Corporate Farming Law:**

*Impacts related to a possible increase in the number  
of large-scale swine and dairy operations*

Kansas Health Impact Assessment Project



**MARCH 2015**



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MARCH 2015

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The report is intended to be an accessible and informative resource for Kansas policymakers as they consider amending the Kansas Corporate Farming Law, which would allow any agricultural business to operate anywhere in the state of Kansas. However, these operations would still be subject to the requirements and processes established under other Kansas laws (e.g., zoning, environmental laws).

The report is intended to inform the decision-making process by describing the potential positive and negative health effects associated with this policy issue.

## Acknowledgements

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### Advisory Panel

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 Brandi Carter – Kansas Cattleman’s Association  
 Chad Bontrager – Kansas Department of Agriculture  
 Craig Volland – Kansas Chapter of the Sierra Club  
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 Tim Stroda – Kansas Pork Association

### Disclaimer

The authors of this report are responsible for the facts and accuracy of the information presented. The views expressed are those of the authors and do not necessarily reflect the views of the HIA Advisory Panel, the Kansas Health Foundation, the Health Impact Project, the Robert Wood Johnson Foundation or The Pew Charitable Trusts.

The Kansas Health Institute (KHI) does not endorse or oppose the proposed legislation. KHI delivers credible information and research enabling policy leaders to make informed health policy decisions that enhance their effectiveness as champions for a healthier Kansas. The Kansas Health Institute is a nonprofit, nonpartisan health policy and research organization based in Topeka that was established in 1995 with a multiyear grant from the Kansas Health Foundation.



## Proposed Policy

During the legislative session of 2013, Kansas lawmakers considered amending the current Kansas Corporate Farming Law by “defining and establishing the limits for agricultural business entities.”<sup>2</sup> The proposed Senate Bill 191 (and its House version, HB 2404), also referred to as the Kansas Agriculture Growth and Rural Investment Initiative, would have removed restrictions for agribusinesses with certain forms of ownership structure (e.g., corporation) to operate in Kansas. The bill would have also amended the definitions of limited agricultural partnerships, family farm corporations, authorized farm corporations, limited liability agricultural companies, and family farm limited liability agricultural companies. Specifically, the bill would have removed limits on the number of stockholders or members and would have eliminated the requirement that at least one of the members reside on the farm or actively engage in the labor or management of the farming operation.

The bill received a hearing in 2013 but did not pass. Similar bills are likely to be introduced for consideration in future legislative sessions, and if passed, could result in multiple direct and indirect effects within the state. The Kansas Health Institute (KHI) conducted a health impact assessment (HIA) to examine how some provisions of this legislation might positively or negatively affect the health of Kansas residents.

An HIA is a practical tool that assesses the health impacts of policies, strategies and initiatives in sectors that aren’t commonly thought of in relation to health — such as transportation, employment and the environment. The overall goal of an HIA is to inform policymakers of the potential health effects of the proposed policy during the decision-making process. The HIA provides evidence-based findings about health impacts and also identifies recommendations to maximize health benefits and mitigate health risks.

In order to determine potential direct and indirect impacts of changes to the Kansas Corporate Farming Law, the HIA team reviewed testimony provided on Senate Bill 191 and conducted a legal analysis of the proposed legislation. According to testimony provided by various key Kansas agricultural organizations,<sup>3</sup> the passage of the bill could have a direct impact on the ownership

structure of agribusinesses and various secondary effects on in-state and out-of-state agribusinesses. For example, changes to the current law would allow Kansas farms to choose any business structure that suits their needs, thus increasing their ability to expand by raising capital and through investment opportunities.<sup>4</sup> Additionally, changes in the law would allow any out-of-state agribusiness to operate anywhere in Kansas.<sup>5</sup> However, these operations would still be subject to the requirements and processes established under other Kansas laws (e.g., zoning, environmental laws).

While these changes would allow for any size of agribusiness to locate or expand in Kansas, testimony on Senate Bill 191 suggested that these businesses may be large-scale. Passage of Senate Bill 191 would have removed barriers for large nonfamily farms to locate in Kansas. Currently, large nonfamily farms are organized into four forms of business structures,<sup>6</sup> three of which are currently prohibited from direct or indirect ownership, acquisition, obtainment, or lease of agricultural land in the state (K.S.A. 17-5904).

## Stakeholder Feedback

Although testimony from various stakeholder groups highlighted potential effects on several types of agribusinesses, the most commonly identified potential impact was an increase in the number of swine and dairy operations. For example, the Kansas Department of Agriculture and the Kansas Pork Association suggested:

*“We (Kansas) had interest from pork and poultry farms. Unfortunately, the restrictive corporate farming laws on the books are prohibitive and driving that business to other states.”<sup>7</sup>*

– Kansas Department of Agriculture

*“Senate Bill 191 sends a clear signal to investors that the state is really serious about bringing new livestock businesses and jobs to Kansas. We believe new farms will also prove valuable.”<sup>8</sup>*

– Kansas Pork Association

The current law sets forth a procedure whereby counties may permit or deny dairy and swine production facilities to be established within the county by a corporation, trust, limited liability company, limited partnership, or corporate partnership.<sup>9</sup> According to the

2013 testimony, existing exemptions for confined animal feeding operations (swine and dairy) have created some potential barriers for these corporations to enter the Kansas market.

*“We’d like to express our support for the repeal of the sections K.S.A. 17-5907 and K.S.A. 17-5908 that require county approval for corporations to operate dairy production facilities and swine production facilities.”*

– Kansas Livestock Association

*“Let’s omit the county-by-county approval process and make our state laws more inviting to entities wanting to locate their business in the state.”<sup>10</sup>*

– Kansas Livestock Association

Further, according to various sources, approximately 20 counties have chosen to restrict corporate swine or dairy operations since the mid-1990s.<sup>11</sup>

## Health Impact Assessment Focus

Based on these considerations, the HIA scope was narrowed to assess potential health effects that could result from an increase in the number and size of swine and dairy operations in Kansas. As noted earlier, the passage of the Kansas Agriculture Growth and Rural Investment Initiative could directly and indirectly impact several other areas beyond swine and dairy operations. However, not all impacts resulting from the legislation may affect the health of Kansans. The goal of the HIA is to assess only those that might affect health in the state.

Additionally, some of these impacts might occur as the result of other changes. For example, a potential impact on crop operations was referenced by several organizations in the context of the expansion of livestock production in Kansas. As a result, this and other effects associated with passage of this legislation were not assessed due to limited attention given in the testimony and the potential for smaller health effects in comparison to those associated with livestock operations.

## Study Approach

In order to assess the potential health effects of an increase in the number of large-scale swine and dairy operations, the HIA team reviewed existing literature and analyzed data pertaining to Kansas. KHI also gathered input from stakeholders in various sectors including farming, business, housing, health care, education, city and county government.

The HIA team received valuable guidance from the project’s HIA Advisory Panel. The Panel included 11 organizations representing a diverse range of sectors within Kansas agriculture to inform the study. The HIA Advisory Panel members met several times during the project and provided their feedback on the project’s methodology, findings, recommendations and the draft of this report. However, the authors of this report are responsible for the facts and accuracy of the information provided. The views expressed are those of the authors and do not necessarily reflect the views of the HIA Advisory Panel.

The assessment of health effects was guided by two primary research questions:

1. *How will new large-scale swine or dairy operations impact residential property values, employment, economic development, water quantity, amount of waste produced and antibiotic use?*
2. *How will changes in these indicators (e.g., employment) impact (positively and negatively) the health of Kansans?*

The goal of the HIA was to examine potential health effects (both positive and negative) associated with an increased number of large-scale swine and dairy operations in Kansas within a larger framework of social, economic and physical factors that could impact health. These factors — including employment, property values/taxes, population, water quantity, amount of waste produced and antibiotic use — were identified through review of testimony, literature and discussions with the HIA Advisory Panel members.

Special attention was given to populations that could be especially impacted, including people with respiratory conditions and those living in close proximity to large-scale livestock operations.

## Summary of Findings and Recommendations

An increase in the number of large-scale swine and dairy operations may affect several economic, social and environmental factors. The analysis presented in this HIA suggested new employment related to an increased number of livestock operations in Kansas might result in positive health effects. The analysis also identified that an increase in the number of operations could result in a decrease in residential property value in close proximity to livestock operations. An increase in volume of waste produced and antibiotics used could result in poor air quality and exposure to antibiotic-resistant organisms, especially for operation employees and neighboring residents.

Additionally, the HIA analysis suggested that there could be little-to-no impact on county-level property values, school funding and population size (Figure 1, page 7). The full table, *Summary of Health Impacts of Changes to the Kansas Corporate Farming Law*, is available in *Appendix A*, page 63.

## Findings

**Jobs:** The report shows that an increase in the number of large-scale swine and dairy operations could have a small but positive impact on total employment. However, no specific impact is projected on local unemployment rates or county-level rates of health insurance coverage.

The potential health effects associated with employment depends on the extent to which these operations provide livable wages and such benefits as health insurance coverage. If new or expanding swine or dairy operations offer jobs that pay livable wages and affordable health insurance benefits, some positive health effects could result. However, no data documenting the number of jobs or actual wages and benefits offered by existing livestock operations were available to this study, so it is unclear how many employees might benefit, if any. The negative correlation between the number of hired farm workers and average wages for hired farm workers suggests that the new jobs offered low wages. Additionally, increases in unemployment in counties where large-scale swine or dairy farms operate might suggest higher job turnover. As a result, positive health effects associated with employment would likely be realized only by some categories of employees (e.g., managers).

**Property Values/Taxes:** An increase in the number of large-scale swine or dairy operations might have little-to-no impact on county-level real property (e.g., commercial, agricultural and residential) values/taxes. However, properties that are located downwind, close to large livestock operations (less than three miles) and higher-priced, are more likely to experience declines in property values. Residents of these properties might have an increased risk of poor health with the decline in their socioeconomic status related to changes in their property values. The level of change in residential property values would also depend on the management practices of the livestock operation. Research suggests that swine operations are likely to have a stronger negative impact on residential property values than dairy operations.

**School Funding:** An increase in the number of large-scale swine or dairy operations would likely have no impact on school funding due to little-to-no expected changes in county-level property values/taxes and the Kansas “equalization” school funding formula. The formula requires the state to make up the difference between the amount of revenue generated by local property taxes and the district’s allowable budget, as calculated under the School District Finance and Quality Performance Act (K.S.A. 72-6405 through 72-6440).<sup>12</sup>

**Population:** Counties with an increased number of large-scale swine operations might experience small decreases in population. However, counties with dairy operations might experience slight increases or no change in population size. Modest changes in population size are not likely to affect availability of health care providers, food sources and social cohesion. However, social cohesion might also be impacted by changes in the demographic composition of the local population.

**Water Use:** Water use for livestock operations makes up a small proportion of total water use in southwestern Kansas. While increases in the number and size of livestock operations would increase the volume of water used for livestock, the impact on total water use is unclear because it could be affected by multiple factors (e.g., changes in crop production, changes in irrigation practices, and available water rights).

**Waste:** An increase in the number of large-scale swine or dairy operations would increase the amount of waste (manure and other waste) produced. Increased waste production could have a negative impact on air quality, as well as increased risks for water pollution and soil contamination. The extent of this impact would depend on the type, number and density of new operations and the implementation of effective management practices to minimize adverse impacts.

**Antibiotic Use:** Adding new animals to swine or dairy operations would result in an increased volume of antibiotics used even if the same dose is administered. This is due to a larger number of animals receiving antibiotics subtherapeutically. Continued or increased widespread use of subtherapeutic antibiotics can contribute to bacteria resistance in humans because there are several pathways through which resistant bacteria can be transferred to humans. Resistance can be spread on a large scale through farm workers,<sup>13 14</sup> farm produce,<sup>15</sup> and soil and water sources.<sup>16</sup> Livestock (dairy and swine) operation employees and residents who live in close proximity to large-scale livestock operations would be at the greatest risk of exposure to antibiotic-resistant organisms. However, the community at-large could also be exposed to antibiotic-resistant organisms due to the application of manure containing resistant bacteria to neighboring fields as fertilizers.

## Recommendations

To maximize the potential positive health effects and mitigate the potential negative health effects associated with the proposed changes to the Kansas Corporate Farming Law, the HIA team, with input from the HIA Advisory Panel, developed a set of recommendations to inform the decision-making process.

Key recommendations are listed below. An asterisk (\*) indicates recommendations that were deemed by the HIA Advisory Panel members as priorities in terms of feasibility, alignment with findings and whether or not they addressed vulnerable populations.

### **Kansas Legislature could consider:**

- Increasing the minimum separation distance from dairy operations with 1,000<sup>17</sup> or more animal unit capacity to any habitable structure in existence to three miles (from the current

0.76 miles); increasing the minimum separation distance from swine operations with 3,725 or more animal unit capacity to any habitable structure in existence to three miles (from the current 0.95 miles).<sup>18 \*</sup>

- Identifying appropriate agencies (e.g., Kansas Department of Health and Environment, Kansas Department of Agriculture) to review existing regulations (e.g., separation distance) related to livestock operations and suggest changes based on the best available research.\*

### **Livestock Operations could consider:**

- Providing health insurance to employees.\*
- Compensating neighboring property owners for negative externalities associated with livestock operations, such as property depreciation.\*
- Prevailing wind direction when locating operations and, when possible, build downwind of residential properties.\*

### **Kansas Department of Health and Environment and/or Kansas Department of Agriculture could consider:**

- Conducting a statewide study of existing large-scale livestock operations' nutrient utilization plans (NUP) to determine if this process adequately regulates manure application in Kansas.
- Developing and implementing a Kansas-specific siting tool to evaluate optimal siting conditions, taking into consideration the facility size, waste management and odor reduction practices and prevailing wind and weather patterns.
- Establishing and maintaining a publicly available database of all regulated animal feeding operations in Kansas. The database should include the name and location of each operation, the numbers and types of animals and animal units on each site, key characteristics of facility operations and waste management plans, and results of routine inspections or complaint investigations (e.g., Iowa Database<sup>19</sup>).
- Exploring the feasibility of monitoring the use of antibiotics in livestock operations in Kansas.\*
- Restricting subtherapeutic antibiotic use (feeding of low doses to animals to achieve prophylaxis [disease prevention] and growth promotion) in livestock operations to antibiotic classes that are not used to treat human diseases.\*

The full list of findings and recommendations is available in *Appendix C*, page. 65.

Figure 1. Summary of Health Impacts of Changes to the Kansas Corporate Farming Law.

Health Factor or Outcome	Expected Effect Based on Literature	Expected Effect Based on Data	Stakeholder Projections	Based on Literature and Data				
				Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
<b>Impacts on Jobs</b>								
<b>General Population</b>								
Jobs	Mixed	Mixed	Increase	Mixed	Medium	Possible	Employees, their families and some businesses in the community	**
Unemployment	Mixed	Increase	N/A	None	None	Unlikely	N/A	**
<b>Employees of Swine and Dairy Operations</b>								
Health Insurance	Mixed	N/A	Mixed	Positive	Low	Possible	Some employees	*
Preventive Care	Mixed	N/A	Mixed	Positive	Low	Possible		*
Socioeconomic Status	Mixed	N/A	Increase	Mixed	Low	Possible		*
<b>Impacts on Property Values/Taxes</b>								
Property Values/Taxes	None	None	Mixed	None	None	Unlikely	N/A	**
<b>Some Residents</b>								
Property Values/Taxes	Decrease	N/A	Decrease	Negative	Low	Possible	Residents who live less than three miles from operation(s)	**
Socioeconomic Status	Decrease	N/A	N/A	Negative	Low	Possible		**
Nutrition/Physical Activity	Decrease	N/A	N/A	Negative	Low	Possible		**
<b>Impacts on Population</b>								
Population Size	Mixed	Mixed	Increase	Mixed	Medium	Possible	Community members	**
Health Care Providers	N/A	Decrease	N/A	Uncertain	Uncertain	Unlikely	N/A	*
Grocery Outlets	N/A	None	N/A	Uncertain	Uncertain	Unlikely	N/A	*
Crime	Increase	None	N/A	Uncertain	Uncertain	Uncertain	Community members	**
<b>Impacts on Waste</b>								
Waste	Increase	Increase	Increase	Mixed	Medium	Likely	Community Members	**
Air Quality	Decrease	N/A	Decrease	Negative	Medium	Likely		**
Water Quality	Decrease	N/A	Mixed	Uncertain	Medium	Possible		**
Soil Quality	Decrease	N/A	Mixed	Uncertain	Medium	Possible		*
<b>Impacts on Antibiotic Use</b>								
Antibiotic Use	Increase	N/A	N/A	Negative	Medium	Likely	Livestock operation employees, residents who live in close proximity to operations	**
Antibiotic Resistance	Increase	N/A	N/A	Negative	Medium	Likely		**

Source: KHI HIA Corporate Farming Project, 2015.

Figure 2. Legend: Health Impacts for Kansas.

CRITERIA	DESCRIPTION
Expected Change Based on Literature	Increase – Literature achieves consensus that this indicator might increase. Decrease – Literature achieves consensus that this indicator might decrease. Mixed – Literature lacks consensus about this indicator’s potential direction. None – Literature achieves consensus that this indicator might remain unchanged. N/A – Literature was not available or performed on this indicator.
Expected Change Based on Data	Increase – Data analysis suggests that this indicator might increase. Decrease – Data analysis suggests that this indicator might decrease. Mixed – Data analysis lacks consensus about this indicator’s potential direction. None – Data analysis suggests that this indicator might remain unchanged. N/A – Data analysis was not possible or performed for this indicator.
Expected Change Based on Stakeholder Projections	Increase – Stakeholders anticipated seeing an increase. Decrease – Stakeholders anticipated seeing a decrease. Mixed – Stakeholders were divided in their opinions. None – Stakeholders anticipated seeing no change. N/A – Stakeholders didn’t express their opinion about this issue.
Expected Health Effect	Positive – Changes may improve health. Negative – Changes may impair health. Uncertain – Unknown how health might be impacted. Mixed – Changes may be positive as well as negative. None – No identified effect on health.
Magnitude of Impact (number of people affected)	High – Affects most or all people (such as the population of a given county or counties). Medium – Affects a large number of people (such as several groups of people in a given county or counties). Low – Affects few or very few people (such as only certain groups of people, for example, residents that live in close proximity to a livestock operation, employees of a livestock operation). It is important to note, that although only certain groups of people might be affected, the impact on a particular individual might be high. Uncertain – It is uncertain that impacts will occur as the result of the proposed changes. None – Affects no people.
Likelihood of Impact	Likely – It is likely that impacts might occur as the result of the proposed changes. Possible – It is possible that impacts might occur as the result of the proposed changes. Unlikely – It is unlikely that impacts might occur as the result of the proposed changes. Uncertain – It is uncertain that impacts will occur as the result of the proposed changes.
Distribution	The population most likely to be affected by changes in the health factor or outcome. N/A – Data analysis was not possible or performed for this indicator.
Quality of Evidence	*** – Strong data or literature. ** – Sufficient data or literature. * – Lacks either quality data or literature.

Source: KHI HIA Corporate Farming Project, 2015.

## History of Corporate Farming Laws in Kansas

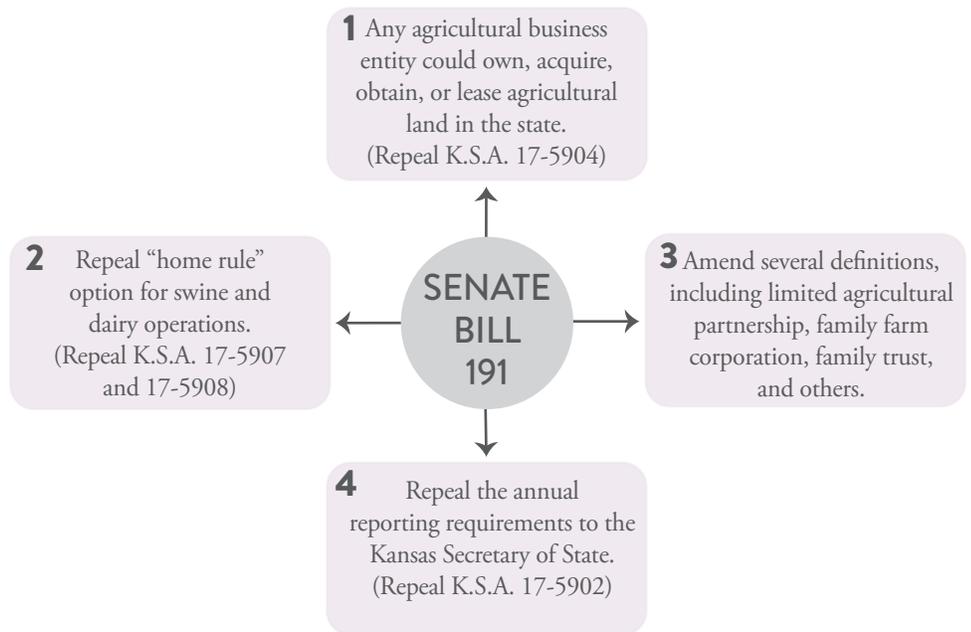
Kansas has a strong agricultural tradition and history. Farming has played a critical role in shaping the Kansas “way of life,” its politics and laws. Today, Kansas agriculture focuses primarily on wheat, grain, sorghum, corn and beef production.

Similar to the rest of the country, the majority of Kansas farms are owned and operated by individuals or families. The question of corporate farming has been a controversial issue in the state for many years, as certain types of corporate farming have been prohibited since the passage of the Kansas Corporate Farming Law in 1931. For example, the 1931 law prohibited corporate farming for the purposes of growing wheat, corn, barley, oats, rye, or potatoes and the milking of cows.

Over the last several decades, the state has made several amendments to the law. During the 1981 legislative session, Kansas legislators passed Senate Bill 298, which prohibited certain types of corporations<sup>20</sup> from engaging in agricultural production.<sup>21</sup> Additionally, this law included thirteen exemptions from the restrictions, such as eliminating restrictions on owning, acquiring, obtaining, or leasing agricultural land for use as a feedlot, a poultry confinement facility, or rabbit confinement facility. The full list of prohibitions and exemptions under the current Kansas Corporate Farming Law is available in *Appendix F*, page 92.

In 1994, the Kansas Legislature passed two bills that allowed acquisition of

Figure 3. Key Provisions of Senate Bill 191 (2013).



Source: *Legal Review of Proposed Changes to the Kansas Corporate Farming Law (Senate Bill 191, 2013)*, Jill Krueger, J.D., Public Health Law Center, Minnesota.

agricultural land by corporations for the purposes of developing either swine or dairy production facilities. Both types of entities could be approved by either county resolution or by an affirmative vote upon petition. In 2012, the Kansas Corporate Farming Law was amended to authorize a board of county commissioners to permit or deny (by resolution) the establishment of a dairy or swine production facility within its county. It is also added that the permission or denial would be subject to a petition protesting the decision within 60 days of the resolution, signed by 5 percent of the county’s voters in the last election for Secretary of State.<sup>22</sup> The issues surrounding the Kansas Corporate Farming Law continued to be discussed in the 2013 legislative session.

## The 2013 Legislative Session: Senate Bill 191

Senate Bill 191 was introduced during the 2013 legislative session and would have allowed any agricultural business entity to operate anywhere in the state. This and other key provisions of Senate Bill 191 are described in *Figure 3*.

**1** Any agricultural business entity could own, acquire, obtain, or lease agricultural land in the state. (Repeal K.S.A. 17-5904)

Currently, the Kansas Corporate Farming Law prohibits direct or indirect ownership, acquisition, obtainer, or lease of agricultural land by specified business entities identified in K.S.A. 17-5904.<sup>23</sup> The prohibition applies, with certain exceptions, to “a corporation, trust, limited liability company, limited

partnership or corporate partnership.” It does not apply to “a family farm corporation, authorized farm corporation, limited liability agricultural company, family farm limited liability agricultural company, limited agricultural partnership, family trust, authorized trust or testamentary trust.”

Senate Bill 191 would have repealed the ban on corporate ownership of farmland. It would have repealed the prohibition contained in K.S.A 17-5904. This means that if Senate Bill 191 was enacted as written, including repeal of the prohibition contained in K.S.A 17-5904, any business entity could have owned, acquired, obtained, or leased agricultural land in the state.

**2** Repeal “home rule” option for swine and dairy operations. (Repeal K.S.A. 17-5907 and 17-5908)

The current law sets forth a procedure by which counties may permit or deny dairy and swine production facilities to be established within the county by a corporation, trust, limited liability company, limited partnership, or corporate partnership. Counties currently have the explicit authority to create an exception to the state corporate farm law by allowing a corporation, trust, limited liability company, limited partnership, or corporate partnership to own farmland for the purpose of establishing a dairy production facility or a swine production facility.

Under Senate Bill 191, the provisions for counties to permit or deny dairy and swine production facilities to be established would have been repealed. The authorization for agricultural business entities to conduct agricultural business and establish agricultural operations, taken together with the repeal of county authority, would mean that swine and dairy production facilities would have been allowed to own agricultural land statewide.

**3** Amend several definitions, including limited agricultural partnership, family farm corporation, family trust, and others.

Senate Bill 191 would have amended several definitions listed in box three. In general, Senate Bill 191 would have removed the limitation on the number of stockholders or members and the requirement that at least one of the members reside on the farm or be actively engaged in the labor or management of the farming operation.

**4** Repeal the annual reporting requirements to the Kansas Secretary of State. (Repeal K.S.A. 17-5902)

Under the current Kansas Corporate Farming Law, K.S.A 17-5902 addresses reports to the Secretary of State that must be filed by corporations and limited partnerships which hold agricultural land. The required reports provide a means of determining whether a corporation or limited partnership was in violation of the Kansas Corporate Farming Law’s restrictions on corporate ownership, acquisition, obtainer, or lease of agricultural land.

Currently, K.S.A. 17-5902 does not apply to corporations and limited partnerships which hold a total of less than 10 contiguous acres. Senate Bill 191 would have repealed this section of the law. If the restrictions were repealed under Senate Bill 191, the basic reporting requirements would continue.

## Focus of the Health Impact Assessment Project

Changes to the Kansas Corporate Farming Law could result in direct and indirect effects. While the primary direct effect of the 2013 legislation (Senate Bill 191) would be related to the ownership structure of agribusinesses, there could be secondary effects due to in-state and out-of-state agribusinesses that may choose to expand or locate here.

### The following considerations informed the focus of the HIA:

#### Review of the proposed legislation:

Changes to the Kansas Corporate Farming Law would allow Kansas farms to choose any business structure that suits their needs, thus increasing their ability to expand by raising capital and through investment opportunities. Additionally, changes in the law would have allowed any out-of-state agribusiness to operate anywhere in Kansas. While these changes would allow for any size of agribusiness to locate or expand in Kansas, testimony from the 2013 debate on this issue suggested that these operations may be large-scale. According to the 2011 U.S. Department of Agriculture data, large nonfamily farms are typically organized into four kinds of business structures,<sup>24</sup> three of which are currently prohibited from direct or indirect ownership, acquisition, obtainment, or lease of agricultural land in Kansas. Passage of Senate Bill 191 would have removed barriers for large nonfamily farms if they choose to locate in Kansas.

#### 1. Key issues referenced/cited by stakeholders:

The focus of the HIA was determined based upon issues discussed during the 2013 Kansas legislative session, as well as previous sessions. The 2013 debate around Senate Bill 191 primarily focused on the issues described below. A summary of testimony provided by various organizations and individuals on Senate Bill 191 is available in *Figure 4*, page 12.

- Expansion of livestock (e.g., dairy, swine and poultry) operations in Kansas.
- Impact on economy (e.g., jobs, new, out-of-state agribusinesses).
- Impact on population.
- Impact on air and water quality and quantity.

- *Impact on “local control.”*
- *Expansion of crop production in Kansas.*
- *Impact on Kansas farms (e.g., multi-generational ownership opportunity regardless of degree of relationship, succession planning, competition from CAFO).*

Although the testimony highlighted multiple potential impacts of Senate Bill 191, the most commonly identified impact was an increase in the number of livestock operations — specifically swine and dairy. According to the testimony, existing exemptions for confined animal operations (livestock operations) have created some potential barriers for these types of corporations to enter the Kansas market. Under Senate Bill 191, K.S.A. 17-5907 and K.S.A. 17-5908 would be repealed, thus removing legal barriers for these types of businesses to locate in Kansas.

Further, the current law sets forth a procedure that counties may permit or deny dairy and swine production facilities to be established within the county by a corporation, trust, limited liability company, limited partnership, or corporate partnership. According to various sources, about 20 counties have chosen to restrict corporate swine or dairy operations since the mid-1990s.

#### 2. Issues which were more likely to have diverse health effects:

The HIA scope was also narrowed to assess issues that are more likely to have diverse health effects. The analysis of the issues showed that an increase in the number of large-scale swine and dairy operations are more likely to have diverse health effects (positive and negative) than other indirect effects listed above. *As a result, the last three bullets above were excluded from further assessment.*

Figure 4. Summary of Key Issues Reference in Regard to Senate Bill 191.

PROJECTION: IMPACTED AREAS											
ORGANIZATION	Swine	Dairy	Poultry	Crops/ Grain	New Out-of-State Agribusiness/New Markets	Kansas Family Farms	Jobs	Economy	Local Control	Population	Water/Air Quality
Kansas Department of Agriculture <sup>25</sup>	Yellow	Yellow	Yellow	Yellow	Grey	Grey	Grey	Yellow	Grey	Grey	Grey
Kansas Farm Bureau <sup>30 31</sup>	Grey	Grey	Grey	Yellow	Yellow	Yellow	Yellow	Yellow	Grey	Yellow	Grey
Kansas Livestock Association <sup>37</sup>	Yellow	Yellow	Grey	Grey	Yellow	Yellow	Grey	Grey	Yellow	Grey	Grey
Kansas Pork Association <sup>41</sup>	Yellow	Grey	Grey	Grey	Yellow	Grey	Yellow	Grey	Grey	Grey	Grey
Kansas Rural Center <sup>44</sup>	Yellow	Yellow	Yellow	Grey	Grey	Yellow	Grey	Yellow	Yellow	Yellow	Yellow
Kansas Farmers Union <sup>48</sup>	Grey	Grey	Grey	Grey	Grey	Yellow	Grey	Grey	Grey	Yellow	Grey
Kansas Chapter of the Sierra Club <sup>50</sup>	Grey	Grey	Grey	Grey	Yellow	Yellow	Grey	Grey	Grey	Grey	Yellow
Donald D. Stull, Ph.D., Professor of Anthropology, University of Kansas <sup>53</sup>	Yellow	Grey	Yellow	Grey	Grey	Yellow	Grey	Yellow	Grey	Grey	Yellow

Source: KHI HIA Corporate Farming Project, 2015.

## STATEMENTS FROM 2013 TESTIMONY ON PROPOSED LEGISLATION

“We have had interest from pork and poultry farms. Unfortunately, the restrictive corporate farming laws on the books are prohibitive and driving that business to other states.”<sup>26</sup>

“Passing Senate Bill 191 will send a loud and clear message to farmers, ranchers and agribusinesses that Kansas is open for their business.”<sup>27</sup>

“Over the years, agribusinesses, hog, dairy and poultry producers in particular, have approached Kansas about the possibility of locating in our state but they are concerned with the Kansas corporate farming laws.”

“What you see in the table are some results in 2013 dollars of what the impact will be if we grow hogs and dairy by 10 percent.”<sup>28</sup>

“Further opening Kansas to animal agriculture creates additional demand for crops farmers grow...”<sup>29</sup>

“While it is impossible to predict the immediate outcome of enacting the Kansas Agricultural Growth and Rural Investment Initiative, some Kansas counties have experienced the economic benefit of large-scale animal agriculture.”

“...removing the real or perceived hurdles to bringing a new business venture online can encourage growth in the industry and, in turn, attract jobs and residents to rural communities...”<sup>32</sup>

“Bill represents a unique opportunity to access new markets, to diversify operations...”<sup>33</sup>

“This change in the law will open our state to new development by removing barriers to entering, or in some cases remaining in business in Kansas.”<sup>34</sup>

“It will allow multi-generation family operations to continue to work in Kansas.”<sup>35</sup>

“New investment and expansion of processing in Kansas will create new opportunities for producers like us through additional markets for grain...”<sup>36</sup>

“...it becomes more difficult to comply with the definition of eligible agricultural entity that can own land, such as family farm corporation...”<sup>38</sup>

“Repealing the corporate farm statutes will provide multigenerational farm and ranch families an easier environment for succession planning.”<sup>39</sup>

“...we’d like to express our support for the repeal of the sections KSA 17-5907 and KSA 17-5908 that require county approval for corporations to operate dairy production facilities and swine production facilities. Let’s omit the county-by-county approval process and make our state laws more inviting to entities wanting to locate their business in the state.”<sup>40</sup>

“Kansas Pork Association supports pork-producing farms.”<sup>42</sup>

“Senate Bill 191 sends a clear signal to investors that the state is really serious about bringing new livestock businesses and jobs to Kansas. We believe new farms will also prove valuable.”<sup>43</sup>

“A few companies or enterprises may profit; the state may see an increase in overall numbers of hogs, poultry or dairy herds, and an increase in gross regional product, but number of farmers and rural communities continue to shrink.”<sup>45</sup>

“At the time we are repealing this law and opening the doors for more animal agriculture, we are reducing funding to the state agency that oversees permits and monitoring that protects water and air quality.”<sup>46</sup>

“Today county residents at least have an option to accept or reject corporate swine or dairy developments. The repeal would take it away.”<sup>47</sup>

“Every time a 2,000-cow dairy goes in, it takes 20 dairy farmers out of a community. That is not economic development; that is rural depopulation.”<sup>49</sup>

“Neighboring farmers and nearby town-folk will suffer excessive odors and a reduced quality of life.”<sup>51</sup>

“Worse, their farming livelihood will be threatened by increased competition from CAFOs for limited water supplies.”<sup>52</sup>

“I oppose Senate Bill 191 because it will encourage greater corporate control of Kansas agriculture and further erode independent agriculture, rural economies, air, and water quality.”<sup>54</sup>

“A single broiler house...produces between 140 and 200 tons of poultry litter.”<sup>55</sup>

“The average hog generates about 1.5 tons of solid manure and 5,270 gallons of liquid manure each year.”<sup>56</sup>



The HIA process, as defined by the National Research Council,<sup>57</sup> includes six main steps.

1. **Screening:** Identify upcoming policy and determine the HIA purpose and value.
2. **Scoping:** Identify potential health indicators and research methods.
3. **Assessment:** Analyze identified potential health impacts.
4. **Recommendations:** Determine options to mitigate identified potential negative health impacts and maximize identified potential positive health impacts.
5. **Reporting:** Share findings with stakeholders, including decision-makers.
6. **Monitoring and evaluation:** Monitor actual future health impacts resulting from policy changes, and assess HIA process, results and lessons learned.

To date, the KHI HIA Corporate Farming Project has included all six steps. A monitoring plan has also been developed, but implementation will depend on availability of future resources.

### Step 1 – Screening

Screening determines whether an HIA is feasible, timely, and would add value to the decision-making process.

In 2013, the Kansas Health Institute conducted an environmental scan to identify a state-level policy that could benefit from a health impact assessment.

The environmental scan process included a review of bills introduced during the 2012 and 2013 legislative sessions, media coverage analysis, and conversations with stakeholders and legislators. Based upon this work, KHI decided to conduct an HIA to inform the legislation that proposed changes to the Kansas Corporate Farming Law. The proposed policy was selected as an HIA project due to the opportunity to inform decision-making; the number, variety and size of potential health impacts (both positive and negative) and relevance to the community.

The KHI HIA Corporate Farming Project aimed to broaden the scope of the policy discussion to include the consideration of impacts on health. During the 2013 legislative session, the topic received statewide attention through legislative hearings and the media, and the conversation was primarily centered on issues of local control,<sup>58</sup> constitutionality of the Kansas Corporate Farming Law, economic (e.g., local jobs) and environmental impacts.<sup>59</sup> Additionally, the Senate Committee on Agriculture and Natural Resources requested an interim legislative committee to study K.S.A. 17-5902 et. seq., for potential constitutional issues prior to the 2014 legislative session. The report was approved by the Judicial Council on December 6, 2013.<sup>60</sup>

Although this study provided valuable information, its scope was limited to potential constitutional issues. Thus, the HIA was conducted to ensure that health issues related to changes to the

Kansas Corporate Farming Law received consideration, as they could result in various economic and environmental effects and associated health outcomes (e.g., respiratory conditions and morbidity).

### Step 2 – Scoping

Scoping determines what health impacts will be studied, which populations will be included, and the methods that will be used to conduct the HIA.

The potential areas of focus (health factors and impacts) were identified by reviewing testimony, conducting preliminary literature review, and soliciting input from key stakeholders including representatives of agricultural, public health, environmental and academia sectors.

In order to identify potential impacts of the proposed legislation and to form the HIA Advisory Panel for the project, the HIA team met with stakeholders and legislators who were actively engaged in discussions related to proposed changes to the Kansas Corporate Farming Law. As a result of these meetings, the HIA team compiled a list of potential impacts of the legislation. These stakeholders and legislators were also convened to further the discussion and finalize the HIA Advisory Panel membership. Eleven of 13 organizations who participated in the meeting agreed to serve on the HIA Advisory Panel.

Using stakeholder input and preliminary literature review findings, the HIA team identified the scope of the HIA and several issues for further research. The study

focused primarily on assessing the potential impact of allowing any agricultural business entity to establish and conduct agricultural business operations anywhere in the state. This might result in changes to the size and density of livestock and crop farming operations in Kansas that are owned by in-state and out-of-state entities, among other impacts. Specifically, it could increase the number of large-scale swine and dairy operations in Kansas. The goal of the HIA was to examine the potential health effects (both positive and negative) associated with increased number of large-scale swine and dairy operations in Kansas within the larger framework of social, economic, environmental and physical factors that could impact health. The HIA assessed how the presence of large-scale swine or dairy operations could impact property values/taxes, jobs/employment, the economy, the environment and associated health outcomes (e.g., respiratory conditions, chronic disease, morbidity and mortality).

### Step 3 — Assessment

This study used multiple methods — including a review of relevant literature, interviews with stakeholders, a community survey and secondary data analysis — to identify and estimate potential health impacts of the proposed changes to the Kansas Corporate Farming Law. Secondary data analysis was based on data provided by federal, state and local agencies (*Appendix E*, page 88).

#### *Literature Review*

The literature review identified 150 relevant research studies that were published in English with full text available through the Kansas State University Library System, using four approaches (*Appendix E*, page 88). First, Google Scholar was searched using keywords, such as jobs and industrial farming. Identified articles were reviewed and eliminated based on pre-determined exclusion criteria, such as being published before 1970, reporting research conducted outside the United States, or having poorly described or inadequate research methods. Exceptions to the latter two criteria were made when there was a limited number of identified articles within a topic area; the study was often cited in recent, related articles and the geographic location did not reduce the relevance of the information presented to a topic (e.g., the association between graduation rates and health). This strategy resulted in identification of 344 articles.

Second, a search of the Kansas State University Journal Catalog Database, using keywords such as livestock operations and industrial farming, identified 33 topic-specific journals. The table of contents for these journals were reviewed for relevant articles, as were the table of contents for four additional topic-specific journals identified through their publication of articles found in the Google Scholar search. This strategy resulted in 30 articles.

Third, Google's basic search engine was used to identify research reports, white papers, technical reports and similar high-quality, yet non-peer-reviewed materials. This strategy identified six additional articles. Fourth, members of the HIA Advisory Panel were asked to suggest articles. This strategy identified one article. In total, 381 articles were collected. Exclusion criteria eliminated 231.

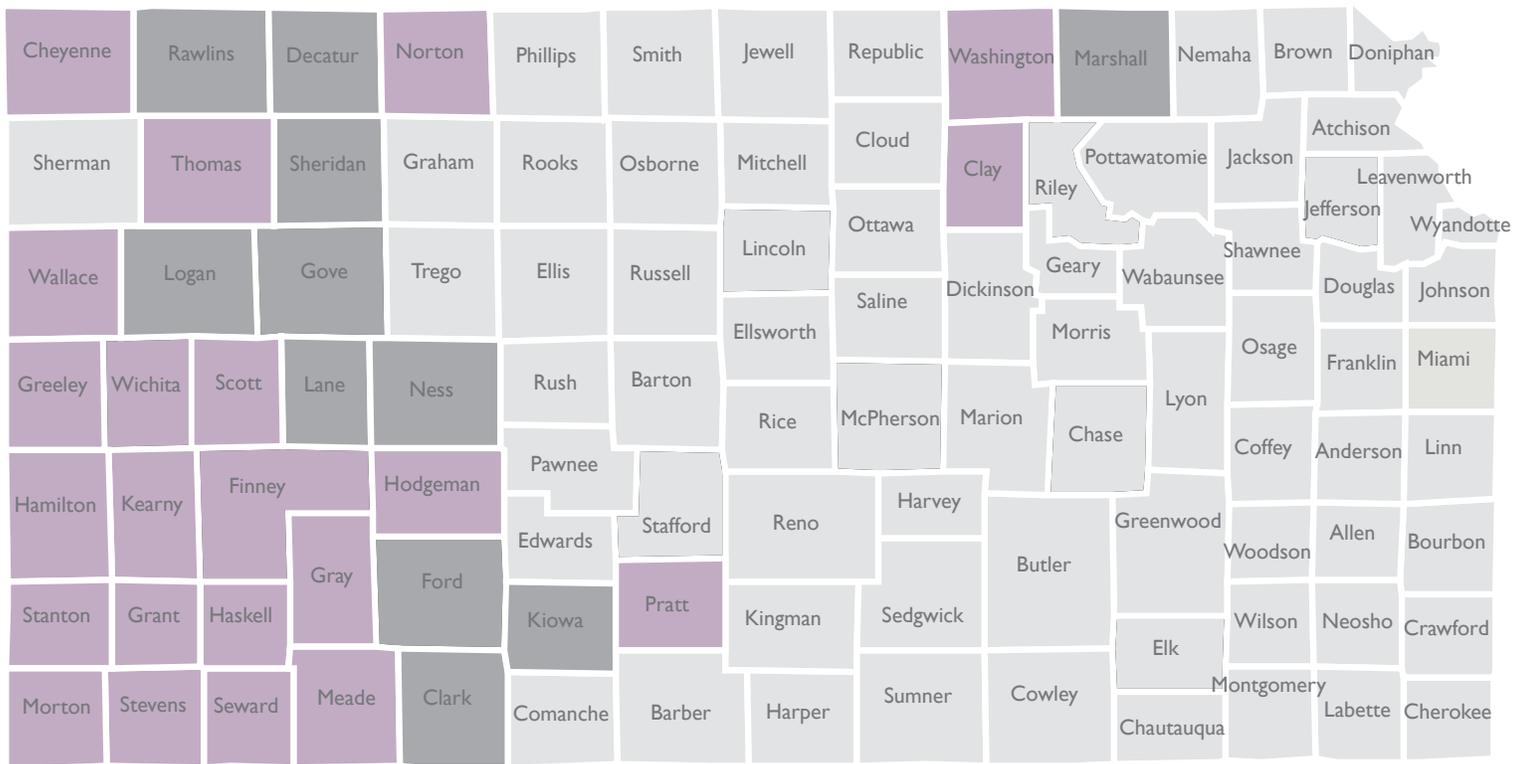
#### *Data Analysis*

Livestock count data from the U.S. Department of Agriculture's National Agricultural Statistics Service and the Kansas Department of Health and Environment, National Pollutant Discharge Elimination System permits were reviewed to identify currently operating (i.e., permits issued in 2012) swine facilities with more than 3,700 animal units, or dairy operations with more than 1,000 animal units. Twenty-two counties that had one or more large-scale swine or dairy operation were identified and selected as study counties. Twenty of the study counties were in the western third of the state. An additional eleven counties that were similar in terms of geography and climatic conditions, but lacking large swine or dairy facilities, were selected as control counties (*Figure 5*, page 17).

Data describing the current large-scale swine or dairy operations in the selected counties are presented in *Appendix H*, page 95. Because numerous large beef feedlots also operate in western Kansas, and the presence of these operations may also exert influence on some of the outcomes of interest in this study, data on beef feedlots were incorporated in some analytic models used in the assessment.

County-level means of indicators,<sup>61</sup> upstream<sup>62</sup> and downstream,<sup>63</sup> and health outcomes<sup>64</sup> measures were compared between study and control counties. Tests of correlation were used to evaluate possible relationships between indicators, upstream and downstream,

Figure 5. Swine/Dairy Operations: Study and Control Counties in Kansas.



Legend: ● Study ● Control

Source: KHI HIA Corporate Farming Project, 2015.

and health outcome measures. Correlations between changes in the number of swine and dairy animal units in each county and selected impact measures were also evaluated. Study and control county means on key indicators were compared using t-tests.<sup>65</sup> Where data were available, comparisons were also made between indicators in 2008 and 2012 to assess recent changes in dairy and swine operations, upstream, downstream and health outcome measures.

### Economic Analysis

The HIA study included an economic analysis of a select set of economic indicators important to the community and related to health, with analysis conducted by an economist from Kansas State University's Department of Agricultural Economics. For economic measures, single-year, cross-sectional and multiple-year panel models were used to assess county-level relationships between the presence or absence of large-scale dairy and swine operations and dependent variables of interest (property values, property taxes, employment, livestock and crop sales revenues, and per capita income).

For single-year models, a cross-section of 2011 data was regressed using ordinary, least-squares regression.<sup>66</sup> Where data were available for the 33 counties across multiple years (either 1969–2011 or 2004–2013), balanced-panel models were employed. Most panel analyses used fixed effects models,<sup>67</sup> although some random effects models<sup>68</sup> were used to avoid problems of correlation among the constant and various independent variables. Spatial autocorrelation models<sup>69</sup> were employed in some analyses to account for events in nearby counties.

### Key-Informant Interviews

To provide a deeper understanding of the context surrounding the presence of large-scale swine and dairy operations in Kansas, the HIA team conducted 12 semi-structured key-informant interviews with selected communities in three of the 22 counties chosen for data analysis (Greeley, Hamilton, and Wichita). Selected interviewees represented diverse sectors and viewpoints including farmers, business owners, educators, city and county government officials and health care providers, among others.

In order to achieve this diversification, the HIA team researched county government and business resources to compile a list of individuals. The team also utilized a “snowball” sampling technique in which community members and subject matter experts suggested important individuals or organizations to interview. For example, the HIA Advisory Panel members were asked to suggest individuals that have lived in communities with large-scale swine and dairy operations. The interviews were conducted via phone. Each interview was analyzed according to common themes and reported in the aggregate to maintain confidentiality. More details about this process and documents used for key-informant interviews are located in *Appendix D*, page 70.

*Survey*

To supplement information collected through the key-informant interviews, the HIA team conducted a survey of Kansas communities. The survey was created using Qualtrics, a web-based survey software, and included a combination of open and closed-ended questions. The survey was distributed via five partner organizations and the HIA Advisory Panel. Sixty-four individuals responded to the survey, which included “skip logic” to identify community members that had experience living in counties with large-scale swine and/or dairy operations. When respondents answered “no” to the qualifying question, “To your knowledge, is there currently either a large-scale swine operation or a large-scale dairy operation in your county?” they were taken to the end of the survey. Twenty-three respondents answered “yes” to the qualifying question,

and provided their perspectives on potential impacts of large-scale swine and dairy operations on a variety of areas including economic, environmental and health impacts. The responses of those 23 individuals were coded according to themes and reported in the aggregate to maintain confidentiality. The questionnaire for the survey is included in *Appendix D*, page 70.

It is important to note that although key-informant interviews and the survey informed the context of the HIA, none of the report’s findings were based on them.

**Step 4 – Recommendations**

Recommendations are a way to suggest action that can enhance positive health effects and mitigate potential negative health effects related to the proposed policy.

The recommendations were developed by the HIA team based on literature review, data and the HIA Advisory Panel’s perspectives, and were informed by the following criteria:

1. **Responsive to predicted impacts:**  
To what extent does the recommendation align with each finding?
2. **Specific and actionable:**  
Does the recommendation include specific steps, details and actionable measures?
3. **Feasible:**  
How realistic is it to implement this recommendation?
4. **Evidence-based and effective:**  
How much evidence is there to support the recommendation?

5. **Vulnerable populations:**  
Does it address the needs of vulnerable populations?

The final list includes 20 recommendations. Using the HIA standards for recommendations, the HIA Advisory Panel provided feedback on whether recommendations were (1) responsive to predicted impacts; (2) feasible; and (3) addressed vulnerable populations.

**Step 5 – Reporting**

Reporting includes the distribution of findings to decision-makers and others involved with the HIA.

The HIA results were summarized in this report, which is designed primarily for legislators and stakeholders in various sectors including agriculture (e.g., Kansas Rural Center, Kansas Farm Bureau, Kansas Department of Agriculture, and Kansas Pork Association); business (e.g., banks and chambers of commerce), health care providers (e.g., local health departments and hospitals) and others.

The report’s findings and recommendations will be shared in various ways (e.g., presentations, in-person discussions, KHI website, printed materials), with the HIA Advisory Panel, members of relevant legislative committees, attendees of the legislative hearings, participants of key-informant interviews and Kansas communities.

## Step 6 — Monitoring

The HIA team developed a monitoring plan in order to measure the outcomes of the policy decision and track the potential effect(s) on health and/or the determinants of health (i.e., employment, etc.). The plan (*Appendix G*, page 94) includes measures which could be tracked if the proposed legislation passes. Additionally, the plan suggests agencies that could monitor changes and suggest appropriate actions to state and local policymakers in order to maximize potential positive and mitigate potential negative health effects.

### Limitations

This study has several limitations which should be considered when interpreting the findings. First, the scope of this assessment was limited to the potential health impacts of an increased number of large-scale swine and dairy operations in Kansas. The scope of the proposed legislation is much broader, and may potentially impact health through other pathways not considered in this assessment.

The literature review portion of this assessment is also subject to limitations. For several of the identified research questions, relevant peer-reviewed studies were sparse or non-existent. Additionally, most of the studies included in the literature review were not specific to Kansas, and their findings may not be fully applicable to a Kansas setting due to differences in state or local policy and regulatory environments, or other location-specific characteristics. There may also be additional published studies that were missing from this analysis.

Finally, it is widely acknowledged that peer-reviewed literature is subject to publication bias, with studies finding significant results far more likely to be published than those that fail to identify significant findings. As such, a review of published literature may not be representative of the results of an overall body of research.

Community engagement is a core component of an HIA. While this HIA offered key stakeholders (both proponents and opponents of the proposed legislation) an opportunity to participate in the HIA Advisory Panel, representatives of some key organizations declined and their knowledge and perspectives are, therefore,

absent in the analysis. Insights and experiences of individuals from communities deemed most likely affected by large-scale swine or dairy operations were gathered through a small convenience sample<sup>70</sup> using either structured interviews or surveys, but it is likely that some sectors of the communities have not been adequately represented in this process.

The data analysis portion of this assessment is subject to several limitations. First, obtaining complete data describing all large-scale swine and dairy operations in Kansas was challenging. Agricultural Census data collected by the U.S. Department of Agriculture are frequently suppressed at the county level to protect proprietary information and do not identify specific farms. Other data sources (the U.S. Environmental Protection Agency and the Kansas Department of Health and Environment) only include information about facilities that are subject to mandatory permitting or reporting, and thus may not be all-inclusive or publicly available. Second, all analysis was based upon county-level data due to limitations of available data. For many of the measures included in the analysis, such as agricultural employment and property tax values, it was not possible to separate the possible impact of multiple agricultural sectors such as crop production, various types of livestock operations, or related agribusiness entities. Also, due to a lack of reliable information on dates when large-scale livestock operations were first established or underwent significant expansions, it is possible that the timeframes included in the analysis were not adequate to detect changes that might have occurred either earlier or later than the time periods examined.

For many of the measures included in this assessment, the impact of a large-scale swine or dairy facility is likely to be greatest for individuals and communities located in close proximity to the facility and not uniformly distributed across a county. Conversely, some impacts may potentially be more regional in nature and not confined within the somewhat artificial constraints of county boundary lines. Analysis of possible changes or relationships between variables at only the county level, rather than at either more local or individual levels, is likely to mask relationships that could exist within counties or falsely identify associations based on population averages.

Population-level observational studies such as this one (sometimes referred to as ecological studies) are useful for exploring patterns or generating hypotheses, but are limited in their ability to fully explore associations or prove causal relationships. Additionally, many of the measures (e.g., physically or mentally unhealthy days, adult obesity, age-adjusted rate of hospital admission for respiratory illnesses) included in this analysis would likely be influenced by many factors in addition to the presence, absence or expansion of large-scale swine or dairy operations within the county.

Comparison of these measures across counties or between groups of counties and examination of patterns of correlation between various indicators may be useful in identification of possible relationships. However, it does not adequately control for other factors and cannot conclusively identify differences that are caused by the presence or absence of large-swine or dairy operations.

According to the 2013 U.S. Census Bureau, Kansas has nearly three million residents.<sup>71</sup> Most of the population identifies as non-Hispanic White (greater than 77 percent).<sup>72</sup> Hispanics are the largest minority with about 11 percent of Kansans identifying as Hispanic or Latino, followed by around six percent identifying as Black.<sup>73</sup> Slightly less than 90 percent of Kansas adults age 25 and older have a high school degree or higher, and approximately 30 percent have a bachelor's degree or higher. Kansas is performing slightly better than the nation in these measures, as the national averages are at 86 and 29 percent, respectively.<sup>74</sup> Fourteen percent of the Kansas population lives in poverty compared to approximately 16 percent nationwide. Based on 2013 data, the median annual household income in Kansas is \$51,332, slightly lower than the national median household income of \$53,046.<sup>75</sup>

Of Kansas' 105 counties, over half are designated as rural<sup>76</sup> or frontier<sup>77</sup> and only 16 have urban<sup>78</sup> or semi-urban<sup>79</sup> status.<sup>80</sup> Currently, Kansas ranks near the middle of the country (27th) in terms of overall health, according to the 2014 America's Health Rankings, presented by the United Health Foundation.<sup>81</sup> In terms of children in poverty, cardiovascular deaths, diabetes, infant mortality and premature death, Kansas ranks near the middle.<sup>82</sup> Additionally, Kansas ranks 35th in terms of primary care physician-to-population ratio in Kansas.

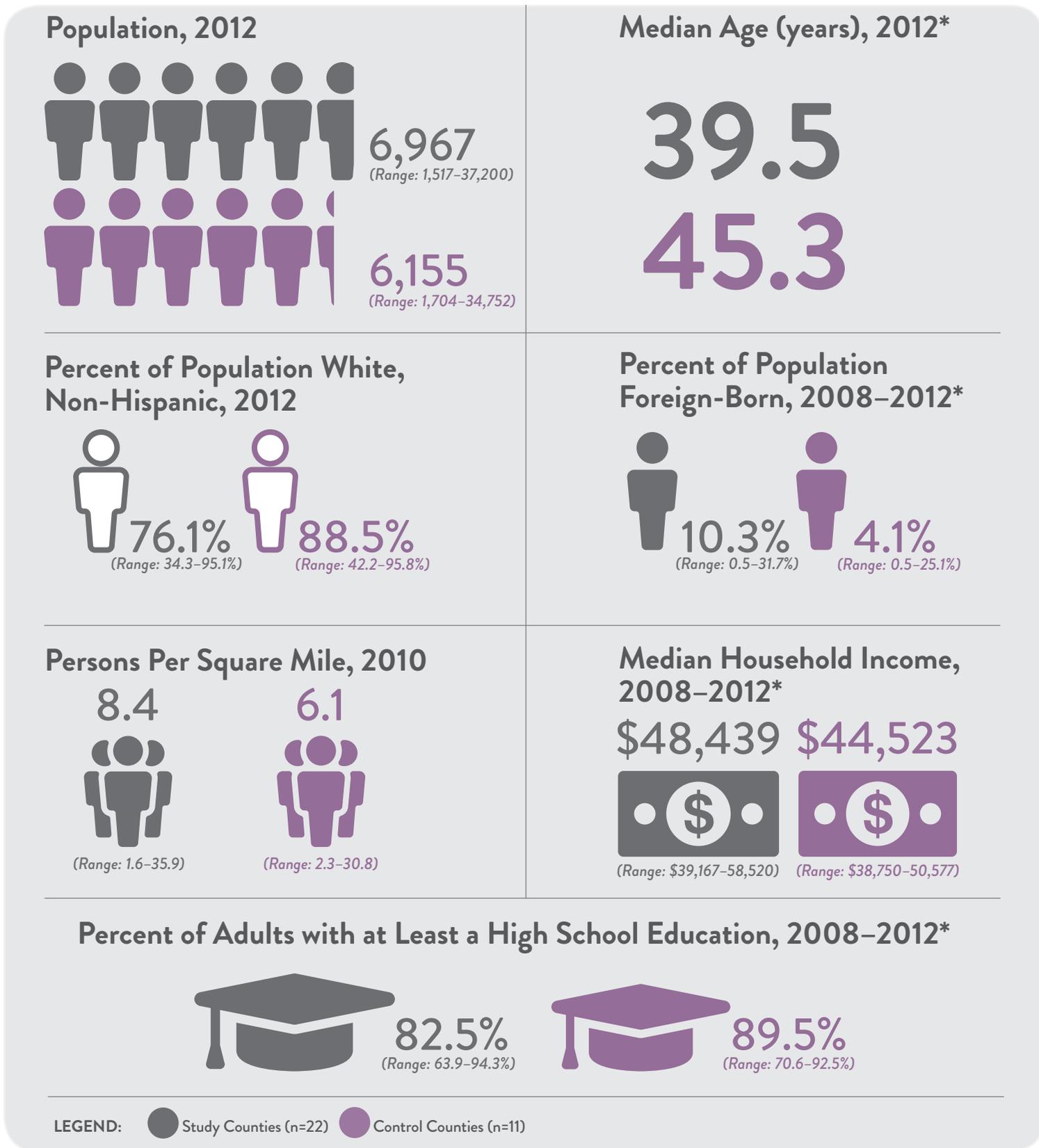
## Picture of Study and Control Counties

Current Kansas demographic and geographic conditions suggest that if changes to the Kansas Corporate Farming Law resulted in expansion of large-scale swine and dairy operations in the state, the growth would occur primarily in the southwestern counties where climate conditions are favorable and sparse populations allow opportunity for adequate separation of livestock operations from inhabited areas. For this reason, the study analysis has focused primarily on this region. However, the growth of these operations could occur in any part of the state, as Senate Bill 191 would have allowed any agribusiness to operate anywhere in the state.

In order to assess potential health effects, the HIA team selected twenty-two counties where large-scale swine or dairy facilities were currently operating (study counties) and eleven counties that were similar in terms of geographic and demographic characteristics but without large-swine or dairy facilities (control counties). The majority of the study counties were located in the western third of the state.

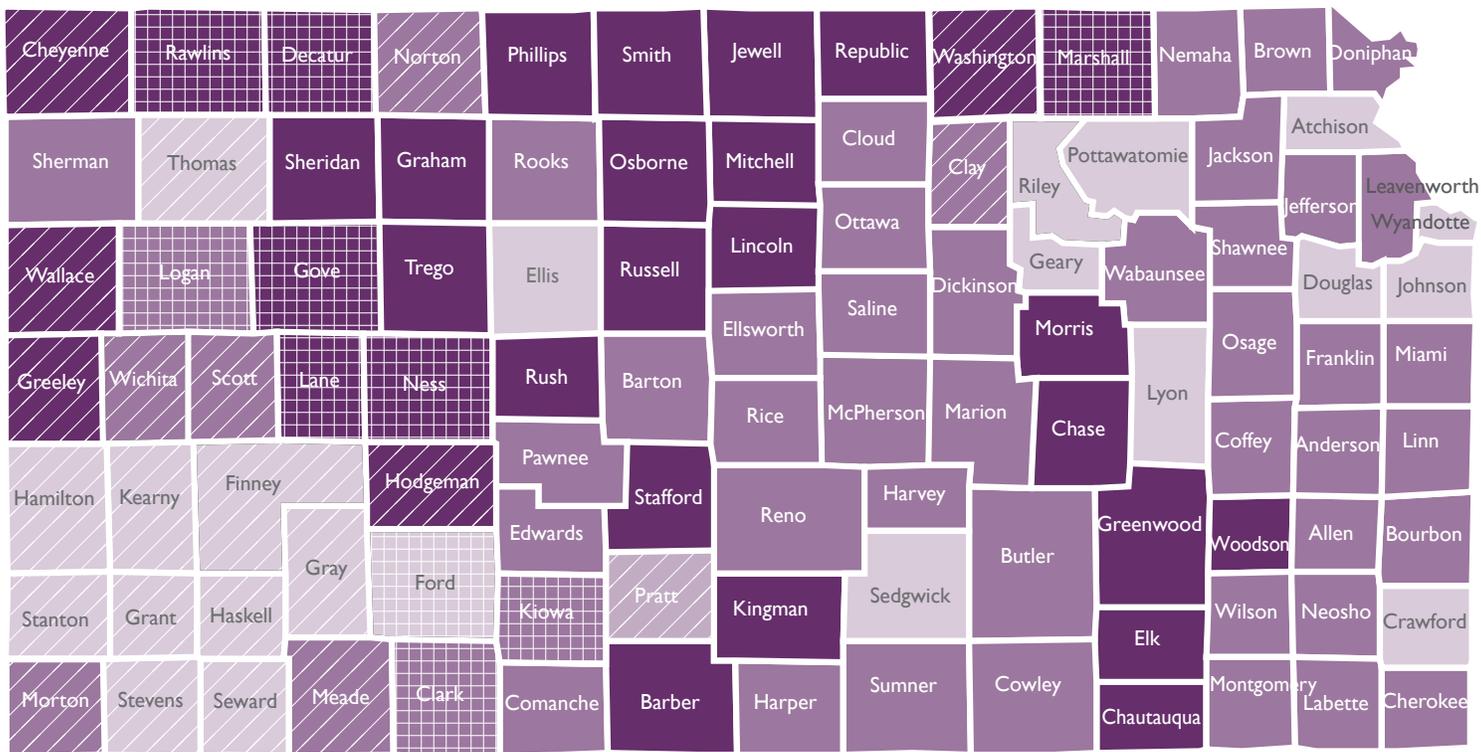
Demographic characteristics of the study and control counties are summarized in *Figure 6*, page 22. Populations of study counties were somewhat younger and more ethnically diverse than the control counties (*Figures 7, 8, 9, 10*, pages 23–24). Study counties had lower educational attainment, as measured by the percent of the adult population with at least a high school diploma, but higher median household incomes than control counties.

Figure 6. Demographic Characteristic Averages, Study versus Control Counties.



Note: \* Difference between study and control counties is statistically significant,  $p < 0.05$ . Information included in this table represents the most recent available data for each indicator, at the time of the HIA report. For each indicator, averages of study and control counties were calculated.  
 Source: U.S. Census Bureau, Quickfacts, retrieved 2014.

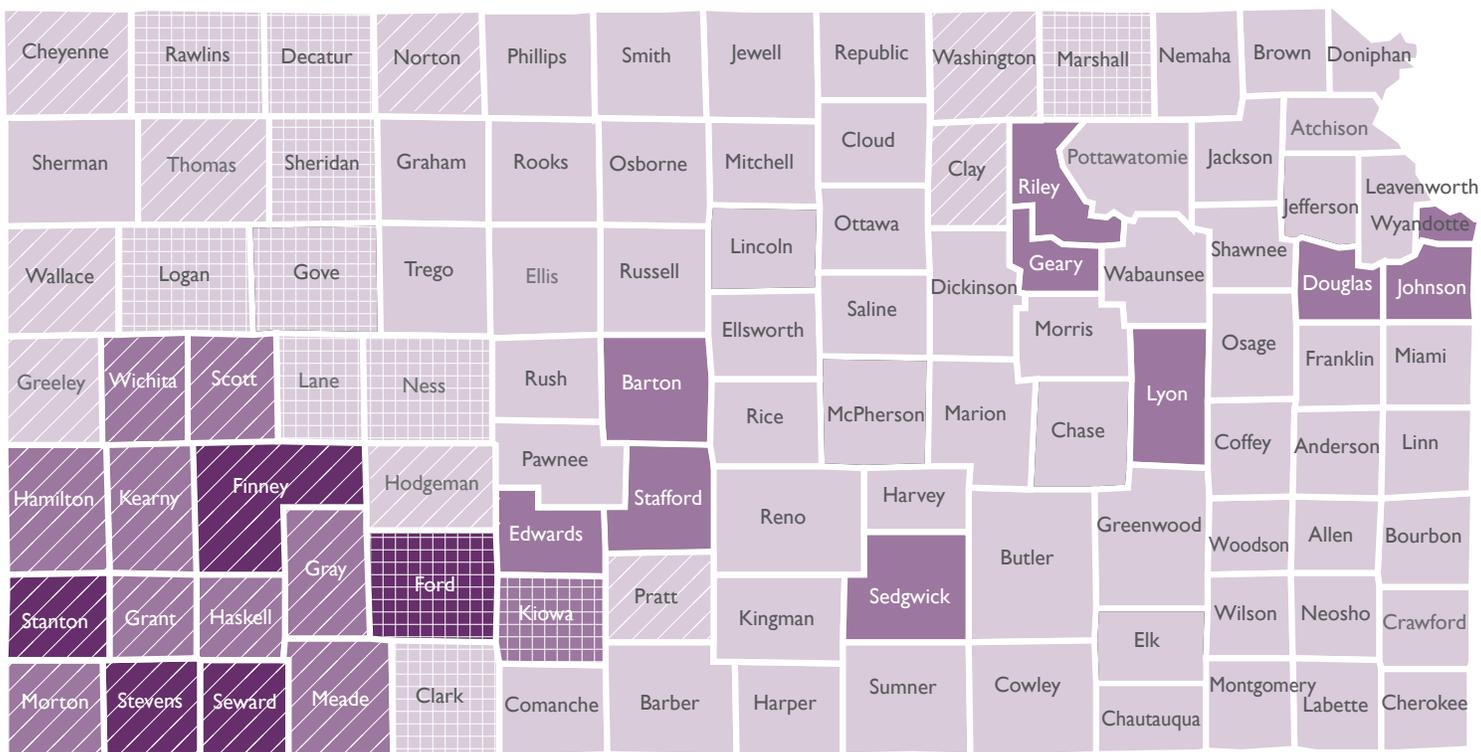
Figure 7. Median Age (in years), by County, 2008–2012.



Legend: Study Control Median Age 24.3–36.7 36.8–44.4 44.5–51.7

Source: U.S. Census Bureau, Quickfacts, retrieved 2014.

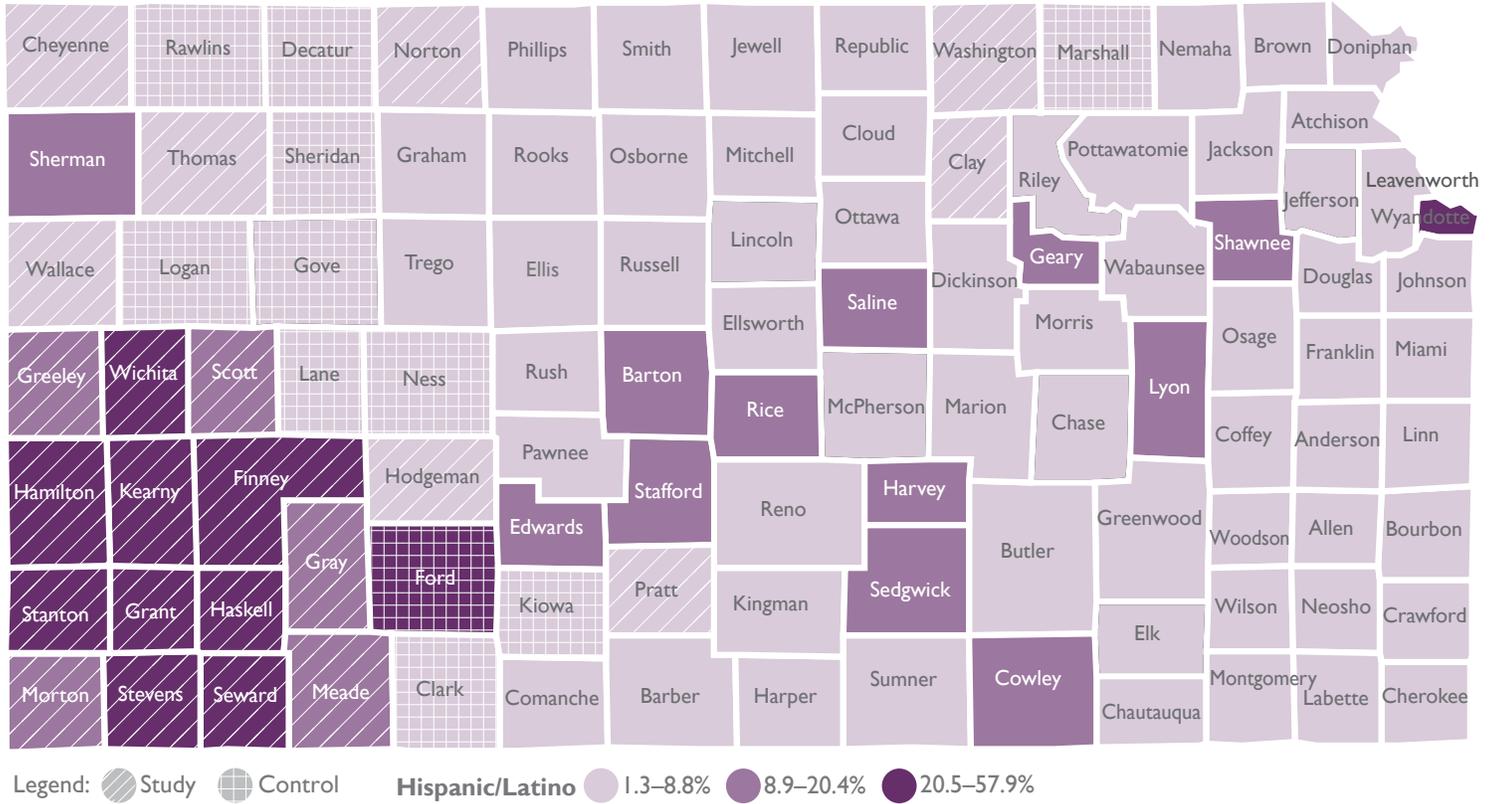
Figure 8. Percent of Population that is Foreign-Born, 2008–2012.



Legend: Study Control Foreign-Born 0.1–5.5% 5.6–15.7% 15.8–31.7%

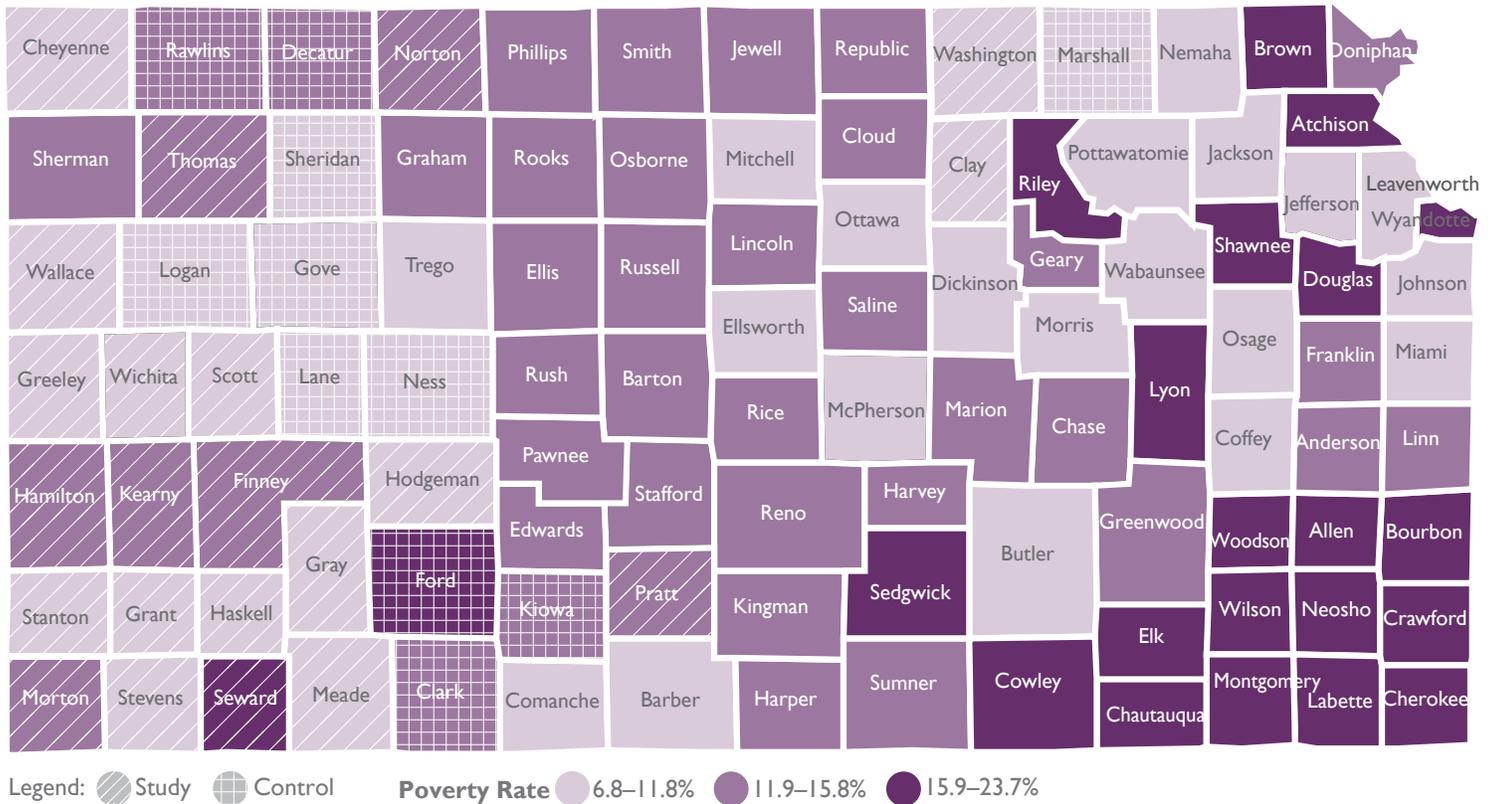
Source: U.S. Census Bureau, Quickfacts, retrieved 2014.

Figure 9. Hispanic/Latino as Percent of Total Population, 2012.



Source: U.S. Census Bureau, Quickfacts, retrieved 2014.

Figure 10. Poverty Rate, All Ages, 2012.

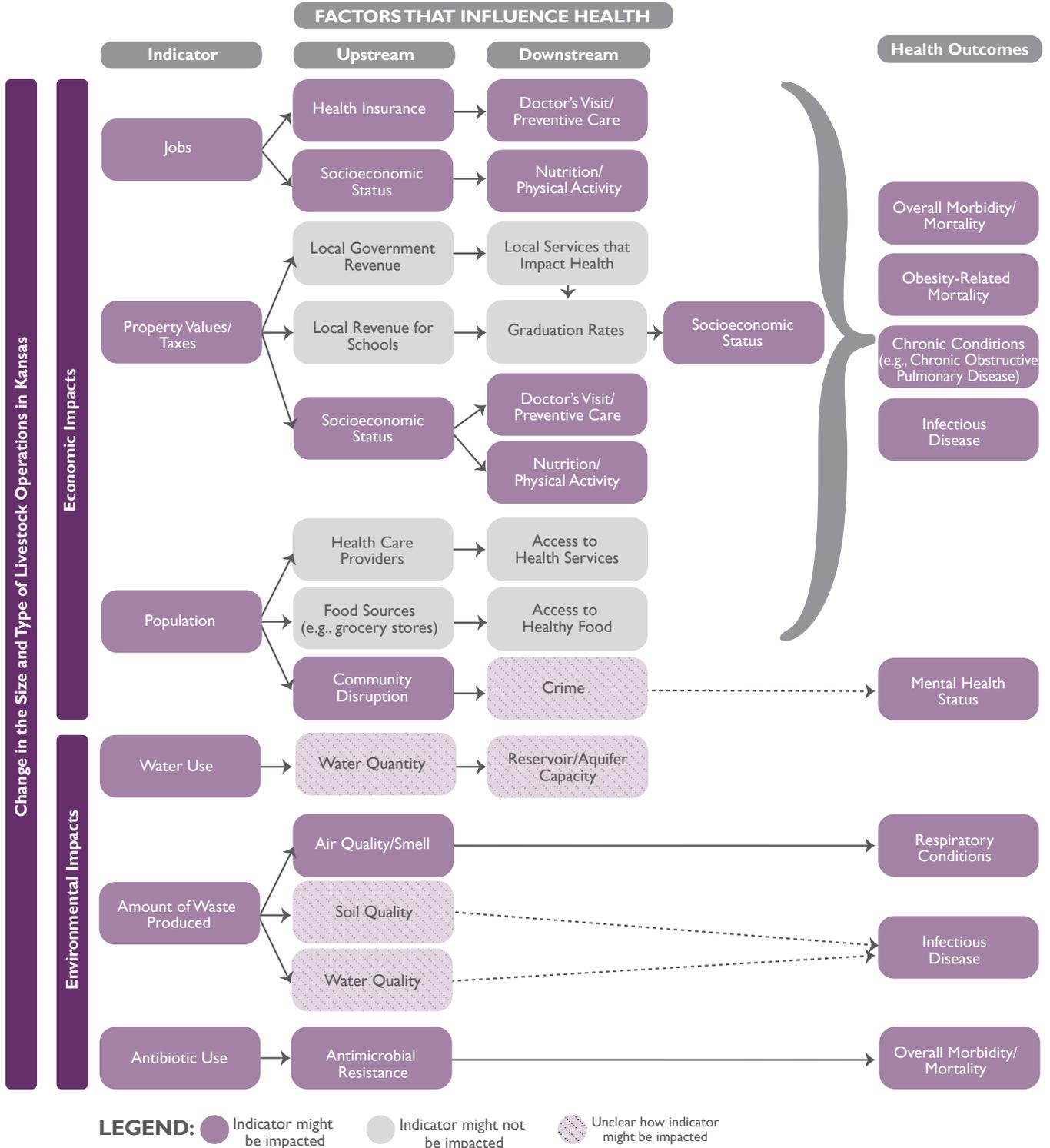


Source: U.S. Census Bureau, Quickfacts, retrieved 2014.

The HIA's pathway diagram (Figure 11) provides the visual links between the proposed legislation and the potential resulting health effects. The diagram illustrates indicators, upstream and downstream impacts and health outcomes.

An "indicator" is a direct change that may happen due to the legislation. These indicators may then lead to impacts that can be considered either more "upstream" or "downstream," depending on how directly they are linked to the ultimate health outcome. Upstream factors are likely to be further removed from health outcomes than downstream factors.

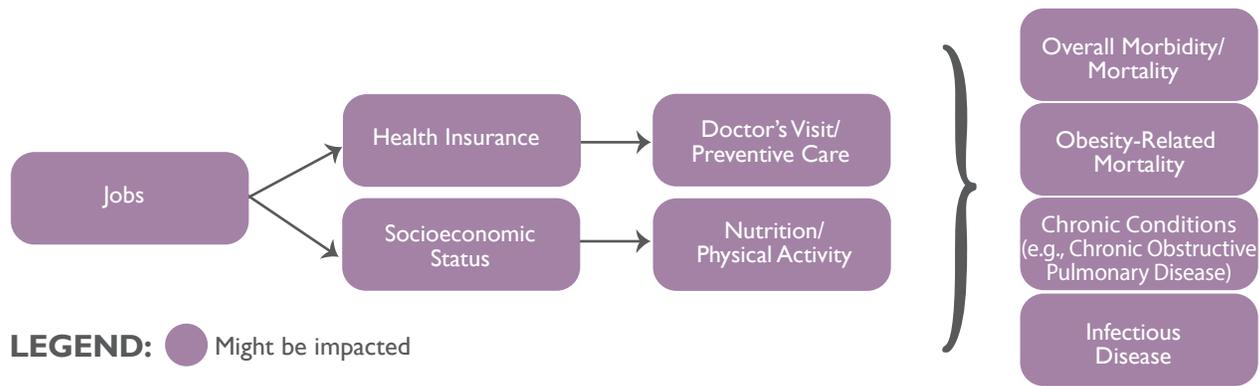
Figure 11. Pathway Diagram: How Changes to the Kansas Corporate Farming Law May Affect Health.



Source: KHI HIA Corporate Farming Project, 2015.



Figure 12. Pathway Diagram: How Changes in the Number of Large-Scale Swine and Dairy Operations May Affect Jobs.



Source: KHI HIA Corporate Farming Project, 2015.

### Key Findings

- An increase in number of large-scale swine and/or dairy operations could have some positive impact on total employment. However, no impact is projected on local unemployment rates or county-level rates of health insurance.
- Swine operations are likely to have a stronger positive impact on total employment than dairy operations.
- It is unclear the extent to which large-scale swine and/or dairy operations would provide health insurance coverage and livable wages for their employees.
- Positive health effects associated with employment at large-scale swine or dairy operations might only be realized by some categories of employees (e.g., managers).

### Recommendations

*Livestock operations could consider:*

- Hiring locally when feasible.
- Partnering with local schools to create workforce development programs and educational opportunities.
- Providing health insurance to employees.\*
- Providing health insurance cost-sharing subsidies to employees.\*
- Providing livable wages.

Note: \*An asterisk notes recommendations that were deemed a priority by the HIA Advisory Panel members in terms of feasibility, alignment with findings and whether or not they addressed vulnerable populations.

### Jobs and Health

Overall, people who have access to jobs enjoy better health and have slower declines in health status over time. Tangible (e.g., health insurance, income) and intangible (e.g., sense of meaning) benefits of employment may have positive impacts on health. For example, having health insurance may increase access to health services, which in turn may affect a person's health and well-being.<sup>83</sup> Regular and reliable access to health services also can prevent disease and disability, detect and treat health conditions, increase quality of life, reduce likelihood of premature death and increase life expectancy.<sup>84</sup> In terms of income, people with higher

incomes are more likely to have longer life expectancies and healthier body mass index (BMI).<sup>85</sup> Additionally, there is a strong positive relationship between a person's socioeconomic status (SES)<sup>86</sup> and their nutrition, physical activity, and access to health care.

The extent of positive or negative health effects associated with employment at large-scale swine and dairy operations depends largely on multiple features of the physical (e.g., exposure to dust) and economic (e.g., livable wages, health insurance) job environment.

### What We Learned From Literature

Published studies showed mixed results as to whether adding or expanding dairy and swine operations would have a significant impact on employment. A comprehensive literature review on the impacts of industrialized farming found that confined animal feeding operations (CAFOs) lead to higher unemployment rates and generated lower total community employment.<sup>87</sup> An Idaho study found that increasing the number of small farms led to greater regional employment.<sup>88</sup> In North Carolina, the 25 counties with the highest increase in swine production were compared to the state as a whole, and it was found that the swine operation counties had slower job growth (14 percent versus 24 percent).<sup>89</sup> Large-scale livestock operations may also impair job growth if they add jobs that are low-paid and low-skilled, as domination of the job market by such positions may prevent economic development and the introduction of higher-skilled job sectors.<sup>90</sup>

On the other hand, a study that looked at local economies across 18 states found that swine production had a strong positive correlation with hired farm labor and was positively correlated with total employment, with 1,000 additional swine being correlated to roughly two additional jobs.<sup>91</sup> The same researchers studied data from 2,015 counties across the United States and found that an

additional 1,000 swine at large-scale swine operations corresponded to an additional 0.96 jobs per county: 0.57 more jobs at large-scale swine operations, 0.04 fewer jobs at small swine operations, 0.16 fewer non-swine farm jobs, and 0.59 more non-farm industry jobs.<sup>92</sup> In a study conducted in southwest Kansas, it was found that large-scale dairy operations added as many as 700 people to local payrolls.<sup>93</sup>

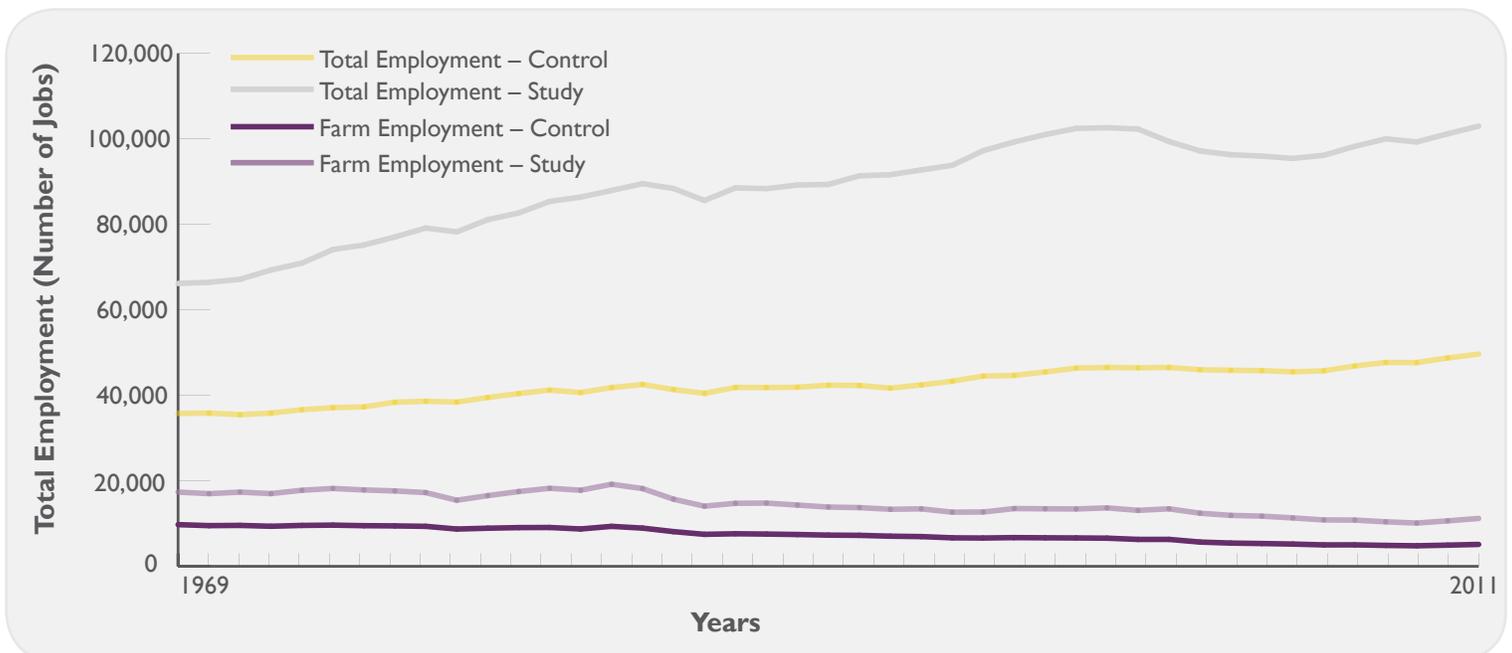
A majority of the reviewed studies included mixed perceptions of the quality of jobs in large-scale livestock production. Several studies suggested that large-scale operations provide jobs that are less than full-time and offer minimal benefits.

### What We Learned From Data

#### Livestock operations and jobs

Results of the data analysis were mixed. Cross-sectional regression models<sup>94</sup> found a significant positive association between the number of large-scale swine facilities in a county and total employment (*Figure 13*), but no significant relationship with agricultural employment. The numbers of dairies and beef feedlots per county were not significantly associated with either total or agricultural employment.

Figure 13. Trends in Total Employment and Farm Employment: Study vs. Control Counties, 1969–2011.



Source: Dr. David Lambert, Agricultural Economics, Kansas State University, “Local Economic Effects of Proposed Changes in the Kansas Corporate Farming Laws.” Report to KHI, June 2014.

Using data from the USDA Agricultural Census (2007 and 2012), increases in the number of dairy animal units in a county were significantly correlated with an increase in the number of hired farm workers ( $r=0.4543$ ,  $p = 0.0079$ ). There was not a significant correlation between increases in the number of swine animal units and the number of hired workers. Increases in the number of hired farm workers were inversely correlated with the average wage for hired farm labor ( $r=-0.5087$ ,  $p=0.0025$ ), meaning that an increase in hired farm workers was associated with a decrease in the average wage.

The average county-level rates of total unemployment in the 22 study counties with large-scale swine or dairy operations increased by 14 percent between 2008 and 2012, compared to an average three percent increase in the 11 control counties ( $p=0.0271$ ). Between 2007 and 2012, the average number of hired farm workers increased by 39 employees in study counties, while hired farm workers declined by an average of 27.5 employees in control counties ( $p=0.055$ ).

### **Jobs and health insurance**

No specific data were available on health insurance options offered to employees of large-scale livestock operations. Data from the national 2013 Medical Expenditure Panel Survey showed that 61.3 percent of Kansas workers who were employed in agriculture, fishing, forestry or construction had access to employer-sponsored insurance, compared to 86 percent of all workers. Correlation analysis did not find statistically significant associations between changes in county-level unemployment rates or numbers of hired farm workers with uninsurance rates for the population age 65 years and under.

### **Health insurance and preventive care**

Data from the 2012 Kansas Behavioral Risk Factor Surveillance System (BRFSS) showed that adults who have health insurance coverage are more likely than their uninsured counterparts to have a usual source of medical care, better general health status, better mental health status, lower rates of obesity, and are more likely to be physically active and have obtained a flu shot in the past year. Additionally, among 33 counties included in the analysis, higher county-level rates of insurance coverage were significantly associated with higher proportions of pregnant women receiving adequate prenatal care ( $r=0.4426$ ,  $p=0.01$ ).

Access to health care providers is another important aspect of preventive care. In 2008, the average ratio of primary care providers per 100,000 population was lower in the 22 study counties (47.5/100,000) than in the 11 control counties (75/100,000) ( $p=0.05$ ). For reference, counties with fewer than 28.6 primary care providers per 100,000 people may be designated as “primary care professional shortage areas” by the U.S. Health and Human Services Health Resources and Services Administration.

### **Preventive care and health status**

At the county level, there were no significant differences in age-adjusted mortality rates (in either 2008 or 2012), general health status, mental health status, or obesity rates between the 22 study and 11 control counties. Years of potential life lost were slightly fewer in the 22 study counties (marginally significant,  $p=0.0505$ ).

### **Employment and income/socioeconomic status**

At the county level, increases (between 2007 and 2012) in the number of hired farm workers were negatively associated with average wages for hired farm labor ( $r=-0.5087$ ,  $p=0.0025$ ). It should be noted that these data reflect all hired farm workers, not just those working at large livestock operations.

Both the average unemployment rates and average household incomes were higher in the 22 study counties, compared to the control group, although unemployment rates were highly variable within groups.

### **Socioeconomic status and nutrition, physical activity, overall morbidity or mortality**

Adults residing in the 22 study counties were more likely to be physically active during leisure time than those in the control counties ( $p=0.0176$ ), and had fewer years of potential life lost before age 75 ( $p=0.05$ ). There were no significant differences between the two groups of counties in terms of adult obesity rates. Income was not found to be associated with county-level rates of obesity or physical activity among adults. No county-level data related to nutritional behaviors were available.

## What We Learned From Stakeholders

### Jobs

#### Interview Results

Interviewees stated that swine and dairy operations brought jobs to their county and that it was a positive development overall. However, some interviewees stated that some had employed individuals living outside counties where the operations exist, or that the operations often brought in immigrant help. Interviewees mostly agreed that more families moving into the county had been a positive thing, but some stated that other community members felt differently.

*“There are more jobs available than workers to do them. The swine operation had to bring in outside employees to fill those positions.”*

– Community Member

*“The operation has been a benefit to the county in terms of jobs. The swine industry has high turnover, and there are jobs available if people are willing to do that type of work.”*

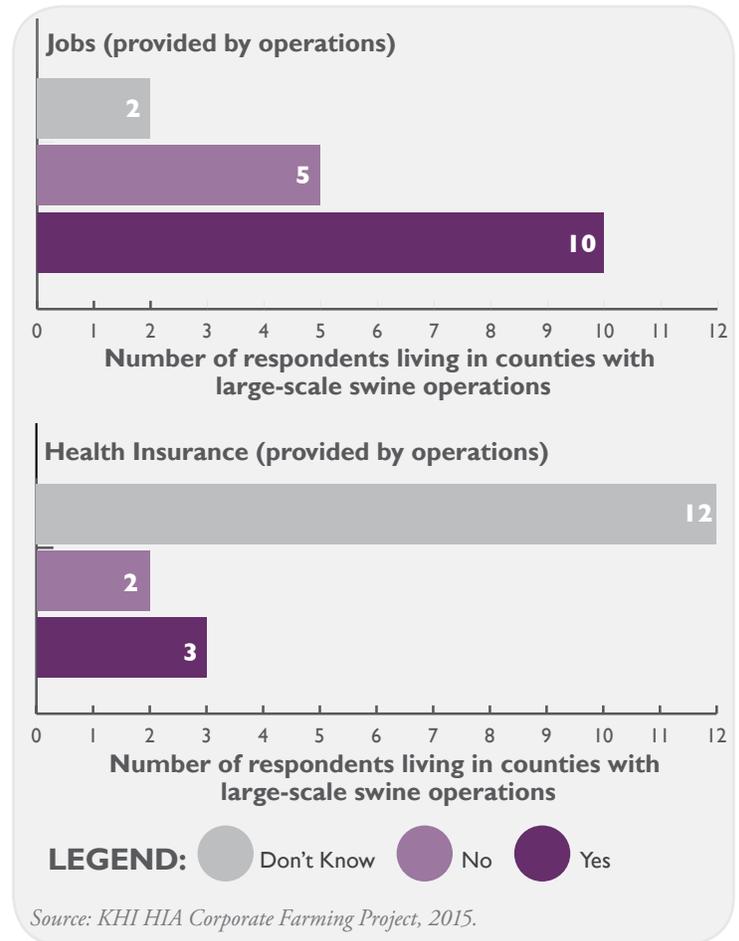
– Community Member

#### Survey Results

Most survey respondents also agreed that large-scale swine operations bring jobs to the community, although they suggested these operations resulted in limited job creation (Figure 14). For instance, one respondent stated that swine operations are “automated which keeps employment minimal.” Others commented on the nature of the jobs, saying they are mostly low-wage, filled by migrant workers, and that the operations experience high turnover rates.

Respondents that lived in counties with large-scale dairies generally did not know if jobs had been impacted. Five respondents indicated they had been impacted in some way, although they did not indicate if this impact was positive or negative. One respondent stated, that like swine operations, dairy operations were mostly automated and didn’t require many employees.

Figure 14. Survey Respondents’ Feelings About Impacts of Large-Scale Swine Operations on Jobs and Health Insurance, 2014 (n=17).



### Health Insurance

#### Interview Results

Interviewees were largely unsure about whether or not large-scale swine and dairy operations provided health insurance to employees. While some interviewees stated that health insurance was available for management positions, interviewees did not believe these operations provided health insurance for general workers. For example, a pharmacist stated that he mostly saw operation employees that did not have health insurance. Moreover, these employees usually filled prescriptions associated with work-related

*“I remember working for someone who worked for a swine operation and he said ‘I went to work there because I got more money to take care of pigs than I did caring for people.’”*

– Community Member

injuries. In some cases, operations paid for these prescriptions due to the lack of health insurance for employees.

### **Survey Results**

Most respondents living in counties with large-scale swine operations did not know whether the operations provided health insurance (*Figure 14*, page 30). A few respondents did not believe the operations provided health insurance. Other respondents were aware that the operations offered health insurance but did not perceive it to be adequate. For example, one respondent stated that employees “rarely use it and usually pay cash for health care services.” Respondents living in counties with large-scale dairies were also unsure whether health insurance was provided, and did not offer any additional comments related to this issue.

### *Income/Wages*

#### **Interview Results**

Interviewees believed that employees were paid at least minimum wage for most jobs at swine and dairy operations. They cited ads in the newspaper for positions when referencing wages paid. Respondents also stated that jobs provided by the operations provided wages to individuals to help them take care of their families and to buy goods in town.

#### **Survey Results**

The survey did not include specific questions regarding wages provided by these operations. However, one survey respondent living in a county with a large-scale swine operation thought that the employees’ wages were low.

### *Preventive Care*

#### **Interview Results**

Overall, interviewees suggested that swine or dairy operation employees are more likely to utilize medical treatment rather than preventive services. Public health practitioners stated that they have provided care to some swine or dairy operation employees that did not have health insurance. They mentioned the care was provided for treating injuries or infections rather than preventive care.

#### **Survey Results**

Additionally, one survey respondent indicated that employees utilize walk-in clinics for their health care services and likely pay cash.

### **Conclusion: Health Impacts for Kansas**

The literature review found mixed results as to whether or not adding or expanding large-scale swine or dairy operations would have an impact on employment. It also suggests that these operations provide jobs that are less than full-time and offer minimum benefits. The data analysis found that there was a statistically significant positive association between large-scale swine operations and total employment. However, similar results were not observed for dairy or beef. Additionally, there was no statistical association between county agricultural employment and the number of large-scale dairy or swine operations. Stakeholders (interviewees and survey respondents) agreed that swine and dairy operations bring jobs to the community, but noted that these jobs usually employ residents from other counties as well as immigrant workers.

Based on literature review and data analysis, an increase in number of large-scale swine operations could possibly have some positive effect on total employment (*Figure 13*, page 28). However, no specific impact is projected on local unemployment rates or county-level rates of health insurance coverage.

Some positive health effects could result from a modest increase in jobs if new or expanding swine or dairy operations provide jobs that pay livable wages and offer affordable health insurance benefits. However, no data documenting the number of jobs or actual wages and benefits offered by existing livestock operations were available to this study, so it is unclear how many, if any, employees might benefit.

The negative correlation between the number of hired farm workers and average wages for hired farm workers suggest that the new jobs offered lower wages, but it is not possible to determine from available data how many of the jobs were associated with livestock versus other farming activities. Similarly, larger increases

in unemployment in counties where large-scale swine or dairy farms operate might suggest higher job turnover, but cannot be attributed conclusively to the livestock operations. As a result, positive health effects associated with employment would likely be realized only by some categories of employees (e.g., managers) (Figure 15).

In general, increased income and access to health insurance may improve access to preventive care and healthy foods. Regular

and reliable access to health services can also prevent disease and disability, increase disease detection, treatment, and quality of life, reduce the likelihood of premature death, and increase life expectancy.<sup>95</sup> Further, people with higher incomes are more likely to have longer life expectancies and healthier body mass index (BMI).<sup>96</sup> The extent of these positive health effects would also depend on availability of primary care providers, access to healthy foods, income and personal behaviors.

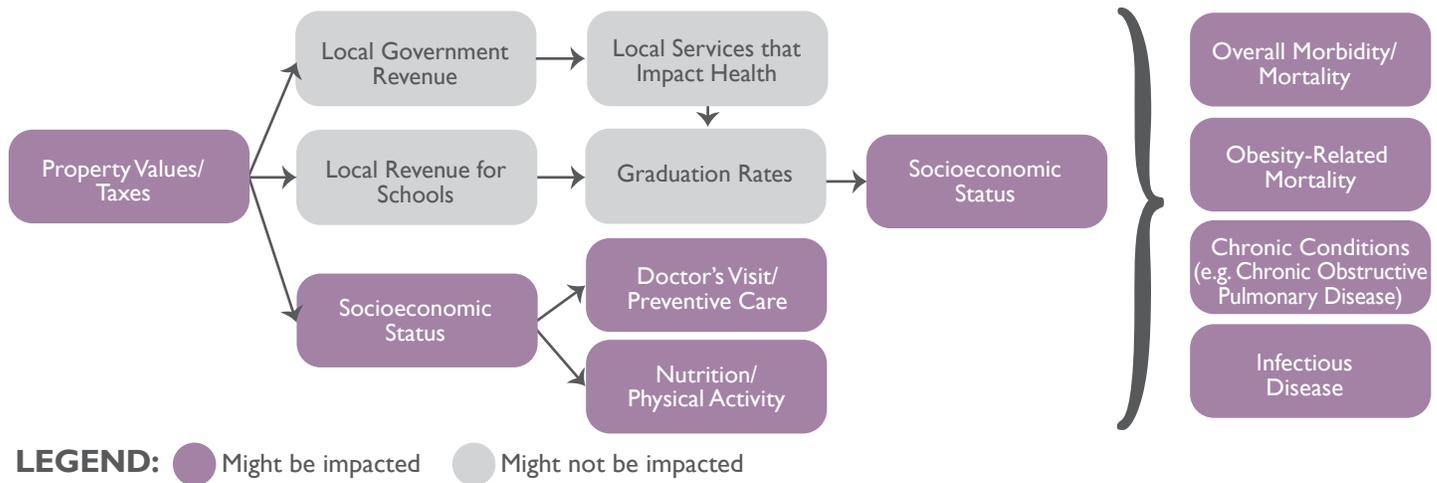
Figure 15. Impacts of an Increase in the Number of Large-Scale Swine and Dairy Operations on Jobs and Associated Health Outcomes.

Health Factor or Outcome	Expected Effect Based on Literature	Expected Effect Based on Data	Stakeholder Projections	Based on Literature and Data				
				Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
<b>General Population</b>								
Jobs	Mixed	Mixed	Increase	Mixed	Medium	Possible	Employees, their families and some businesses in the community	**
Unemployment	Mixed	Increase	N/A	None	None	Unlikely	N/A	**
<b>Employees of Swine and Dairy Operations</b>								
Health Insurance	Mixed	N/A	Mixed	Positive	Low	Possible	Some employees	*
Preventive Care	Mixed	N/A	Mixed	Positive	Low	Possible		*
Socioeconomic Status	Mixed	N/A	Increase	Mixed	Low	Possible		*

Note: See Legend, Appendix B, page 64.

Source: KHI HIA Corporate Farming Project, 2015.

Figure 16. Pathway Diagram: How Changes in the Number of Large-Scale Swine and Dairy Operations May Affect Property Values/Taxes and Associated Health Outcomes.



Source: KHI HIA Corporate Farming Project, 2015.

Key Findings

- An increase in the number of large-scale swine or dairy operations might have minimal-to-no impact on county-level real property (e.g., commercial, agricultural and residential) values/taxes.
- Residential properties that are downwind, close to large livestock operations (less than three miles) and higher-priced would be more likely to experience a decline in property values. Owners of these properties might experience increased risk of mortality and morbidity associated with decline in their socioeconomic status related to changes in property values.
- The level of change in residential property values also would depend on the management practices of a livestock operation. Swine operations are likely to have a stronger impact on residential property values than dairy operations.
- An increase in the number of large-scale swine or dairy operations likely would have no impact on school funding due to a projected little-to-no impact on property values/taxes and the Kansas “equalization” school funding formula.
- An increase in the number of large-scale swine or dairy operations would likely have no impact on local government revenue due to a projected little-to-no impact on property values/taxes.

Recommendations

Kansas Legislature could consider:

- Increasing the minimum separation distance from dairy operations with 1,000<sup>17</sup> animal unit capacity to any habitable structure in existence to three miles (from the current 0.76 miles). Increasing the minimum separation distance from swine operations with 3,725 animal unit capacity to any habitable structure in existence to three miles (from the current 0.95 miles).\*
- Developing and implementing a Kansas-specific siting tool to evaluate options, taking into consideration the facility size, waste management and odor reduction practices, and prevailing wind and weather patterns (e.g., OFFSET tool developed by the University of Minnesota<sup>97</sup>). Once a tool such as this has been developed and tested, it may be reasonable to relax the three-mile setback recommendation in some situations.
- Identifying appropriate agencies (e.g., Kansas Department of Health and Environment, Kansas Department of Agriculture) to review existing regulations (e.g., separation distance) related to livestock operations and suggest changes based on the best available research.\*

Note: \*An asterisk notes recommendations that were deemed a priority by the HIA Advisory Panel members in terms of feasibility, alignment with findings and whether or not they addressed vulnerable populations.

*Recommendations, continued*

*Livestock operations could consider:*

- Compensating neighboring property owners for negative externalities associated with the operations. Various factors (e.g., loss dollars) could be considered when determining the amount of compensation.

\*Note: Compensation could also be given to county governments for costs incurred due to large-scale livestock operations (e.g., road and bridge repair).

- Prevailing wind direction when locating operations and, when possible, build downwind of residential properties.\*

Note: \*An asterisk notes recommendations that were deemed a priority by the HIA Advisory Panel members in terms of feasibility, alignment with findings and whether or not they addressed vulnerable populations.

**Property Values and Health**

Published research suggests that property values impact the socioeconomic status (SES) of individuals.<sup>98 99 100 101 102 103 104 105 106 107 108</sup> Homeownership appears to be an important component of wealth accumulation. For lower-income households, non-housing wealth accumulation is, at best, minor and, for minority households, often negative.<sup>109</sup> Wealth accumulation for low-income and minority households, although low, increases substantially through homeownership.<sup>110</sup> This tie to SES is important to consider because there are such strong relationships between a person's SES and nutrition, physical activity and access to health care.<sup>111 112 113</sup>

Studies examining relationships between SES and physical activity found consistent evidence of higher levels of leisure time or moderate-vigorous intensity physical activity in those at the top of the socioeconomic strata compared with those at the bottom. Education produced the most stable relationships. When education levels were high, the connection between SES and physical activity was less susceptible to confounding effects of ethnicity and the environment. Additionally, individuals with higher SES were more likely to receive recommended preventive health care and consume recommended amounts of fruits and vegetables.

**What We Learned From Literature**

One of the questions that is often raised during the debate on the impact of large livestock operations entering a county is whether or not personal property values will be impacted. The majority of published research indicates that the presence of large-scale

livestock operations negatively impacts residential property values<sup>114 115 116 117 118 119 120 121 122 123 124 125 126 127 128</sup> although there are a few papers that say otherwise.<sup>129 130</sup> In a review of the effects of swine Concentrated Animal Feeding Operations (CAFOs) on real estate values, it was found that proximity is often an important factor in the degree of impact, as residences closest to livestock operations experience reduced property values to a greater extent relative to residences that are farther away.<sup>131 132 133 134 135</sup> Nationwide, it was found that counties with large-scale swine operations had lower median home values than those that did not.<sup>136</sup>

Along with distance to the farm, there are many factors that could affect whether or not a livestock operation would have a negative impact on property values including density of farms,<sup>137 138</sup> prevailing wind direction<sup>139 140 141 142 143</sup> and facility size.<sup>144 145 146</sup> These varying factors can make it difficult to understand exactly how a large livestock operation would affect residential property values.<sup>147 148 149 150 151</sup> One study found that properties adjacent to the large farms had an increase in property value, although this only stayed true to a point, after which increased distance from the facility corresponded with increased residential property value.<sup>152</sup> Even with the mixed results, the majority of the literature points to a negative impact of large livestock operations on property values. This conclusion is also supported by past legal proceedings. A court in Nebraska found that a county board of equalization had erred by not considering a residence's proximity to a swine operation when determining the fair market value of a residence.<sup>153</sup>

## Property Values/Taxes and School Revenue

Nationally, school revenues have been shown to be strongly impacted positively or negatively by changes in property values and taxes. However, the literature review findings need to be considered in the context of the Kansas school finance laws. Based on review of these laws, data analysis and expert opinion from Kansas government officials, an increase in number of large-scale swine or dairy operations would likely have no impact on school funding due to projected little-to-no impact on residential property values/taxes and the “equalization” school funding formula in Kansas. Additionally, no impact on local government revenue is projected through the “property values/taxes” pathway due to little-to-no expected changes in county-level property values/taxes and sales taxes. No statistically significant relationship was found among sales tax and the number of large-scale dairy, swine or beef feedlot operations within a county. As a result, this section doesn’t include any further discussion on these issues.

## What We Learned From Data

### Livestock operations and property values/taxes

Between 2004 and 2013, values of assessed property (real, agricultural and commercial) showed statistically significant positive trends in all of the 33 counties (study and control) included in the analysis. At the county level, no statistically significant relationship was found between the number of large-scale swine or dairy operations in the county and assessed real property valuation (either residential or commercial). Real property assessed values, county residential values and commercial property taxes collected

were positively associated with the number of large-scale beef feedlots in the county (Figure 17).

### Livestock operations and individual socioeconomic status

There was a marginally significant relationship between the numbers of large-scale swine and dairy operations in a county and per capita income. Counties in which large-scale swine or dairy operations were located had slightly lower per capita income than counties without them, but had slightly higher average household income ( $p=0.037$ ). There were no significant differences in poverty rates or the percentage of school-age children who qualified for free or reduced price meals (based on household income) between counties with and without large-scale swine or dairy operations.

### Livestock operations and physical activity, nutrition

Adults residing in the 22 study counties were more likely to be physically active during leisure time than those in the control counties ( $p=0.0176$ ), and had fewer years of potential life lost before age 75 ( $p=0.05$ ). There were no significant differences between the two groups of counties in terms of adult obesity rates. Income was not found to be associated with county-level rates of obesity or physical activity among adults. No county-level data related to nutritional behaviors were available.

### Livestock operations and health

When comparing county-level rates of health outcomes, few significant population health differences were observed between counties with and without large-scale swine or dairy operations.

Figure 17. Relationships Between Annual Property Tax Assessments, Time and the Number of Large-Scale Swine, Dairy and Beef Feedlot Operations, 2004–2013.

	Model 1	Model 2	Model 3	Model 4
	Assessed Real Property	Residential Property	Agricultural Taxes	Commercial Taxes
Dairy #	-3.44 (-0.38)	-9.51 (-0.83)	-9.15 (-0.78)	-18.35 (-1.20)
Swine #	-4.56 (-0.64)	4.84 (-0.53)	19.91** (-2.13)	-11.03 (-0.91)
Beef Feedlot #	5.82** (2.56)	7.21** (2.49)	4.25 (1.42)	11.15*** (2.87)

Note: Regression analysis was performed using logarithmic transformations of the dependent variables. Coefficients have been adjusted to reflect the original scales of measurement and should be interpreted as percent changes in the relevant dependent variable. \*\* and \*\*\* denote significance at the 5 and 1 percent levels, respectively. Source: Dr. David Lambert, Agricultural Economics, Kansas State University, “Local Economic Effects of Proposed Changes in the Kansas Corporate Farming Laws.” Report to KHI, June 2014.

There were no differences in age-adjusted mortality rates (2008, 2012), self-reported general health status (2006–2012), self-reported number of physically or mentally unhealthy days (2006–2012), adult obesity (2010), age-adjusted rate of hospital admission for respiratory illnesses (2008, 2011), age-adjusted rates of hospital admission for chronic obstructive pulmonary disease (2009–2011) or the percentage of Medicare beneficiaries that received treatment for asthma (2011). Years of potential life lost between 2008 and 2010 were slightly lower in the counties with large-scale swine or dairy operations than in the control counties (p=0.0505).

## What We Learned From Stakeholders

### Interview Results

A majority of interviewees that lived in counties with a presence of large-scale swine or dairy operations did not see an impact on residential property values. If their property values or property taxes had changed, they did not attribute it to the operations, but to the general state of the economy or other factors. However, one interviewee living near a swine operation stated that he or she believed the value of his or her residential property and other neighbors’ residential properties had diminished due to its close proximity to the operation.

“Property values around swine operations always decrease. According to our appraisal, ours hasn’t decreased yet, but I don’t think anyone will want to buy our property because of issues with flies and dirt.”

– Property Owner near swine operation

“Property values aren’t affected by the dairies. They are located outside of the communities.”

– Community Member

### Survey Results

Survey respondents that lived in counties with a presence of large-scale swine operations were mixed on their opinions regarding how these operations affected their property values: seven believed

property values decreased, two indicated they increased and two believed there had been no impact. The remaining six survey respondents stated they did not know if or how property values had been affected.

Survey respondents that lived in counties with a presence of large-scale dairy operations believed impacts on county-level property values were also mixed: six stated there had been no impact while three indicated there had been an increase and one indicated a decrease. The seven remaining respondents did not know if or how property values had been affected (Figure 18).

Figure 18. Survey Respondents’ Feelings about Impacts of Large-Scale Dairy Operations on Property Taxes/Values, 2014 (n=17).



Source: KHI HIA Corporate Farming Project, 2015.

Please see *Appendix D*, page 70, for charts depicting survey respondents' feelings about swine and dairy operations in their counties.

### Conclusion: Health Impacts for Kansas

Results of the literature review found that residential properties closest to livestock operations experience reduced residential property values to a greater extent relative to residences that are farther away. In addition to proximity, there are several other factors that could affect the extent of negative impacts of a livestock operation on residential property value, including the size of an operation, wind direction and type of animals. Additionally, the density of livestock operations could also impact the property values. For example, expanding swine production in areas where swine production is already high will have a smaller negative impact on property values than when expansion occurs in areas with little to no swine production. The data analysis showed

that at the county level, property values have not been impacted by existing large-scale swine or dairy operations. In general, stakeholders (interviewees and survey respondents) expressed mixed views about the impact of these operations on property values.

Based on literature review and data analysis, an increase in the number of large-scale swine or dairy operations could have minimal-to-no impact on county-level real property (e.g., commercial, agricultural and residential) values (*Figure 17*, page 35). However, properties that are located downwind, in close proximity to large livestock operations (less than three miles) and are higher-priced are likely to experience decline in property values. Residents of these properties might experience increased risk of health issues associated with decline in their socioeconomic status related to changes in their property values (*Figure 19*).

**Figure 19. Impacts of an Increase in the Number of Large-Scale Swine and Dairy Operations on Property Values/Taxes and Associated Health Outcomes.**

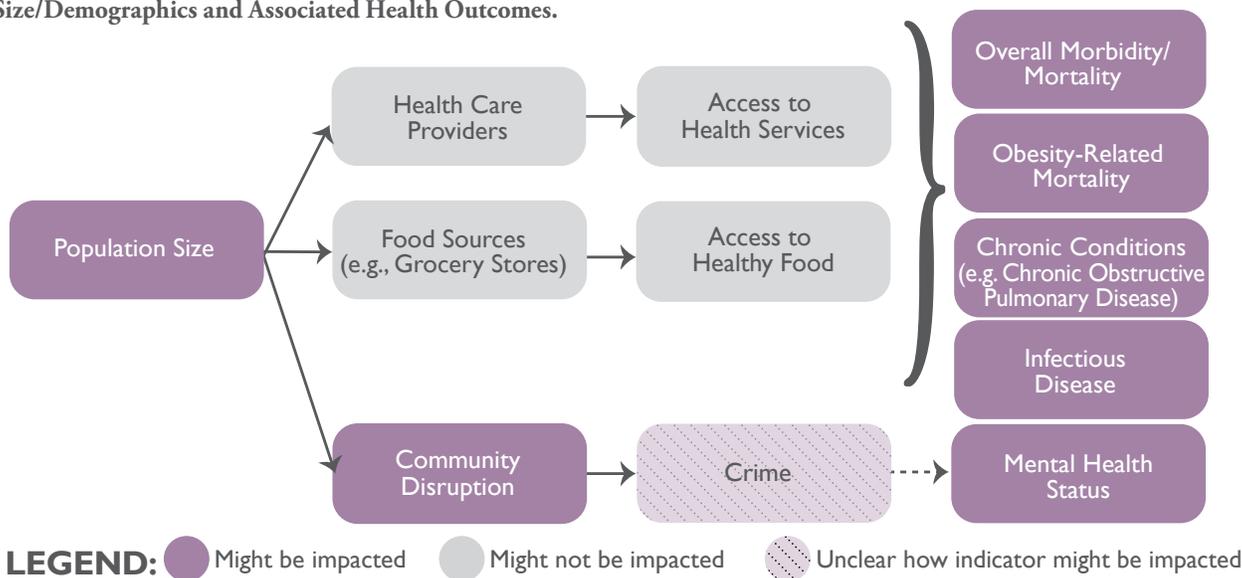
Health Factor or Outcome	Expected Effect Based on Literature	Expected Effect Based on Data	Stakeholder Projections	Based on Literature and Data				
				Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
<b>General Population</b>								
Property Values/Taxes	None	None	Mixed	None	None	Unlikely	N/A	**
<b>Some Residents</b>								
Property Values/Taxes	Decrease	N/A	Decrease	Negative	Low	Possible	Residents who live less than three miles from operation(s)	**
Socioeconomic Status	Decrease	N/A	N/A	Negative	Low	Possible		**
Nutrition/Physical Activity	Decrease	N/A	N/A	Negative	Low	Possible		**

Note: See Legend, *Appendix B*, page 64.

Source: KHI HIA Corporate Farming Project, 2015.



Figure 20. Pathway Diagram: How Changes in the Number of Large-Scale Swine and Dairy Operations May Affect Population Size/Demographics and Associated Health Outcomes.



Source: KHI HIA Corporate Farming Project, 2015.

Key Findings

- Counties with large-scale swine operations might experience a decrease in population. However, counties with dairy operations might experience a slight increase or no change in population size.
- Modest changes in population size are not likely to affect availability of health care providers, food sources and social cohesion. However, social cohesion also might be impacted by changes in the local demographics.

Recommendations

Local agencies (e.g., local health department) could consider:

- Assessing the availability of services and infrastructure (e.g., health care providers, housing) in the community in order to accommodate any potential changes in population size and demographics of the community.\*

Note: \*An asterisk notes recommendations that were deemed a priority by the HIA Advisory Panel members in terms of feasibility, alignment with findings and whether or not they addressed vulnerable populations.

Population Size and Health

In rural communities, population growth could help spur economic activity and increase the residents’ socioeconomic status.<sup>154</sup> Larger populations are more likely to attract and keep health care service providers.<sup>155</sup> A large population also could attract other industries to the area based on the cycle of increased population leading to increased jobs and vice versa.<sup>156</sup> Because food-related businesses are attracted to higher population areas, stores that carry quality fresh produce may come to the area.<sup>157</sup>

A larger population also can decrease social isolation and its negative impacts.<sup>158 159</sup> Social isolation is a strong predictor of

declining health over time. People who are socially isolated have a mortality risk that is 1.9 to 5 times higher than their socially connected peers.<sup>160</sup> Although there are health benefits to having a larger population, there also are negative health impacts, including crime, noise and crowding.

What We Learned From Literature

Published studies on how a large livestock operation could affect population size and a county’s demographics showed mixed results. Several studies found that counties with the largest reduction in population were those with the largest number of swine confinement facilities.<sup>161</sup> On the other hand, a comprehensive case

study on industrialized farming conducted by the Regional Center for Rural Development found that Texas County, Oklahoma, experienced an increase in population relative to comparison counties after a CAFO owned by the Seaboard Corporation moved there in 1992. The study also found that an increase in population was associated with increased crime rates and a decline in housing availability. Another study conducted by a University of Kansas professor examined the large-scale swine operation in the same county and also found the population increased by one-third from 1990-2000.<sup>162</sup> This study found similar results in terms of crime and housing availability. Additionally, this and several studies suggest that communities with industrialized farming have seen an increase in demand for social services.<sup>163 164</sup>

### What We Learned From Data

In order to assess county-level relationships between the presence or absence of large-scale livestock operations and changes in

population, the HIA team analyzed various dependent variables (e.g., number of primary care providers, number of grocery stores, crime rates). *Figure 21* describes the summary of findings from the data assessment.

### Livestock Operations and Population Growth

In the long run, crop revenues were positively associated with county population, but no statistically significant relationship was found between the value of livestock production and population. In the shorter run model (2008–2012), there was a statistically significant negative relationship between the number of large-scale swine operations within the county and population. In terms of dairy operations, the relationship between number of facilities and population was not statistically significant (*Figure 22*, page 41).

*Figure 21. Summary of Findings from the Data Assessment: Population Pathway.*

Indicator	Positive Relationship	Negative Relationship	No Relationship
Population growth		Swine Large-Scale Operation	Dairy Large-Scale Operation
Number of primary care providers		X	
Percentage of pregnant women with adequate prenatal care		X	
Number of grocery stores			X
Number of convenience stores			X
Number of fast-food restaurants			X
Percentage of low-income individuals with low access to a retail grocery outlet			X
Average number of households receiving benefits through the Temporary Assistance to Needy Families, general assistance, Supplemental Nutrition Assistance Program or child care assistance programs			X
Crime rates (violent and property)			X
Age-adjusted mortality rates, self-reported general health status, self-reported number of physically or mentally unhealthy days, adult obesity, age-adjusted rates of hospital admission for respiratory illnesses, age-adjusted rates of hospital admission for chronic obstructive pulmonary disease or the percentage of Medicare beneficiaries that received treatment for asthma			X
Years of potential life lost	X		

Note: Results were deemed statistically significant at the p<0.05 level.

Source: KHI HIA Corporate Farming Project, 2015.

Figure 22. Factors Affecting County Population.

	County Population 1969–2011	County Population 2008–2011 <sup>165</sup>	County Population 2008–2012 <sup>166</sup>
Livestock Revenues	-0.0010 (-0.715)	0.0111 (0.80)	
Crop Revenues	0.0089*** (6.254)	0.0234 (0.73)	
Dairy #			1.65 (0.45)
Swine #			-7.54** (-2.51)
Beef Feedlot #			1.17 (1.24)

Note: A 1 percent increase in crop revenues is associated with a 0.89 percent increase in county population. A one unit increase in swine # is associated with a 7.54 percent decrease in county population.\*\* and \*\*\* denote significance at the 5 and 1 percent levels, respectively.

Source: Dr. David Lambert, Agricultural Economics, Kansas State University, “Local Economic Effects of Proposed Changes in the Kansas Corporate Farming Laws.” Report to KHI, June 2014.

### Livestock Operations and Access to Health Care Services

During 2008, access to primary care providers, as represented by the ratio of the number of primary care providers to the population in each county, was lower in study counties compared to control counties (47.5 per 1,000 population, versus 74.9 per 1,000;  $p=0.0516$ ). The availability of primary care providers also was lower in study counties than in control counties during 2011, but the difference was not statistically significant. During 2008, 19.6 percent of adults in study counties lacked health insurance, compared to 16.8 percent in control counties ( $p=0.0196$ ). In 2011, rates of health insurance remained lower in study counties than in control counties, but the difference was not statistically significant. During 2012, 68.9 percent of pregnant women in study counties received adequate or better prenatal care, compared to 78.2 percent of pregnant women in control counties. This difference was marginally significant ( $p=0.0636$ ). There were no statistically significant differences in funding support of local health departments in study counties compared to control counties.

### Livestock Operation and Access to Food Sources

No significant differences were observed when comparing the number of grocery stores, convenience stores or fast-food restaurants per 1,000 population in the counties with and without large-scale swine or dairy operations in 2011. There was also no significant difference in the percentage of low-income individuals

with low access to a retail grocery outlet in 2010 (defined as households with annual incomes less than or equal to 200 percent of the federal poverty level and living more than a mile from a large grocery store if in an urban area, or more than 10 miles from a grocery store if in a rural area).

### Livestock Operations and Crime Rates

County-level crime indexes, which include violent and property crimes, did not differ between counties with and without large-scale swine or dairy operations in 2008 or 2011.

### Livestock Operations and Social Services

From 2010 to 2014, there were no significant differences between the study and control groups in terms of the average number of households receiving benefits through the Temporary Assistance to Needy Families, general assistance, Supplemental Nutrition Assistance Program or child care assistance programs. Estimated rates of household food insecurity were slightly higher in the 11 control counties than the 22 study counties during 2012 (11.7 vs. 10.7 percent,  $p = 0.0281$ ). Food insecurity is generally defined as not having consistent access to enough food to maintain active and healthy living. Homeowner and rental vacancy rates were not significantly different between the groups of counties from 2000 to 2012.

**Livestock Operations and Health**

When comparing county-level rates of health outcomes, few significant differences were observed between counties with and without large-scale swine or dairy operations. There were no differences in age-adjusted mortality rates (2008, 2012), self-reported general health status (2006–2012), self-reported number of physically or mentally unhealthy days (2006–2012), adult obesity (2010), age-adjusted rates of hospital admission for respiratory illnesses (2008, 2011), age-adjusted rates of hospital admission for chronic obstructive pulmonary disease (2009–2011) or the percentage of Medicare beneficiaries that received treatment for asthma (2011). Years of potential life lost from 2008 to 2010 were slightly lower in the counties with large-scale swine or dairy operations than in the control counties (p=0.0505).

**What We Learned From Stakeholders**

**Interview Results**

Although interviewees didn't think that the overall size of their county population had changed, they noted that new families had moved into their communities in order to work at the livestock operation. They mentioned several positive effects, including tax revenue, some new businesses and jobs. Additionally, these families added to the economy by buying locally. However, those benefits were not as strong as the community members initially hoped for.

*“The operation has had a positive impact on at least some of the businesses in the community. Housing is pretty tight, and sometimes new people moving here have a tough time finding housing at first.”*

– Community Member

*“The demand for social services increased as a result of the dairy operations. The county is challenged by having to maintain the infrastructure brought on by greater use and demand.”*

– Community Member

Several respondents also mentioned there was an increased number of students attending local schools as a result of new immigrant families moving into the community. Interviewees noted that changes in the population also affected community resources. For example, they noted an increased demand on housing, education (e.g., English as a Second Language classes) and health care services (local health departments, walk-in clinics).

**Conclusion: Health Impacts for Kansas**

There are mixed findings from the literature and stakeholder opinions on the possible effect of large-scale livestock operations on population size. Several published studies found reductions in population in counties that had large-scale swine operations. The data analysis found that at the county level, population decreased when the number of large-scale swine operations increased. For dairy operations, the relationship was not statistically significant. Additionally, counties with large-scale livestock operations had lower ratios of primary care providers to the population than counties without these operations. The average number of households receiving benefits through the social service programs, the number of grocery stores and crime rates were not significantly different when comparing counties with and without large-scale swine or dairy operations. In general, stakeholders (interviewees and survey respondents) noted change in county demographics, some economic benefits and increased demand on community resources. However, generally they did not observe changes to the overall size of the population in their counties.

Based on literature review and data analysis, an increase in the number of large-scale swine or dairy operations is likely to have minimal-to-no impact on population size (Figure 23, page 43). Modest changes in the population size are not likely to affect availability of health care providers, food sources and social cohesion. However, social cohesion could be impacted by demographic changes in the local population, which in turn could affect utilization of community resources.

**Figure 23. Impacts of an Increase in the Number of Large-Scale Swine and Dairy Operations on Population Size/Demographics and Associated Health Outcomes.**

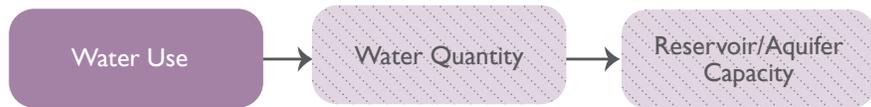
Health Factor or Outcome	Expected Effect Based on Literature	Expected Effect Based on Data	Stakeholder Projections	Based on Literature and Data				
				Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
Population Size	Mixed	Mixed	Increase	Mixed	Medium	Possible	Community members	**
Health Care Providers	N/A	Decrease	N/A	Uncertain	Uncertain	Unlikely	N/A	*
Grocery Outlets	N/A	None	N/A	Uncertain	Uncertain	Unlikely	N/A	*
Crime	Increase	None	N/A	Uncertain	Uncertain	Uncertain	Community members	**

Note: See Legend, *Appendix B*, page 64.

Source: KHI HIA Corporate Farming Project, 2015.



Figure 24. Pathway Diagram: How Changes in the Number of Large-Scale Swine and Dairy Operations May Affect Water Use and Associated Health Outcomes.



**LEGEND:** ● Might be impacted    ▨ Unclear how indicator might be impacted

Source: KHI HIA Corporate Farming Project, 2015.

### Key Findings

- Water use for livestock operations in western Kansas makes up a small proportion (1.17 percent in 2008 and 1.23 percent in 2012 for 33 study and control counties) of total water use. While increases in the number and size of livestock operations likely would increase use of water for livestock, the impact on total water use is unclear as it would depend on other factors such as changes in crop production and the availability of water use rights.

### Recommendations

*Kansas Department of Health and Environment and/or Kansas Department of Agriculture could consider:*

- Encouraging or providing incentives for owners of large-scale livestock facilities to minimize their water use by employing water conservation management practices.

## What We Learned From Literature

By law, the Kansas Department of Agriculture’s Division of Water Resources administers water rights for all beneficial uses<sup>167</sup> and requires annual use reports for all water rights except domestic. The major categories of water use in Kansas are irrigation, public supply, industrial and livestock. About 84 percent of the freshwater drawn in Kansas during 2000 was used for irrigation. The second largest use of water in that year was public supply, which comprised about 9 percent of the total. Self-supplied industrial uses represented less than 4 percent of the 2000 total, and livestock uses represented less than 3 percent. Irrigation water use varies from year to year, primarily because of climate, but water use also is affected by changes in availability, efficiencies of application methods, and the types and acreages of crops grown.

Livestock production, especially in industrialized farm settings, requires service water to cool and water animals, especially in

extreme climates, and to flush waste from confinement sites into waste lagoons.<sup>168 169</sup> Overall, compared to grazing systems, industrialized systems require more daily water for both dairy cattle and swine.<sup>170</sup> Dairy farms in particular generally require about 10 times as much water per animal as beef-cattle feedlots.<sup>171</sup> Water use for livestock production is increasing because more water is needed for the process.<sup>172</sup>

### Water Rights in Kansas

According to the Kansas Department of Agriculture, “The Kansas Water Appropriation Act protects both the people’s right to use Kansas water and the state’s supplies of groundwater and surface water for the future.”<sup>173</sup>

The law (K.S.A. 829-701) is administered by the Division of Water Resources, which issues permits to appropriate water, regulates usage and keeps records of all water rights in the state.

It is illegal for individuals in Kansas to use water without holding a vested right — a right of a person under a common law to continue the use of water — or applying for and receiving a permit from the Division of Water Resources to appropriate water.

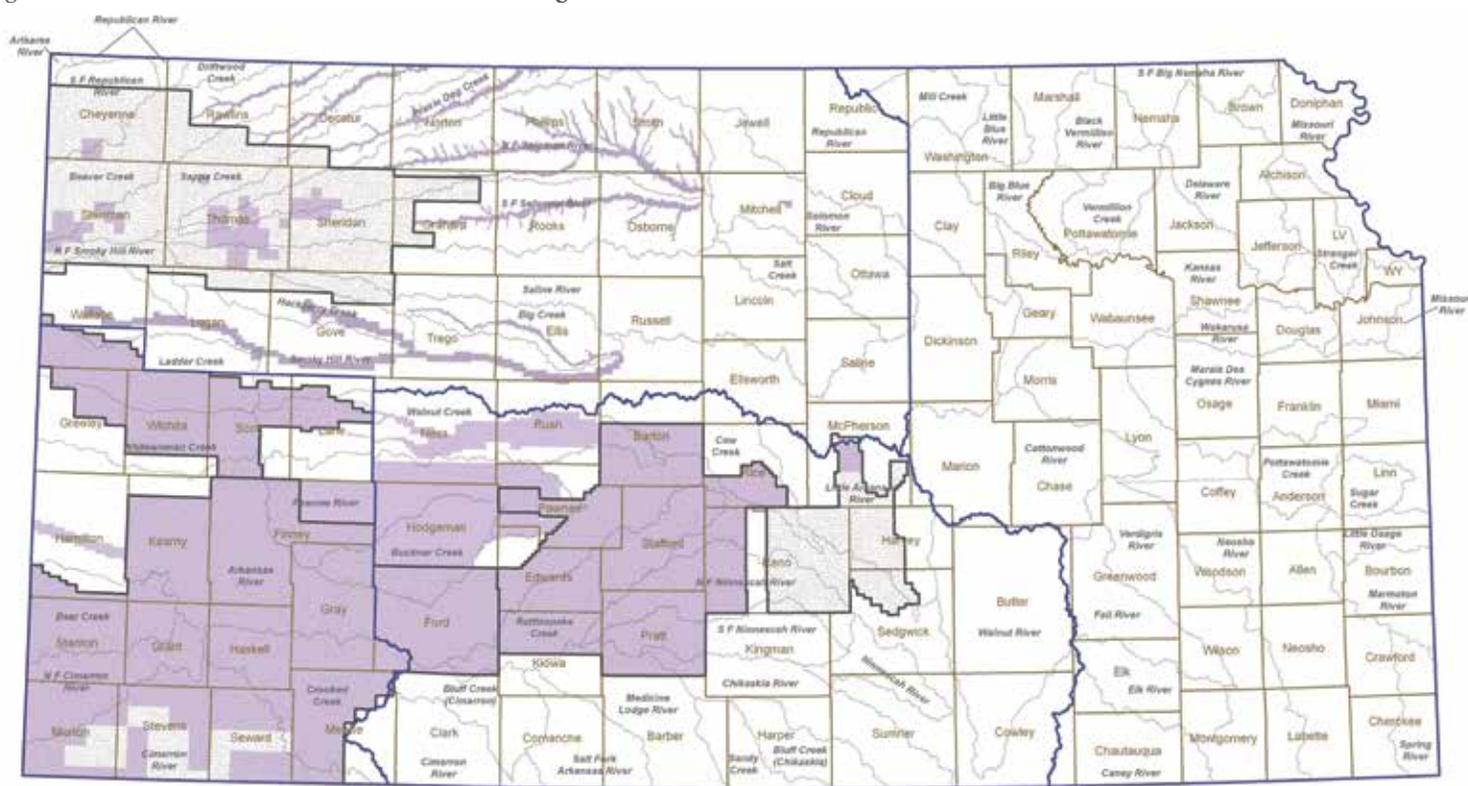
The exception is water used solely for household purposes. No permit is needed for using water primarily for the household, watering livestock on pasture, or watering up to two acres of lawn and gardens.

The Water Appropriation Act affects all Kansans. Farmers that use irrigation to grow crops are required to obtain a permit and report water use yearly.

After the water right is developed, the holder is required by Kansas law to submit an annual report of water use no later than March 1 of every year. Water use reports are used to “perfect” the water right and make sure that the right has not been abandoned. Even if water was not used in the previous year, a report is required and must explain the reason for nonuse.

Many areas of Kansas are reaching the status of full water appropriation, and some parts of Kansas (mainly western counties) have no water available for new permits. This means the only way someone coming into a closed area may acquire a water right for beneficial use is to lease it or acquire it from the current water right owner. *Figure 25* shows areas in Kansas that are closed to new water rights.<sup>174</sup>

Figure 25. Groundwater Areas Closed to New Water Rights in Kansas, 2011.



Kansas Department of Agriculture  
Administrative Services.  
GIS Feb. 9, 2011

DWR Field Office Boundaries
  Closed Areas\*
  GMD Boundaries
  County Boundaries
  DWR Basins

\*Western Kansas Groundwater Management District No. 1 has requested rules and regulations to close the Ogallala and Niobrara formations within the district to new appropriation of water. A moratorium is in place while the rules and regulations are in the process of being adopted.

Source: Kansas Department of Agriculture, 2013.

Some water appropriations were made many years ago when water availability was different and might not completely reflect current conditions. If water rights that are currently used for irrigation are purchased, the Division of Water Resources will require the owner to change it to a stockwater right for use in livestock facilities. Livestock use and irrigation use have different limitations, and changing use rights from irrigation to livestock may result in a loss of as much of a third of the appropriated water right.<sup>175</sup> Thus, livestock operations may have to acquire multiple water rights to meet their estimated water needs.

### What We Learned From Data

Water use in the 22 study counties and 11 control counties during 2008 and 2012 is summarized in *Figure 26*. As a percentage of total water use, water used for livestock accounted for less than 2 percent in study counties with large-scale swine or dairy operations and control counties without any large swine or dairy facilities. This figure reflects all water used to support livestock operations, including beef feedlots and smaller farming operations.

Although an increase in the number of swine or dairy cows would almost certainly result in proportional increases in livestock water use, the increase in water volume would likely still be dwarfed by the amount of water consumed for crop irrigation. This would

be the case unless crop production practices were displaced by livestock operations or the types of crops produced were shifted to alternate grains and feeds that require less water during the growth cycle (see *Figure 27*, page 48).

### What We Learned from Stakeholders

#### Water Use and Water Availability

##### Interview Results

Most interviewees stated that water use by operations was a major concern, as the availability of water is declining. However, they stated that recent drought conditions had impacted this more than the operations, but that any additional use by operations may also have an impact. They also noted that irrigation for crops such as corn uses more water than a swine or dairy operation.

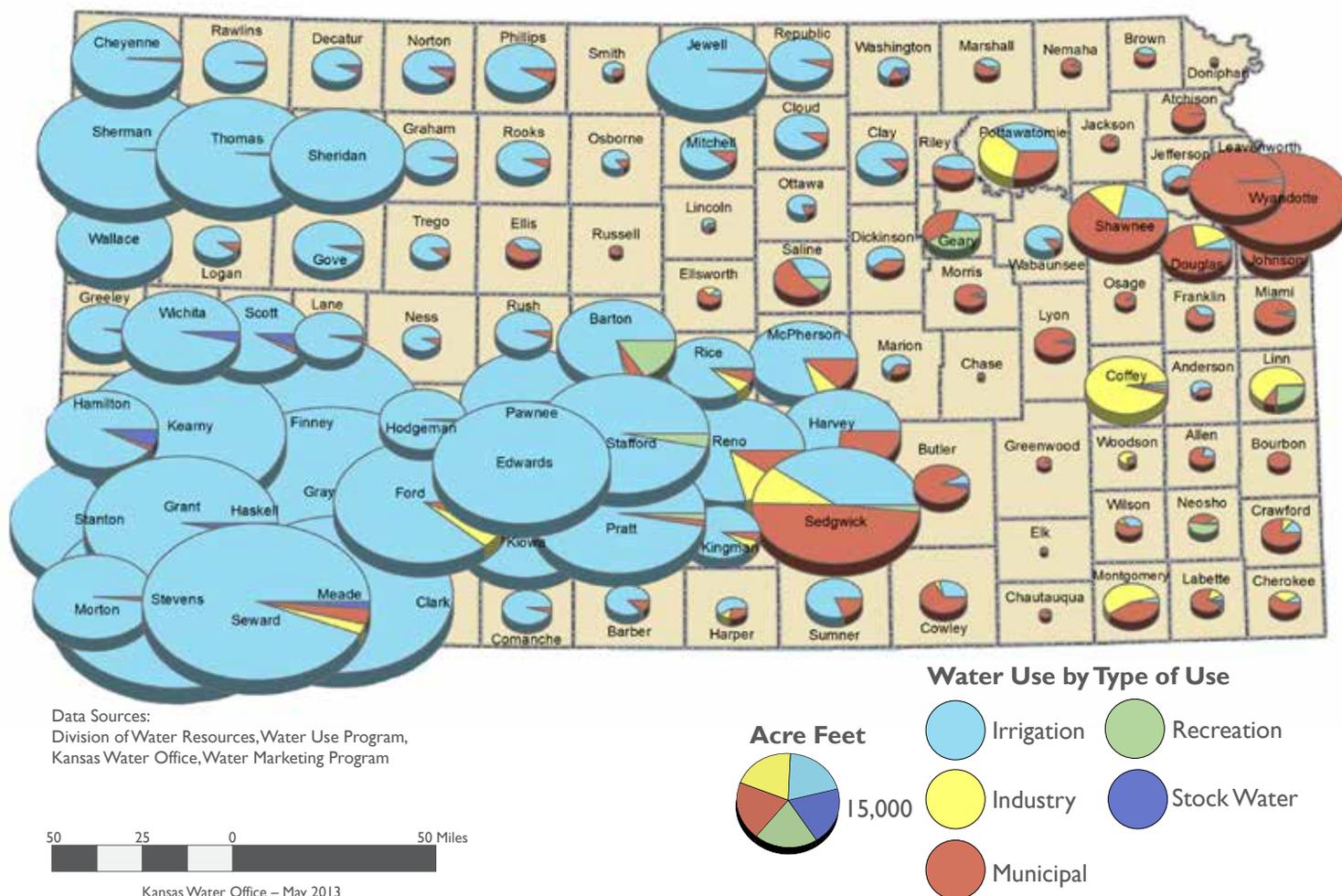
Most interviewees stated that water use by the livestock operations contributed to the depletion of the Ogallala Aquifer in Kansas. However, they did not think that operations had impacted the amount of water available for community use. They did state that any additional swine and/or dairy operations coming into the counties might affect future water availability and place additional strain on the aquifer.

*Figure 26. Water Use in Study and Control Counties, 2008 and 2012.*

Counties	Total Use (gallons)	Irrigation Use, As Percent of Total	Livestock Use, As Percent of Total	All Other Uses, As Percent of Total
<b>2008</b>				
Study Counties (n=22)	2,477,548	96.90%	1.20%	1.90%
Control Counties (n=11)	335,495	93.56%	0.97%	5.47%
<b>2012</b>				
Study Counties (n=22)	2,691,514	96.73%	1.27%	2.00%
Control Counties (n=11)	414,979	93.13%	0.94%	5.93%

Source: KHI HIA Corporate Farming Project, 2015.

Figure 27. Water Use by Kansas County, 2011.



Source: Kansas Water Office, Division of Water Resources, Water Use Program, 2013.

**Survey Results**

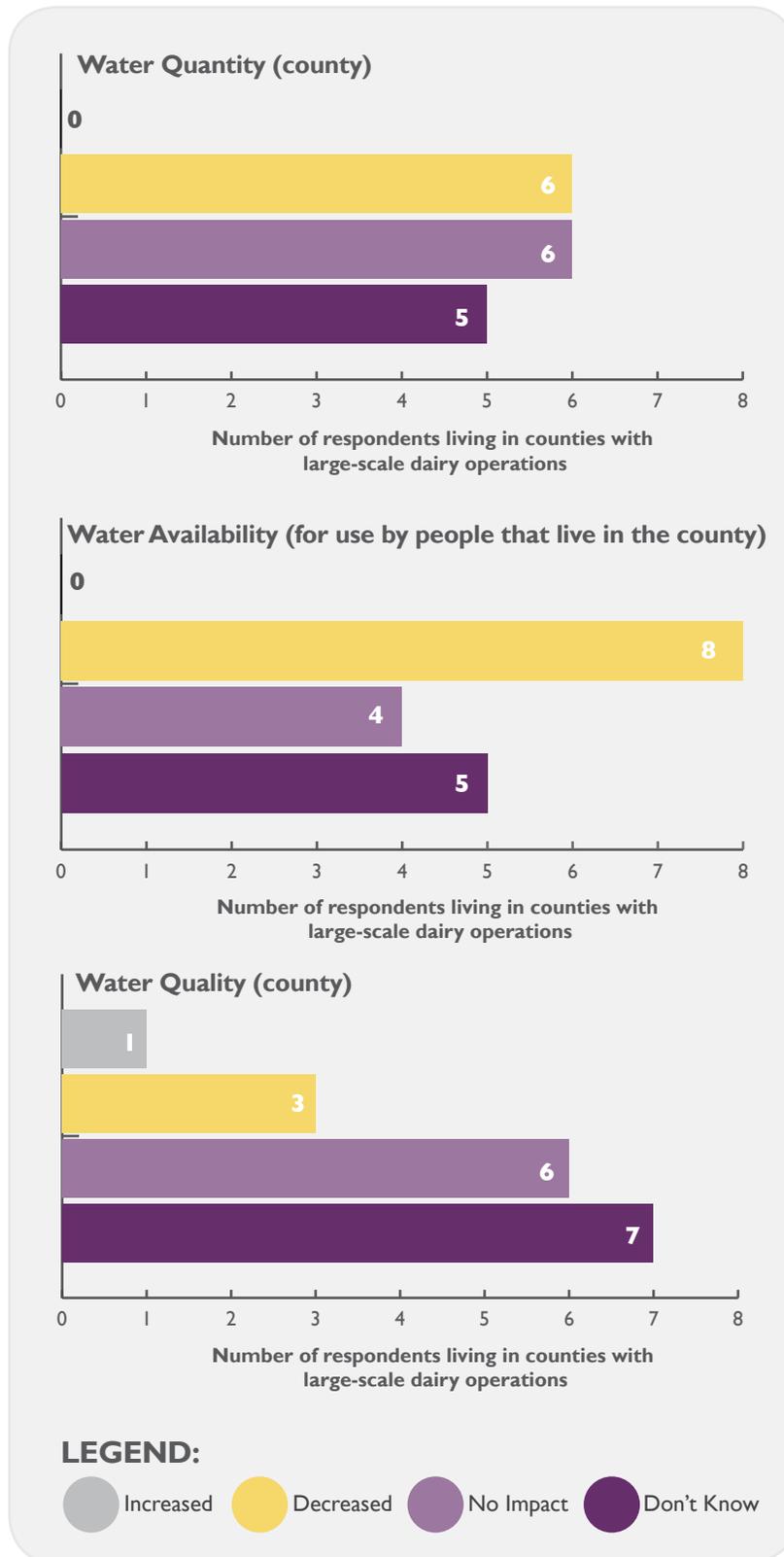
The majority of survey respondents living in counties with large-scale swine operations indicated a decline in water quantity (Ogallala Aquifer), water available for county residents and water quality. However, a few said there was either no impact or did not know of any impact for each indicator.

Survey respondents expressed similar feelings about the dairy operations' impact on water quantity and quality (Figure 28, page 49).

“The swine operation is about 14 miles from town, but there are several people that live close to it, and they don’t have enough water.”  
 – Community Member

“I don’t think the dairy operations themselves impacted the availability of water. It was impacted more by the drought this area has experienced for the last five years.”  
 – Community Member

Figure 28. Survey Respondents' Feelings about Impacts of Large-Scale Dairy Operations on Water Quantity, Availability and Quality, 2014 (n=17).



Source: KHI HIA Corporate Farming Project, 2015.

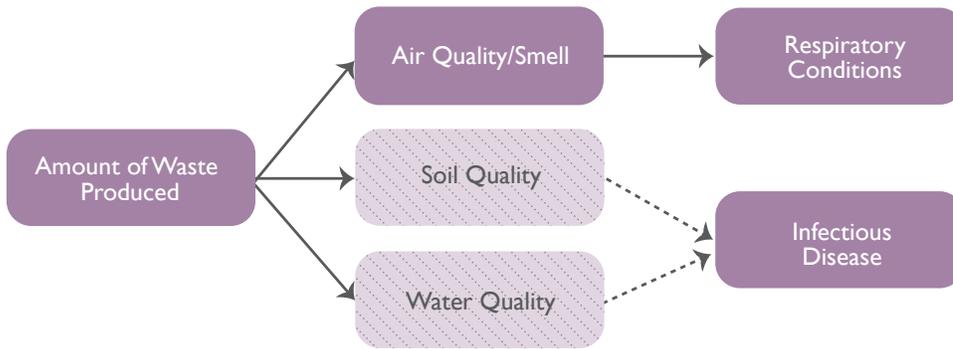
## Conclusion: Impacts for Kansas

The literature review findings echo stakeholder concerns regarding the potential negative effect of an increased number of livestock operations on water quantity. The literature found that the use of water in livestock production is high and its contribution to water depletion trends is growing, as an increasing amount of water is needed for the livestock production process.<sup>176</sup> In general, stakeholders said that water use by the operations was a major concern because of declining water availability. However, they stated that the drought had affected this more than the operations, but that any additional use of water by livestock operations may have an impact. They also noted that irrigation of crops such as corn uses more water than a swine or dairy operation. The data analysis showed that water used for livestock accounted for less

than 2 percent of total water use in the study counties with large-scale swine or dairy operations as well as the control counties without any facilities. However, an increase in the number of large-scale livestock operations could raise demand for locally grown feed crops, and additional water would be needed for irrigation.

Based on literature review and data analysis, an increase in the number of large-scale swine or dairy operations likely would result in proportional increases in livestock water use. However, the increase in water use likely would still be dwarfed by the amount of water consumed for crop irrigation, unless crop production practices were displaced by livestock operations or the types of crops produced were shifted to alternate grains and feeds that require less water during the growth cycle.

Figure 29. Pathway Diagram: How Changes in the Number of Large-Scale Swine and Dairy Operations May Affect Waste Production and Associated Health Outcomes.



**LEGEND:** ● Might be impacted    ● Might not be impacted    ● Unclear how indicator might be impacted

Source: KHI HIA Corporate Farming Project, 2015.

*Key Findings*

- An increase in the number of large-scale swine or dairy operations will increase the amount of waste produced.
- Increased amounts of waste might have a negative impact on air quality and increase risk for water pollution and soil contamination. The extent of this impact could depend upon the number and density of new operations and management practices.

*Recommendations*

*Kansas Department of Health and Environment and Kansas Department of Agriculture could consider:*

- Exploring technologies and tools like the “Odor Footprint Tool” developed by the University of Nebraska to improve odor control.\*
- Conducting a statewide study of existing large-scale livestock operations’ nutrient utilization plans (NUP) to determine if this process adequately regulates manure application in Kansas.
- Identifying the volume of manure produced in Kansas and how much can be reasonably applied (specifically with potential increase in livestock operations).
- Establishing and maintaining a publicly available database of all regulated animal feeding operations in Kansas. The database should include the name and location of each operation, the numbers and types of animals and animal units on each site, key characteristics of facility operations and waste management plans, and results of routine inspections or complaint investigations (e.g., similar to Iowa Database<sup>177</sup>).

Note: \*An asterisk notes recommendations that were deemed a priority by the HIA Advisory Panel members in terms of feasibility, alignment with findings and whether or not they addressed vulnerable populations.

## Air Quality, Water Quality, Soil Quality and Health

The vast majority of literature found that large-scale livestock operations diminished water, soil and air quality and resulted in various negative health effects. Those living near the operations and employees of CAFOs may be at an increased risk of developing respiratory illnesses, neurobehavioral problems and psychological impairments because of exposure to contaminants released at these facilities. Pregnant women and children may be at particular risk for exposures related to CAFO operations.<sup>178 179 180 181 182</sup> Studies consistently showed that people living near large-scale swine operations experience abnormally high rates of health problems compared with other populations.<sup>183</sup>

Large-scale livestock operations and their associated manure storage structures and application of waste to nearby farm fields attract flies and other insects that may become a nuisance to neighbors and transmit disease.<sup>184</sup> However, large outbreaks of disease do not usually occur as a result of transmission between animals and humans, and there is no direct evidence of community outbreaks of infectious disease resulting from microbial contamination from livestock facilities.<sup>185 186</sup>

One study in North Carolina found that a 7.8 percent annual increase in the number of swine in CAFOs was correlated with a 7.2 percent increase in sulfur dioxide emissions per year.<sup>187</sup> Another study of the health impact of sulfur dioxide found no association between exposure

to sulfur dioxide and deficits in overall neurobehavioral performance.<sup>188</sup> A study of large dairy CAFOs in California found that regions with high density of large-scale dairy operations had higher than average death rates due to chronic obstructive pulmonary disease, and elevated asthma rates, as well as one of the highest rates of pollution-attributable mortality in the United States.<sup>189</sup> That study also concluded that health risks associated with dairy CAFOs decreased the appeal of surrounding communities.<sup>190</sup>

The health of employees at large-scale swine facilities may be compromised due to occupational exposures.<sup>191 192</sup> Over a 25-year period beginning in the 1970s, nearly 30 published studies consistently revealed a variety of health problems among swine confinement workers, the most notable of which are a series of respiratory problems.<sup>193</sup> At least 25 percent of livestock confinement workers suffer from respiratory diseases, including bronchitis, mucus membrane irritation, asthma-like syndromes and acute respiratory distress syndrome.<sup>194</sup> Although the variety of adverse health effects related to working at a swine CAFO are well-documented, it is not clear which agents or mixtures are responsible for the symptoms.<sup>195</sup>

## What We Learned From Literature

In addition to requiring drinking water for animals, livestock production uses service water to cool and water animals and flush waste from confinement sites into waste lagoons.<sup>196 197</sup> Compared to grazing

systems, industrialized systems require greater volumes of water for dairy cattle and swine.<sup>198</sup> Dairy farms generally require about 10 times as much water per animal as a beef-cattle feedlot.<sup>199</sup> The use of water in livestock production is growing, as more water is needed to meet the expanding number of animals managed in large-scale livestock production facilities.<sup>200</sup>

Published studies are in consensus that large-scale livestock operations generate a large amount of waste. One adult swine generates eight times as much solid waste per day as a human.<sup>201</sup> In addition to manure, waste products generated by CAFOs include urine, animal carcasses, dust, dander, excess feed and other waste materials.<sup>202 203</sup> These waste products are often apparent to local residents in the form of pervasive, noxious odors; excessive flies; and feces and carcasses littered along nearby roads and landscapes.<sup>204</sup> The large volume of manure produced by animals in CAFOs creates many management and disposal challenges. Across Oklahoma, swine operations produce billions of pounds of waste each year.<sup>205</sup>

Because it is not economical to transport manure for any distance, it typically is stored in pits under buildings or in lagoons adjacent to buildings and later applied to nearby fields as fertilizer.<sup>206</sup> Manure application intensities rise sharply as the size of the operation increases.<sup>207</sup> If manure is applied in excess, levels of nitrogen and phosphorous in the applied waste can exceed what the crops can utilize or the soil can retain.<sup>208</sup> Excess nitrogen and phosphorous from manure

application may produce run-off that contaminates waterways, and excessive nutrient loads applied to soil can result in soil degradation that renders the ground unfit for crop production. Compounding this problem is the fact that this manure is increasingly concentrated on limited land areas. In addition to excessive application of nitrogen and phosphorous, manure may contain heavy metals and trace minerals that can be absorbed by plants in small amounts but may become toxic at higher concentrations.<sup>209</sup>

### *Air Quality*

The majority of published studies conclude that large livestock operations negatively affect air quality, although a 1997 study from the USDA Agricultural Research Service found that a swine production facility did not have a large impact on air quality.<sup>210</sup> Large-scale livestock operations contribute to diminished air quality, both in the United States and worldwide.<sup>211 212</sup> Raising animals increases the amount of greenhouse gases, especially with a high concentration of animals on livestock farms.<sup>213</sup> Of all global emissions resulting from human activity, livestock accounts for 9 percent of carbon dioxide, 35–40 percent of methane, 65 percent of nitrous oxide and 64 percent of ammonia emissions.<sup>214 215</sup>

Air quality degradation around large-scale livestock operations is a problem because of the localized release of significant quantities of toxic gases, odorous substances, particulates and bio aerosols that contain a variety of microorganisms, human pathogens and antimicrobial-resistant bacteria.<sup>216</sup>

Large-scale livestock production has been correlated with ambient air pollution.<sup>217 218</sup> In one study, doubling swine production in a county yielded a 6.6 percent increase in sulfur-related pollution. It also found that the strongest effect on air pollution occurs when swine production is most geographically concentrated.<sup>219</sup> Both ammonia and phosphate can absorb to fine particles, such as dust, that can become airborne.<sup>220</sup>

Emissions from CAFOs can travel beyond the immediate neighborhood, affecting much larger areas.<sup>221</sup> CAFOs have a large amount of waste on-site that generates significant odors.<sup>222</sup> Large livestock operations store substantial quantities of manure onsite, and high concentrations of manure (whether stored in lagoons, pits or ponds prior to transport or application) raise the likelihood of leaching or volatilization, threatening water and air quality.<sup>223</sup> One study of large-scale dairy operations found that the region had especially low air quality and that dairies' share of air pollutant emissions was nearly six times greater than their share of the regional payroll.<sup>224</sup>

Diminished air quality poses a public health concern for those living or recreating near lagoons, buildings and fields where manure is stored or applied.<sup>225</sup> In North Carolina, researchers compared nearby residents of large-scale swine operations to a control group with no exposure to these operations. They found that respiratory and nausea-type symptoms appear to be higher among nearby residents than the control group.<sup>226</sup> Another study found

that swine operations negatively affect immune system function.<sup>227</sup> In contrast to these findings, an older study from 1997 concluded that while some EPA priority pollutants, including phenol, are present in livestock waste emissions, they pose no immediate health risk concerns as the airborne concentrations found in the study.<sup>228</sup>

Odors associated with CAFOs can hinder community and social growth.<sup>229</sup> Thousands of vapors have been identified as being responsible for the odors associated with these facilities.<sup>230</sup> Odorous emissions downwind from swine facilities were found to cause nasal irritation. Other causes of nasal irritation included vapors from the houses and the lagoon, dust from the swine houses, particulates formed over the lagoon or a combination of these.<sup>231</sup>

### *Water Quality*

Published studies strongly suggested that large-scale livestock operations pose a threat to water quality because of the excess waste that they produce.<sup>232</sup> Waste from large-scale livestock operations can be transmitted to surface water through the runoff of nutrients, organic matter and pathogens from fields and storage to groundwater through the leaching of nutrients and pathogens, and to the atmosphere through the volatilization of gases and odors.<sup>233 234 235</sup> Waste from animals at large-scale livestock operations can despoil water and compromise commercial and recreational uses.<sup>236</sup> This can be particularly problematic in rural areas, where many communities rely on well water.<sup>237</sup> A large concentration of

animals in a small area can result in excessive nutrient loads that are too high for the ecosystem to recycle. When this happens, greater flux through the system (e.g., greater rates of ammonia volatilization from storage facilities, suppression of biological nitrogen fixation [a process in which nitrogen in the atmosphere is converted into ammonium], increased rates of nitrate-nitrogen leaching and runoff from heavily manured soils) and sequestration (e.g., buildup of potassium and phosphorus in storage facilities, buildup of organic nitrogen and total potassium in soils) of nutrients will take place.<sup>238</sup> Improper disposal of animal carcasses and abandoned livestock facilities also can contribute to water problems.<sup>239</sup>

Livestock production is a significant source of water pollution.<sup>240</sup> With swine production, sulfates are mineral contaminants that cause water quality problems; dairy production has been shown to cause contamination from bacteria, microbes and residual antibiotics that are passed in manure.<sup>241 242</sup> Pollution resulting from large-scale livestock production is more acute and noticeable than that from other livestock production systems.<sup>243</sup>

In Kansas, nitrate-nitrogen is one of the most widespread inorganic contaminants of groundwater. Major sources are from application of fertilizer, human and animal wastes, and plant decay. However, the presence of nitrate-nitrogen usually is associated with agriculture, the largest industry in Kansas.<sup>244</sup> Nitrate-nitrogen concentrations increased from the 1970s to the 1990s, and related increases in groundwater seem to follow the trend of increased irrigated farming in Kansas.<sup>245</sup> South-central Kansas has higher nitrate-nitrogen concentrations than western Kansas, at least in part due to the sandier soils and shallower aquifer in south-central Kansas.<sup>246</sup>

Water quality can be affected by large-scale livestock operations through contamination of surface or groundwater supply. Zoonotic pathogens (pathogens naturally transmitted between animals and humans) have the potential for transport to ground water and surface water and may be subsequently ingested through recreation or drinking water; they also may contaminate food crops through fecally contaminated runoff or irrigation water or by contact with soil to which manure has been applied.<sup>247</sup> Animal wastes also

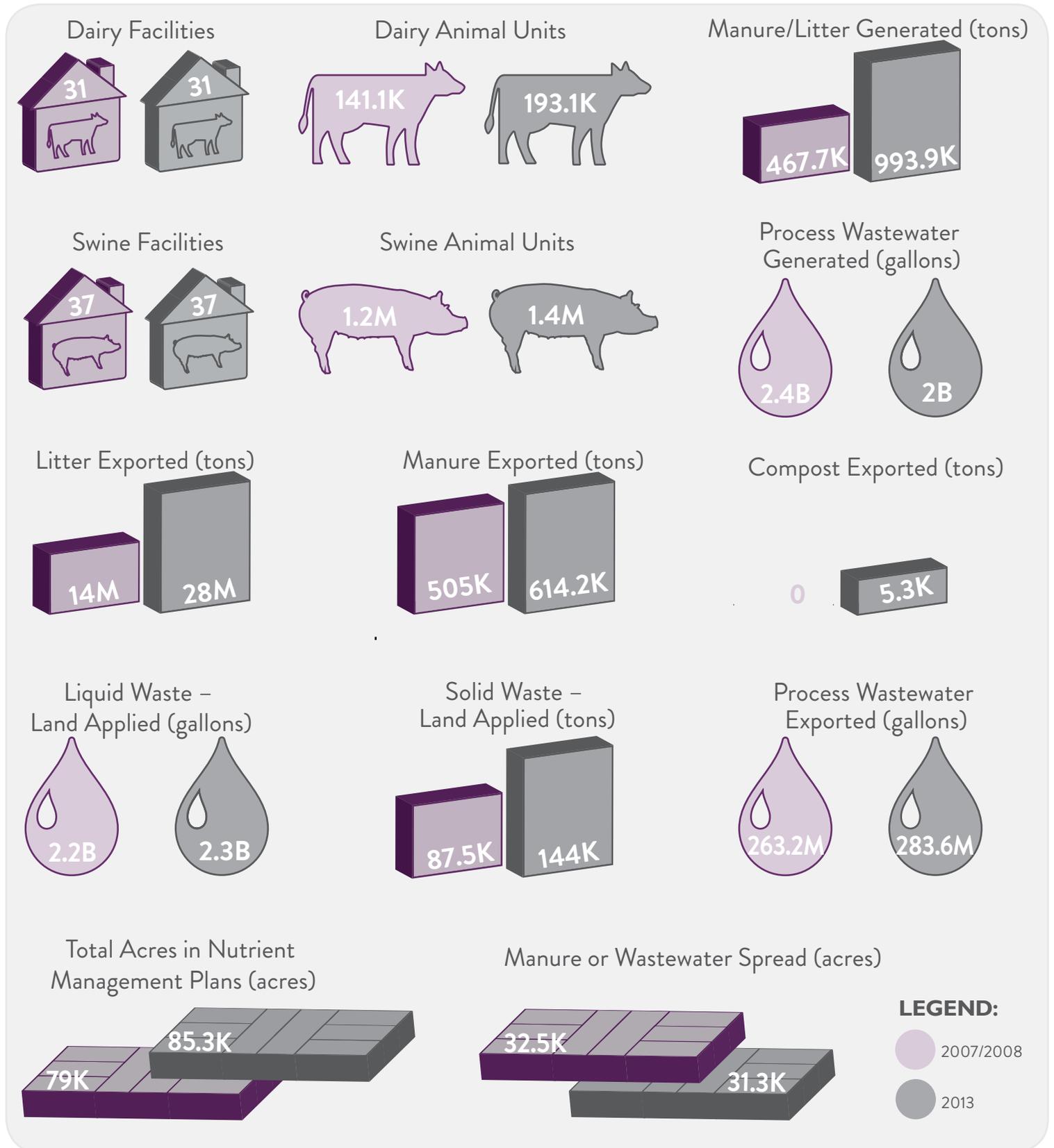
contain high quantities of many nutrients such as nitrogen and phosphorus.<sup>248</sup> Excess nitrates in water have been implicated in a number of health outcomes in susceptible populations.<sup>249</sup> Infants and others drinking nitrate-contaminated water can develop methemoglobinemia, a potentially fatal condition.<sup>250</sup>

Three microbes commonly found in livestock — *Escherichia coli*, *Campylobacter* and *Cryptosporidium* — have caused serious disease outbreaks via contaminated drinking water.<sup>251</sup> Excessive phosphorus levels in water emanating from waste from large-scale livestock operations can contribute to algal blooms and cyanobacterial growth in surface waters used for recreation and as sources of drinking water.<sup>252</sup> Exposure to chemical contaminants can occur in private wells and community water supplies and may present health risks.<sup>253</sup> Drinking water exposure to pathogens could occur in vulnerable private wells; under normal circumstances, community water utilities disinfect water sufficiently before distribution to customers.<sup>254</sup> Clear epidemiologic findings are lacking on the possible association of nitrate in drinking water with cancer risk.<sup>255</sup> High-risk populations are generally the very young, the elderly, pregnant women and immunocompromised individuals.<sup>256</sup>

### Soil Quality

Literature regarding the impact of large-scale livestock operations on soil quality is mixed; however, as a whole, it indicates a number of negative effects that accompany these operations. On the plus side, manure can improve the fertility, productivity and quality of soil.<sup>257</sup> However, the large volume of waste produced by CAFOs may lead to increased risks of nutrient overload in soils.<sup>258</sup> Excessive cyclic application of manure from large-scale livestock operations may contribute to soil quality degradation through continuous exposure of microbes, bacteria, viruses, parasites, antibiotic residues and antibiotic-resistant bacteria.<sup>259 260</sup> Another component of soil degradation is ammonia from industrial swine waste lagoons. It combines readily with various acidic compounds and figures in the production of acid rain, which can damage surrounding soil and vegetation and contribute to the eutrophication<sup>261</sup> (a process when water bodies receive excess nutrients) and acidification of soils.<sup>262</sup>

Figure 30. Animal Waste Generated by Large-Scale Swine and Dairy Operations in Study Counties, 2007/2008 and 2013.



Source: Data abstracted in 2014 by KHI staff from NPDES CAFO Permit Annual Reports on file with the Kansas Department of Health and Environment.

## What We Learned From Data

As part of their annual permit renewal process, large livestock facilities are required to report to the Kansas Department of Health and Environment estimates of the amount of animal waste generated and the disposition of the waste products. During 2007/2008, permitted swine and dairy facilities in the 33 counties included in the analysis reported that they generated more than 467,000 tons of manure and 2.3 billion gallons of process wastewater. In 2013, the reported amount of manure more than doubled to 993,870 tons, while the volume of process wastewater generated decreased (*Figure 30*, page 55).

## What We Learned from Stakeholders

### Waste

#### Interview Results

Most interviewees agreed that the operations increased the amount of waste in their county. However, they also stated that most operations handled the waste appropriately and followed environmental regulations.

*“The dairy operations produce a lot of waste. A lot of farmers buy and spread it as fertilizer, so it all gets used one way or the other.”*

– Community Member

#### Survey Results

Survey respondents also stated that the waste had generally increased as a result of swine and/or dairy operations in the county (*Figure 32*, page 57). Comments from survey respondents indicated concerns about water and soil contamination, and also mentioned that the odor from swine operations, in particular, was bothersome (*Figure 31*, page 57).

### Air Quality

#### Interview Results

Most interviewees stated that residents living in close proximity downwind of swine operations would encounter bad odors as a result of waste production by the operations. However, if operations were located far from towns, the odor was less pronounced. Overall, interviewees did not report negative effects on air quality

other than odor. In general, interviewees living in counties with dairy operations stated that the odor was not as strong as from other livestock operations.

*“The operations impact the air quality. The odor is pretty offensive, but it depends on which way air blows. The impact from the swine operation is not any greater than any other types of livestock operations we have.”*

– County Elected Official

*“The air quality is not as good as it was 10 years ago. The odor means there are other particulates in the air we breathe.”*

– Community Member

#### Survey Results

Several survey respondents stated that their main concern about the large-scale operations was the smell from waste (*Figure 31*, page 57). For those living near large-scale operations, it was more of an issue. Some respondents indicated that community members had experienced upset stomachs and headaches as a result of the odor from large-scale swine operations.

### Soil Quality

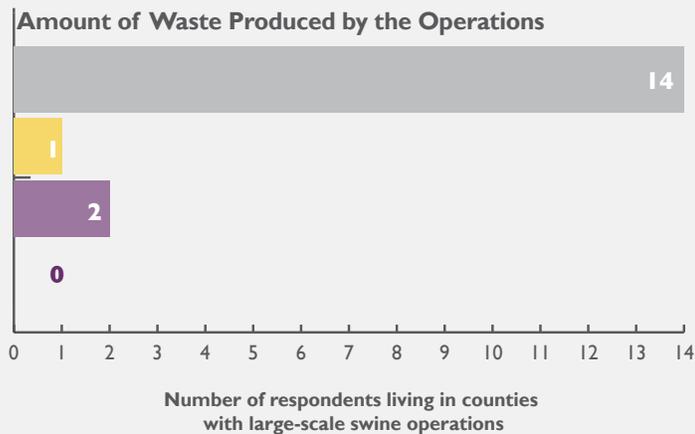
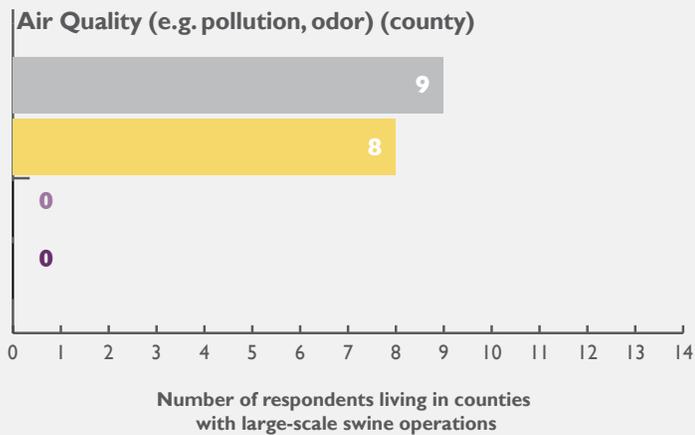
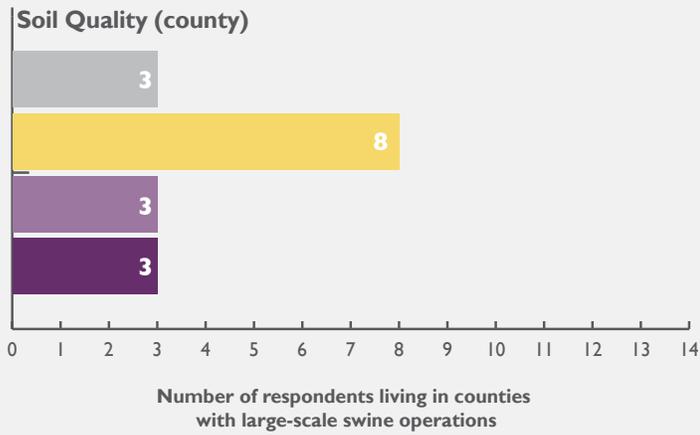
#### Interview Results

Most interviewees stated that the soil quality was adequate. Some suggested that their county had high nitrate levels in the soil but associated that with nearby feedlots rather than swine or dairy operations. A few interviewees stated they had concerns about how the soil quality might be impacted by waste from livestock operations but were not aware of any negative impacts to date.

*“Soil quality is a concern of mine, and some farmers are very concerned about the soil quality. They worry about potential contaminants and if the waste is disposed properly.”*

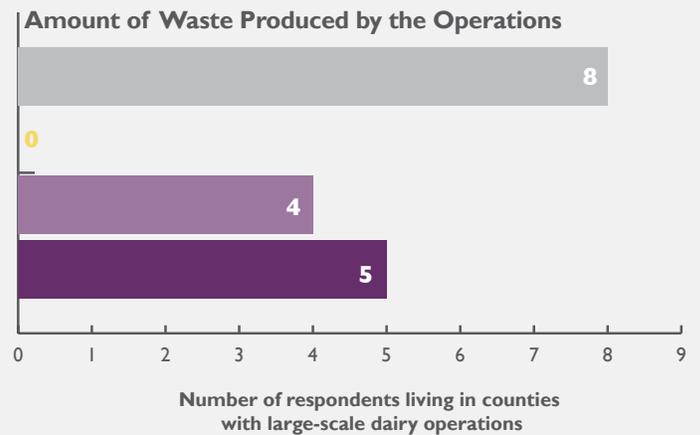
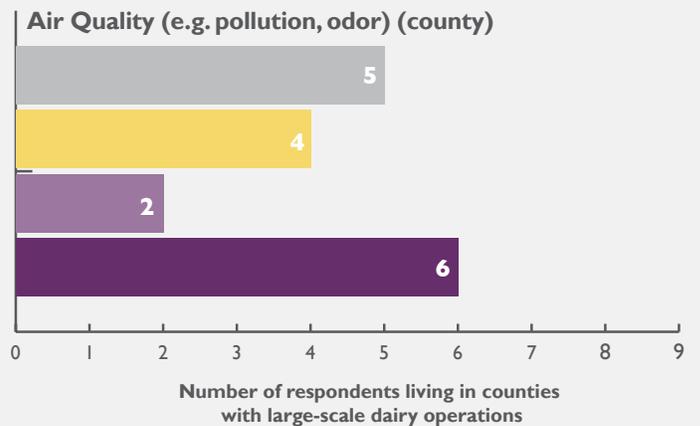
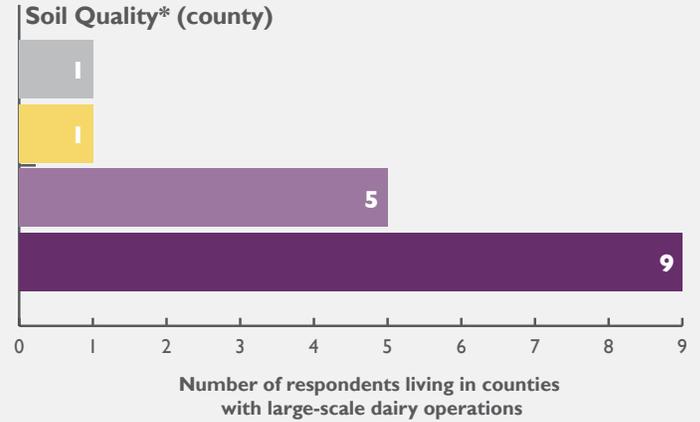
– Community Member

Figure 31. Survey Respondents' Feelings about Impacts of Large-Scale Swine Operations on Soil, Air and Waste, 2014 (n=17).



**LEGEND:**  
 Increased (Grey circle)    Decreased (Yellow circle)    No Impact (Purple circle)    Don't Know (Dark Purple circle)

Figure 32. Survey Respondents' Feelings about Impacts of Large-Scale Dairy Operations on Soil, Air and Waste, 2014 (n=17)\*.



**LEGEND:**  
 Increased (Grey circle)    Decreased (Yellow circle)    No Impact (Purple circle)    Don't Know (Dark Purple circle)

Note: An \*asterisk notes in Figure 32 that "Soil Quality" only had 16 respondents in the survey.

Source: KHI HIA Corporate Farming Project, 2015.

**Survey Results**

Survey respondents indicated that soil quality had been affected. For those living in counties with large-scale swine operations, the majority stated that soil quality decreased, while the remaining respondents were mixed, reporting an increase or no impact (Figure 31, page 57). For dairy operations, most stated there either had been no impact on soil quality or they were not sure of any impact (Figure 32, page 57).

*Water Quality*

**Interview/Survey Results**

Most interviewees stated that the water quality in the county was adequate. Some had experienced warnings about water quality but did not necessarily associate them with swine and dairy operations. A few interviewees stated they had concerns about how the water quality might be impacted by waste runoffs but were not aware of any negative impacts to date. A few survey respondents noted that water quality had diminished due to the operations having inadequate waste management and manure runoffs. Similar comments were made about large-scale dairies.

**Conclusion: Impacts for Kansas**

The majority of the literature concluded that large livestock operations negatively impact air quality. It also suggested that large-scale livestock operations may increase the risk for water pollution and soil contamination. On the plus side, swine manure can improve soil fertility, soil productivity and soil quality.<sup>263</sup> The

data analysis shows that during 2007/2008, permitted swine and dairy facilities in the 33 counties included in this study reported that they generated more than 467,000 tons of manure and 2.3 billion gallons of process wastewater. In 2013, the reported amount of manure generated more than doubled to 993,870 tons, while the volume of process wastewater decreased.

In general, most interviewees agreed that the amount of waste increased as a result of the operations. However, they also stated that most operations handled the waste appropriately by abiding by environmental regulations. The respondents also provided some comments regarding the potential effect of large-scale operations on water and soil quality. Overall, interviewees identified odor as being the main issue, especially for residents living in proximity of an operation. A few interviewees stated they had concerns about how the soil quality might be affected by waste production, but they were not aware of any negative impacts to date.

Based on literature review and data analysis, an increase in the number of large-scale swine or dairy operations would result in proportional increases in the amount of waste. Increased amounts of waste might have negative impacts on air quality and could increase the risk for water pollution and soil contamination. A potential decrease in air quality might have several negative health effects, including increased risk of developing respiratory illnesses. The extent of the impacts might depend on the number and density of new operations and management practices (Figure 33).

*Figure 33. Impacts of an Increase in the Number of Large-Scale Swine and Dairy Operations on Amount of Waste Produced and Associated Health Outcomes.*

Health Factor or Outcome	Expected Effect Based on Literature	Expected Effect Based on Data	Stakeholder Projections	Based on Literature and Data				
				Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
Waste	Increase	Increase	Increase	Mixed	Medium	Likely	Community members	**
Air Quality	Decrease	N/A	Decrease	Negative	Medium	Likely		**
Water Quality	Decrease	N/A	Mixed	Uncertain	Medium	Possible		**
Soil Quality	Decrease	N/A	Mixed	Uncertain	Medium	Possible		*

Note: See Legend, Appendix B, page 64.

Source: KHI HIA Corporate Farming Project, 2015.

**Figure 34. Pathway Diagram: How Changes in the Number of Large-Scale Swine and Dairy Operations May Affect Antibiotic Use and Associated Health Outcomes.**



**LEGEND:** ● Might be impacted

Source: KHI HIA Corporate Farming Project, 2015.

### Key Findings

- An increase in the number of large-scale swine or dairy operations likely will increase the volume of antibiotics used, given current practices and federal regulations. The U.S. Food and Drug Administration (FDA) issued a voluntary guidance to promote judicious use of antimicrobial in drugs food-producing animals. The change might not be fully implemented by pharmaceutical manufacturers until December 2016.
- Continued or increased widespread use of subtherapeutic antibiotics can contribute to Kansans' antimicrobial resistance.
- Livestock operation employees and nearby residents would be at the greatest risk of exposure to antibiotic-resistant organisms.

### Recommendations

*Kansas Department of Agriculture and Kansas Department of Health and Environment could consider:*

- Exploring alternatives to subtherapeutic use of antibiotics in livestock production and communicating findings with large-scale livestock operations in Kansas.\*
- Exploring the feasibility of monitoring the use of antibiotics in livestock operations in Kansas.\*
- Restricting subtherapeutic antibiotic use in livestock operations to antibiotic classes that are not used to treat human diseases.\*
- Strengthening routine surveillance of the prevalence and epidemiology of antibiotic-resistant infections by expanding the categories of antibiotic-resistant infections that are included in the Kansas list of reportable diseases.

*Kansas State University and its Extension Offices could consider:*

- Conducting workshops and providing other educational opportunities to Kansas agribusinesses related to judicious use of medically important antimicrobial drugs in food-producing animals.

Note: \*An asterisk notes recommendations that were deemed a priority by the HIA Advisory Panel members in terms of feasibility, alignment with findings and whether or not they addressed vulnerable populations.

## Antibiotic Resistance and Health

Bacteria and viruses have been shown to be highly adaptable to their environments. As microbes are exposed to antimicrobial agents, they readily adapt to become resistant to the drugs. Genetic material from the resistant microbes may then be transferred to other microbes, spreading the drug resistance throughout the environment and reducing the effectiveness of antibiotics for treating disease. When antibiotics (that are the same or similar to those used to treat disease in humans) are administered at low doses and on a routine basis to livestock living in confinement, ideal conditions are created to foster the development of antibiotic-resistant microbes that then make their way into the community.<sup>264</sup> Humans who live near large-scale livestock operations may be exposed to those antibiotic-resistant bacteria and develop infections that do not respond to treatment with the usual regimen of antibiotics.<sup>265</sup>

Antibiotic-resistant bacteria from large-scale livestock operations can reach humans through many routes, both direct (through food, air, water or contact) and indirect (via transmission of resistance in the environmental pool of bacteria).<sup>266 267 268</sup> The application of manure to land may transmit antibiotic-resistant microbials and could pose health concerns to people living near land application areas.<sup>269</sup> Inhalation of airborne bacteria from these facilities may help transfer drug-resistant bacterial pathogens (such as parasites, bacteria and viruses) from animals to humans.<sup>270</sup>

Antibiotic resistance may disproportionately impact employees at large-scale livestock operations.<sup>271</sup> Epidemiologic studies have shown that farmers and slaughterhouse workers have higher incidences of antimicrobial-resistant bacteria than people in other occupations.<sup>272</sup> High dust exposure in animal confinement buildings is believed to be a respiratory health hazard because of the high content of microorganisms, endotoxins and allergens, and further risks may arise from the inhalation of dust contaminated with a combination of antibiotic-resistant organisms.<sup>273</sup>

Additionally, studies suggest that there is an association between the development of antimicrobial resistance in humans and increases in mortality, morbidity and length of hospitalization.<sup>274</sup>

## What We Learned From Literature

In the United States, subtherapeutic doses of antibiotics are routinely administered to animals in confined feeding operations to enhance weight gain and compensate for the heightened infection risk of raising animals under confined, stressful conditions.<sup>275 276</sup> Annually, at least 20 million pounds of antibiotics are administered to livestock — more than four times the estimated amount of the same medicines given to humans annually.<sup>277</sup> About two-thirds (65 percent) of the antibiotics are identical or closely related to antibiotics in human medicine. Subtherapeutic use of antibiotics is among the most controversial practices in CAFO management<sup>278</sup> because of its proven linkage to the development of antibiotic resistance. Large-scale swine production operations are more likely to provide subtherapeutic antibiotics than smaller operations, including feeder-to-finish operations (60 percent versus 20 percent) and farrow-to-finish operations (75 percent versus 40 percent).<sup>279</sup> These antibiotics can escape into the environment, as manure can contain antibiotics that are routinely added to animal feeds.<sup>280</sup>

### *Impact of Antibiotic Use on Antibiotic Resistance*

A strong body of scientific research has demonstrated that greater antibiotic use increases the development of antibiotic-resistant bacteria. Adding antibiotics to animal feed, especially at subtherapeutic levels to enhance weight gain, promotes increased development of antibiotic resistance among the present microbial populations.<sup>281 282 283 284 285 286 287</sup> Research indicates that increased use of antimicrobials in livestock may be related to a greater prevalence of resistant pathogens in manure.<sup>288 289 290</sup> Antimicrobial-resistant bacteria are generally shed in animal manure, but they may also be present in the mucosa of livestock animals.<sup>291</sup> A study of the presence of antibiotic-resistant bacteria at a large-scale swine operation found that 98 percent of the pathogens identified showed a high level of resistance to at least two antibiotics commonly used in swine production.<sup>292</sup> Another study examined air samples from two large-scale swine operations and found that resistant bacterial forms were found inside and downwind of the swine confinement facilities, indicating that resistant organisms were being produced in and released from these facilities.<sup>293</sup> Dairy farming was also shown to affect the incidence and distribution of drug resistance in the environment; farm manure contained significantly more resistant bacteria than the other sites.<sup>294</sup>

## Conclusion: Health Impacts for Kansas

The practice of administering subtherapeutic levels of antibiotics to livestock in confined feeding operations is commonplace in the United States. Published research provides strong evidence that this practice results in the development of antibiotic-resistant strains of bacteria.<sup>295 296 297 298 299 300 301</sup> Currently, no data are available that quantify the use of antibiotics in Kansas livestock operations. Therefore, data analysis was not performed on this topic area.

The majority of interviewees were unsure about the use of antibiotics in swine and dairy operations. The survey did not include questions about antibiotic resistance.

Based on findings from the literature review, an increase in the number of large-scale swine or dairy operations likely will increase the volume of antibiotics administered, given current practices and federal regulations (*Figure 35*). The volume of antibiotics used would increase even if the same dose is administered due to

addition of livestock to swine and dairy operations. This is due to a larger number of animals receiving antibiotics subtherapeutically.

Continued or increased widespread use of subtherapeutic antibiotics can contribute to bacteria resistance in humans because there are several pathways through which bacteria can be transferred to humans. Resistance can be spread on a large scale through farm workers, farm produce, and soil and water sources. Livestock operation employees and nearby residents would be at greatest risk of exposure to antibiotic-resistant organisms. However, the community at-large could also be exposed to antibiotic-resistant organisms due to the application of manure containing resistance bacteria to neighboring fields as fertilizers. The development of antimicrobial resistance in humans has been associated with increases in mortality, morbidity and length of hospitalization.

**Figure 35. Impacts of an Increase in the Number of Large-Scale Swine and Dairy Operations on Antibiotic Use and Associated Health Outcomes.**

Health Factor or Outcome	Expected Effect Based on Literature	Expected Effect Based on Data	Stakeholder Projections	Based on Literature and Data				
				Expected Health Impact	Maginitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
Antibiotic Use	Increase	N/A	N/A	Negative	Medium	Likely	Livestock operations' employees, residents who live in close proximity to operations	**
Antibiotic Resistance	Increase	N/A	N/A	Negative	Medium	Likely		**

Note: See Legend, *Appendix B*, page 64.

Source: KHI HIA Corporate Farming Project, 2015.



Figure A-1. Summary of Health Impacts of Changes to the Kansas Corporate Farming Law.

Health Factor or Outcome	Expected Effect Based on Literature	Expected Effect Based on Data	Stakeholder Projections	Based on Literature and Data				
				Expected Health Impact	Magnitude of Impact	Likelihood of Impact	Distribution	Quality of Evidence
<b>Impacts on Jobs</b>								
<b>General Population</b>								
Jobs	Mixed	Mixed	Increase	Mixed	Medium	Possible	Employees, their families and some businesses in the community	**
Unemployment	Mixed	Increase	N/A	None	None	Unlikely	N/A	**
<b>Employees of Swine and Dairy Operations</b>								
Health Insurance	Mixed	N/A	Mixed	Positive	Low	Possible	Some employees	*
Preventive Care	Mixed	N/A	Mixed	Positive	Low	Possible		*
Socioeconomic Status	Mixed	N/A	Increase	Mixed	Low	Possible		*
<b>Impacts on Property Values/Taxes</b>								
Property Values/Taxes	None	None	Mixed	None	None	Unlikely	N/A	**
<b>Some Residents</b>								
Property Values/Taxes	Decrease	N/A	Decrease	Negative	Low	Possible	Residents who live less than three miles from operation(s)	**
Socioeconomic Status	Decrease	N/A	N/A	Negative	Low	Possible		**
Nutrition/Physical Activity	Decrease	N/A	N/A	Negative	Low	Possible		**
<b>Impacts on Population</b>								
Population Size	Mixed	Mixed	Increase	Mixed	Medium	Possible	Community members	**
Health Care Providers	N/A	Decrease	N/A	Uncertain	Uncertain	Unlikely	N/A	*
Grocery Outlets	N/A	None	N/A	Uncertain	Uncertain	Unlikely	N/A	*
Crime	Increase	None	N/A	Uncertain	Uncertain	Uncertain	Community members	**
<b>Impacts on Waste</b>								
Waste	Increase	Increase	Increase	Mixed	Medium	Likely	Community Members	**
Air Quality	Decrease	N/A	Decrease	Negative	Medium	Likely		**
Water Quality	Decrease	N/A	Mixed	Uncertain	Medium	Possible		**
Soil Quality	Decrease	N/A	Mixed	Uncertain	Medium	Possible		*
<b>Impacts on Antibiotic Use</b>								
Antibiotic Use	Increase	N/A	N/A	Negative	Medium	Likely	Livestock operation employees, residents who live in close proximity to operations	**
Antibiotic Resistance	Increase	N/A	N/A	Negative	Medium	Likely		**

Source: KHI HIA Corporate Farming Project, 2015.

Figure B-1. Legend: Health Impacts for Kansas.

CRITERIA	DESCRIPTION
Expected Change Based on Literature	Increase – Literature achieves consensus that this indicator might increase. Decrease – Literature achieves consensus that this indicator might decrease. Mixed – Literature lacks consensus about this indicator’s potential direction. None – Literature achieves consensus that this indicator might remain unchanged. N/A – Literature was not available or performed on this indicator.
Expected Change Based on Data	Increase – Data analysis suggests that this indicator might increase. Decrease – Data analysis suggests that this indicator might decrease. Mixed – Data analysis lacks consensus about this indicator’s potential direction. None – Data analysis suggests that this indicator might remain unchanged. N/A – Data analysis was not possible or performed for this indicator.
Expected Change Based on Stakeholder Projections	Increase – Stakeholders anticipated seeing an increase. Decrease – Stakeholders anticipated seeing a decrease. Mixed – Stakeholders were divided in their opinions. None – Stakeholders anticipated seeing no change. N/A – Stakeholders didn’t express their opinion about this issue.
Expected Health Effect	Positive – Changes may improve health. Negative – Changes may impair health. Uncertain – Unknown how health might be impacted. Mixed – Changes may be positive as well as negative. None – No identified effect on health.
Magnitude of Impact (number of people affected)	High – Affects most or all people (such as the population of a given county or counties). Medium – Affects a large number of people (such as several groups of people in a given county or counties). Low – Affects few or very few people (such as only certain groups of people, for example, residents that live in close proximity to a livestock operation, employees of a livestock operation). It is important to note, that although only certain groups of people might be affected, the impact on a particular individual might be high. Uncertain – It is uncertain that impacts will occur as the result of the proposed changes. None – Affects no people.
Likelihood of Impact	Likely – It is likely that impacts might occur as the result of the proposed changes. Possible – It is possible that impacts might occur as the result of the proposed changes. Unlikely – It is unlikely that impacts might occur as the result of the proposed changes. Uncertain – It is uncertain that impacts will occur as the result of the proposed changes.
Distribution	The population most likely to be affected by changes in the health factor or outcome. N/A – Data analysis was not possible or performed for this indicator.
Quality of Evidence	*** – Strong data or literature. ** – Sufficient data or literature. * – Lacks either quality data or literature.

Source: KHI HIA Corporate Farming Project, 2015.

Figure C-1. Key Findings and Recommendations.

KEY FINDINGS		RECOMMENDATIONS	RATIONALE
AREAS	The findings were developed based on the literature review, data analysis and expert opinion (HIA Advisory Panel).	The recommendations were drawn from the findings and are intended to maximize health benefits while minimizing health risks.	The recommendations were based on evidence-based materials or expert opinion.
JOB	<ul style="list-style-type: none"> <li>An increase in the number of large-scale swine and/or dairy livestock operations could have some positive impact on total employment. However, no impact is projected on local unemployment rates or county-level rates of health insurance coverage.</li> <li>Swine operations are likely to have a stronger positive impact on total employment than dairy operations.</li> <li>It is unclear the extent to which large-scale swine and/or dairy operations would provide health insurance coverage and livable wages for their employees.</li> <li>Positive health effects associated with employment at large-scale swine or dairy operations might only be realized by some categories of employees (e.g., managers).</li> </ul>	<p><b>Livestock operations could consider:</b></p> <ol style="list-style-type: none"> <li>Hiring locally when feasible.</li> <li>Partnering with local schools to create workforce development programs and educational opportunities.</li> <li>Providing health insurance to employees.*</li> <li>Providing health insurance cost-sharing subsidies to employees.*</li> <li>Providing livable wages.*</li> </ol>	<ol style="list-style-type: none"> <li>According to the Kansas Board of Regents, education and post-secondary education focused on workforce needs and training provides employers and industries with skilled workers which leads to a higher quality of life for Kansans.<sup>302</sup></li> <li>(3) (4) (5) According to the U.S. Department of Health and Human Services, overall, people who have access to jobs enjoy better health and have slower declines in health status over time. Additionally, there is a strong positive relationship between a person's socioeconomic status (SES)<sup>303</sup> and their nutrition, physical activity, and access to health care.</li> <li>(5) Providing adequate wages, benefits and support (e.g., education programs) for livestock operation employees that live in Kansas communities could increase the potential for positive health impacts among the employees and their families.</li> </ol>

Note: \*An asterisk notes recommendations that were deemed a priority by the HIA Advisory Panel members in terms of feasibility, alignment with findings and whether or not they addressed vulnerable populations.

Figure C-1, continued

KEY FINDINGS		RECOMMENDATIONS	RATIONALE
AREAS	The findings were developed based on the literature review, data analysis and expert opinion (HIA Advisory Panel).	The recommendations were drawn from the findings and are intended to maximize health benefits while minimizing health risks.	The recommendations were based on evidence-based materials or expert opinion.
RESIDENTIAL PROPERTY VALUES/TAXES	<ul style="list-style-type: none"> <li>An increase in the number of large-scale swine or dairy operations might have minimal-to-no impact on county-level real property (e.g., commercial, agricultural and residential) values/taxes.</li> <li>Residential properties that are downwind, close to large livestock operations (less than three miles) and higher-priced would be more likely to experience a decline in property values. Owners of these properties might experience increased risk of mortality and morbidity associated with decline in their socioeconomic status related to changes in property values.</li> <li>The level of change in residential property values also would depend on the management practices of the livestock operation. Swine operations are likely to have a stronger impact on residential property values than dairy operations.</li> <li>An increase in the number of large-scale swine or dairy operations likely would have no impact on school funding due to a projected little-to-no impact on property values/taxes and the Kansas “equalization” school funding formula.</li> <li>An increase in the number and size of large-scale swine or dairy operations likely would have no impact on local government revenue due to a projected little-to-no impact on property values/taxes.</li> </ul>	<p><b>Kansas Legislature could consider:</b></p> <ul style="list-style-type: none"> <li>(6) Increasing the minimum separation distance from dairy operations with 1,000 animal unit capacity to any habitable structure in existence to three miles (from the current 0.76 miles). Increasing the minimum separation distance from swine operations with 3,725 animal unit capacity to any habitable structure in existence to three miles (from the current 0.95 miles).*</li> <li>(7) Developing and implementing a Kansas-specific siting tool to evaluate options, taking into consideration the facility size, waste management and odor reduction practices, and prevailing wind and weather patterns (e.g., OFFSET tool developed by the University of Minnesota<sup>304</sup>). Once such a tool has been developed and tested, it may be reasonable to relax the three-mile setback recommendation in some situations.</li> <li>(8) Identifying appropriate agencies (e.g., Kansas Department of Health and Environment, Kansas Department of Agriculture) to review existing regulations (e.g., separation distance) related to livestock operations and suggest changes based on the best available research.*</li> </ul> <p><b>Livestock operations could consider:</b></p> <ul style="list-style-type: none"> <li>(9) Compensating neighboring property owners for negative externalities associated with the operations. Various factors (e.g., loss dollars) could be considered when determining the amount of compensation. *Note: Compensation could also be given to county governments for costs incurred due to large-scale livestock operations (e.g., road and bridge repair).</li> <li>(10) Prevailing wind direction when locating operations and when possible, build downwind of residential properties.*</li> </ul>	<p><b>Utilizing “Best Practices:”<sup>305</sup></b></p> <ul style="list-style-type: none"> <li>(6)–(8) The majority of published research suggests that increasing the minimum distance from livestock operations to habitable structures to at least three miles would help to address some nuisances associated with residing near these operations (e.g., property depreciation, odor, noise, dust).<sup>306</sup></li> <li>(7) (8) The Environmental Protection Agency provides “Best Management Practices” (BMP) for animal feeding operations.<sup>307</sup> Utilizing “best practices”<sup>308</sup> such as the Odor From Feedlots Setback Estimation Tool (OFFSET), which is designed to estimate average odor impacts from a variety of animal facilities and manure storages, could assist livestock operations in determining appropriate separation distance.</li> </ul> <p><b>Quality of Life:</b></p> <ul style="list-style-type: none"> <li>(9) There is a strong positive relationship between a person’s socioeconomic status (SES)<sup>309</sup> and their nutrition, physical activity, and access to health care. Evidence from the literature suggests that a decline in property values may decrease overall SES. Compensating neighboring property owners could mitigate potential negative effects experienced associated with these operations.</li> <li>(10) Research indicates that odor from livestock operations often travels upwind. Considering the prevailing wind direction and locating operations downwind of residential properties may also mitigate any potential negative health effects that could result from dust or decreased air quality (e.g., respiratory conditions) and decrease the need for compensation.<sup>310</sup></li> </ul>

Note: \*An asterisk notes recommendations that were deemed a priority by the HIA Advisory Panel members in terms of feasibility, alignment with findings and whether or not they addressed vulnerable populations.

Figure C-1, continued

	KEY FINDINGS	RECOMMENDATIONS	RATIONALE
AREAS	The findings were developed based on the literature review, data analysis, and expert opinion (HIA Advisory Panel).	The recommendations were drawn from the findings and are intended to maximize health benefits while minimizing health risks.	The recommendations were based on evidence-based materials or expert opinion.
POPULATION	<ul style="list-style-type: none"> <li>Counties with large-scale swine operations might experience a decrease in population. However, counties with dairy operations might experience a slight increase or no change in population size.</li> <li>Modest changes in the population size are not likely to affect availability of health care providers, food sources and social cohesion. However, social cohesion also might be impacted by changes in the local demographics.</li> </ul>	<p><b>Local Agencies (e.g., Local Health Department) could consider:</b></p> <p>(11) Assessing the availability of services and infrastructure (e.g., health care providers, housing) in the community in order to accommodate any potential changes in population size and demographics of the community.*</p>	<p><b>Monitoring and Surveillance:</b></p> <p>(11) Many local health departments and community hospitals develop Community Health Assessments (CHAs) which assess the demographics and health status of Kansas communities in order to provide services efficiently and effectively.<sup>311 312</sup> Incorporating assessment of available services and infrastructure in CHAs, specifically in counties with large-scale livestock operations, may improve readiness for potential change in the population (e.g., demographics, size).</p>
WATER	<ul style="list-style-type: none"> <li>Water use for livestock operations in western Kansas makes up a small proportion (1.17 percent in 2008 and 1.23 percent in 2012 for 33 study and control counties) of total water use. While increases in the number and size of livestock operations likely would increase use of water for livestock, the impact on total water use is unclear as it would depend on other factors, such as changes in crop production and the availability of water use rights.</li> </ul>	<p><b>Kansas Department of Health and Environment and/or Kansas Department of Agriculture could consider:</b></p> <p>(12) Encouraging or providing incentives for owners of large-scale swine and dairy operations to minimize water use by employing conservation management practices.</p>	<p><b>Management Practices:</b></p> <p>(12) The 2014 report “A Long Term Vision for the Future of Water Supply in Kansas” was developed with input from Kansans across the state.<sup>313</sup> The plan includes several goals for developing and continuing water conservation practices. Livestock operations could maximize the use of water conservation management practices suggested by agencies such as the Environmental Protection Agency (Animal Feeding Operations – Best Management Practices (BMPs)).<sup>314</sup></p>

Note: \*An asterisk notes recommendations that were deemed a priority by the HIA Advisory Panel members in terms of feasibility, alignment with findings and whether or not they addressed vulnerable populations.

Figure C-1, continued

KEY FINDINGS		RECOMMENDATIONS	RATIONALE
AREAS	The findings were developed based on the literature review, data analysis and expert opinion (HIA Advisory Panel).	The recommendations were drawn from the findings and are intended to maximize health benefits while minimizing health risks.	The recommendations were based on evidence-based materials or expert opinion.
WASTE	<ul style="list-style-type: none"> <li>An increase in the number of large-scale swine or dairy operations will increase the amount of waste produced.</li> <li>Increased amounts of waste might have a negative impact on air quality and increase risk for water pollution and soil contamination. The extent of this impact could depend upon the number and density of new operations and management practices.</li> </ul>	<p><b>Kansas Department of Health and Environment and Kansas Department of Agriculture could consider:</b></p> <ul style="list-style-type: none"> <li>(13) Exploring technologies and tools like the “Odor Footprint Tool” developed by the University of Nebraska to improve odor control.*</li> <li>(14) Conducting a statewide study of existing large-scale livestock operations’ nutrient utilization plans (NUP) to determine if this process adequately regulates manure application in Kansas.</li> <li>(15) Identifying the volume of manure produced in Kansas and how much can be reasonably applied (specifically with potential increase in livestock operations).</li> <li>(16) Establishing and maintaining a publicly available database of all regulated animal feeding operations in Kansas. The database should include the name and location of each operation, the numbers and types of animals and animal units on each site, key characteristics of facility operations and waste management plans, and results of routine inspections or complaint investigations (e.g., similar to Iowa Database<sup>315</sup>).</li> </ul>	<p><b>Utilizing “Best Practices:”<sup>316</sup></b></p> <ul style="list-style-type: none"> <li>(13) Using “best practices” and evidence-based tools such as the “Odor Footprint Tool”, allows livestock operations to estimate and reduce problems with unpleasant odor around existing or proposed livestock facilities. This tool also provides information to determine the minimum separation distances that should be maintained around those facilities and helps in siting decisions. Additionally, tools like this one can help to compare odor control technology options for a facility.<sup>317</sup></li> </ul> <p><b>Surveillance and Monitoring:</b></p> <ul style="list-style-type: none"> <li>(14) (15) Monitoring the volume of manure produced could assist the state in developing appropriate plans for land application and disposal procedures of excess manure.</li> <li>(16) An online database would provide access to information about Kansas livestock operations (e.g., location, animal numbers, environmental or geological reviews; and details about manure management plans, production areas, manure storage structures and treatment systems). The database would support effective monitoring and planning.</li> </ul>

Note: \*An asterisk notes recommendations that were deemed a priority by the HIA Advisory Panel members in terms of feasibility, alignment with findings and whether or not they addressed vulnerable populations.

Figure C-1, continued

KEY FINDINGS		RECOMMENDATIONS	RATIONALE
AREAS	The findings were developed based on the literature review, data analysis and expert opinion (HIA Advisory Panel).	The recommendations were drawn from the findings and are intended to maximize health benefits while minimizing health risks.	The recommendations were based on evidence-based materials or expert opinion.
ANTIBIOTIC RESISTANCE	<ul style="list-style-type: none"> <li>An increase in the number of large-scale swine or dairy operations likely will increase the volume of antibiotics used, given the current practices and federal regulations. The U.S. Food and Drug Administration (FDA) issued a voluntary guidance to promote judicious use of antimicrobial in drugs food-producing animals. The change might not be fully implemented by pharmaceutical manufacturers until December 2016.</li> <li>Continued or increased widespread use of subtherapeutic antibiotics can contribute to Kansans' antimicrobial resistance.</li> <li>Livestock operation employees and nearby residents would be at the greatest risk of exposure to antibiotic-resistant organisms.</li> </ul>	<p><b>Kansas Department of Agriculture and Kansas Department of Health and Environment could consider:</b></p> <ul style="list-style-type: none"> <li>(16) Exploring alternatives to subtherapeutic use of antibiotics in livestock production and communicating findings with large-scale livestock operations in Kansas.*</li> <li>(17) Exploring the feasibility of monitoring the use of antibiotics in livestock operations in Kansas.*</li> <li>(18) Restricting subtherapeutic antibiotic use in livestock operations to antibiotic classes that are not used to treat human diseases.*</li> <li>(19) Strengthening routine surveillance of the prevalence and epidemiology of antibiotic-resistant infections by expanding the categories of antibiotic-resistant infections that are included in the Kansas list of reportable diseases.</li> </ul> <p><b>Kansas State University and its Extension Offices could consider:</b></p> <ul style="list-style-type: none"> <li>(20) Conducting workshops and providing other type of educational opportunities to Kansas agribusinesses related to judicious use of medically important antimicrobial drugs in food-producing animals.</li> </ul>	<p><b>Public Health:</b></p> <p>(16)–(19) The emergence of antibiotic-resistant microbes has been linked to excessive use of antibiotics, including subtherapeutic uses in livestock production, and infections caused by antibiotic-resistant organisms pose a threat to public health. In 2013, The U.S. Food and Drug Administration's (FDA) issued a guidance on judicious use of medically important antimicrobial drugs in food-producing animals attempts to address issues related to antibiotic resistance by phasing out the use of medically important antimicrobials in food animals for food production purposes and phasing in veterinary oversight of the remaining appropriate therapeutic uses of such drugs.<sup>318</sup> Although the proposed rule is voluntary, as of June 2014, all 26 drug manufacturers affected by this guidance have agreed to fully engage in these efforts by December 2016.<sup>319</sup></p> <p>In the meantime, relevant Kansas state agencies could consider implementing suggested recommendations 16–19 in order to decrease the subtherapeutic use of antibiotics in Kansas livestock operations. Once the FDA-proposed rule on judicious use of medically important antimicrobial drugs in food-producing animals rule is fully implemented, state agencies could assess whether any further or ongoing action needs to be taken.</p> <p>(20) Education about the judicious use of antibiotics (e.g., the efficacy of alternative non-antibiotic treatments and prevention technologies) could assist livestock facility operators in balancing business priorities with public health considerations.</p>

Note: \*An asterisk notes recommendations that were deemed a priority by the HIA Advisory Panel members in terms of feasibility, alignment with findings and whether or not they addressed vulnerable populations.

Source: KHI HIA Corporate Farming Project, 2015.

## HIA Key-Informant Interviews/Survey

### Part I. Key-Informant Interviews

In order to provide a deeper understanding of issues surrounding the presence of large-scale swine and dairy operations in Kansas, the HIA team conducted 13 key-informant interviews with community members in three out of the 22 counties selected for the HIA data analysis. All of these counties had one or more large-scale swine or dairy operation (*Figure D-1*).

#### Method of Selecting Interviewees

Interviewees were selected to ensure inclusion of diverse sectors and viewpoints. These interviewees included farmers, business owners, educators, city and county government officials and elected officials, among others. In order to achieve this, the HIA team: (1) reviewed county websites and official public documents to identify individuals from the sectors described above, and (2) utilized a “snowball” technique in order to identify additional individuals. The “snowball” technique is utilized when stakeholders and subject matter experts suggest individuals or organizations that could provide valuable insights into the issues

surrounding corporate farming in Kansas. For example, the HIA team asked the Advisory Panel members to recommend candidates for key informant interviews. As a result, one of the stakeholders recommended to interview an elected official who was a long-time resident in a community with large-scale swine operations. This “snowball” technique helped to access some hard-to-reach participants across the study areas.

#### Process

The interviews were conducted by two HIA project staff members over the phone, as a number of interviewees lived in counties that were located a considerable distance from KHI’s location in Topeka, Kansas. The majority of the interviews were conducted from May to July 2014. Interviews lasted an average of about one hour, but ranged from about 45 minutes to one-and-a-half hours long. The interviews were semi-structured in nature, meaning that the HIA team asked a standard set of questions, but they were tailored to interviewees through follow up or clarification questions as necessary. The interview questionnaire went through a detailed internal and external review and was approved by the University of Kansas School of Medicine-Wichita (KUSM-W).

*Figure D-1. Selected Communities for Key-Informant Interviews.*

	GREELEY COUNTY	HAMILTON COUNTY	WICHITA COUNTY
Total Permitted Animal Units for Swine and Dairy Operations	113,770	83,340	159,840
Number of large-scale swine operations	1	0	7
Number of large-scale dairy operations	2	6	0
Voting Record	In 2010, the Greeley County Commission voted to approve Seaboard Farms’ request to build a 132,000 hog facility. In 2014, KDHE approved the expansion of this operation.	Hamilton County commissioners authorized corporate hog facilities in 1994 but repealed this decision in 1995.	Voting information not available.

Source: KHI HIA Corporate Farming Project, 2015.

Interviews were completely voluntary and confidential. Interviewees were given the option to skip any question they did not wish to answer and/or terminate the interview at any time for whatever reason. No interviewees chose to terminate the interview.

**Each interview followed the same general structure:**

1. Interviewee was given an informed consent which outlined the interview protocol, including a confidentiality agreement.
2. Interviewer provided interviewee with background on the KHI HIA Corporate Farming Project.
3. Standard questions were presented to interviewee including prompts. Topics included:
  - a. History of corporate swine or dairy operations in their community.
  - b. Health impacts (positive and negative) associated with swine or dairy operations.
  - c. Anticipated future impacts if additional operations were to locate in their communities.

*Analysis*

During the interviews, one HIA project staff member asked questions while the other typed notes into the interview guide. Notes were coded using NVivo9, a qualitative analysis software tool, and Microsoft Excel. The HIA project staff discussed and

resolved any coding disagreements to ensure consistency in themes and results.

*Limitations*

Insights and experiences of individuals from communities deemed most likely affected by large-scale swine or dairy operations were gathered through a small convenience sample. A convenience sample is a type of nonprobability sampling which involves the sample being drawn from that part of the population which is close at hand. That is, a population is selected because it is readily available and convenient. As a result, it is likely that some sectors of the communities have not been adequately represented in this process. However, interviewees' perspectives provide important insights and can be helpful in understanding the complexity of issues surrounding the proposed changes to the Kansas Corporate Farming Law. Thus, they were used in the HIA process to provide additional context and background surrounding the policy topic, but didn't inform the HIA findings.

## Key-Informant Interviews: Informed Consent and Questionnaire

Interviewee name/title:

Date:

Method:

KHI Staff:

### *Health Impact Assessment Key Informant Questions (Community members)*

The Kansas Health Institute (KHI), in collaboration with the University of Kansas School of Medicine – Wichita (KUSM-W), is conducting a health impact assessment on proposed state legislation which proposes changes to the Kansas Corporate Farming Law, which includes allowing any agricultural operation to operate anywhere in the state of Kansas. A Health Impact Assessment is policy tool, which combines available research, data assessment and community input in order to project potential positive and negative health impacts of a decision.

The purpose of this interview is to bring varying perspectives into the health impact assessment analysis, and you have been identified as a key community member. We will also talk with additional community members and stakeholders from other Kansas communities and statewide organizations and state policymakers about the potential health impacts of this legislation. While we realize there are many possible impacts related to the proposed legislation, KHI has projected that there will likely be an increase in the number of large-scale swine and dairy operations in the state, should it pass. In order to assess the potential positive and negative health effects of an increased number of large-scale farms in Kansas, we will ask you to describe any possible health-related impacts of existing or potential large-scale swine and dairy operations in your community.

While your participation is invaluable to the process, it is voluntary. This interview should take about 45 minutes to an hour. All responses will be kept strictly confidential and no statements will be attributed directly to you unless we get your consent to do so.

If you have any questions about this project or this interview, please email ([ssmith@khi.org](mailto:ssmith@khi.org)) or call (785) 233-5443 and ask for Sheena Smith.

### *Corporate Agriculture Legislation*

We will first start off by asking a few questions related to the Corporate Agriculture legislation (Senate Bill 191).

1. Are you familiar with the state legislation regarding changes to Corporate Agriculture regulations?  
If not, explain the legislation.
2. Do you/your organization have a specific position on this legislation? If so, what is that position? Please explain.
  - a. Did you have any involvement in the legislative process regarding the proposed expansion of Corporate Agriculture operations in Kansas (e.g., testimony, advocacy, decision-maker, community member)? If so, please describe.

## *History of Large-Scale Farming in Your Community*

Next, we will ask you a few questions about large-scale farming operations in your community and county.

1. Approximately, how many large-scale dairy and swine operations do you have in your county (Large-scale operations: 1,000 dairy cows, 3,700 swine)?
  - a. In general, when did these large-scale farming operations arrive in your community?
    - Within the last 5 years
    - Within the last 10 years
    - Within the last 15 years
    - Longer than 15 years

Now we would like to get an idea of how you and the community felt about large-scale operations at the time they located in your community.

For counties that have a mix of swine and dairy operations: Do you and/or the community feel differently about swine and dairy operations? If so, please explain. If yes, please make a distinction between swine and dairy operations when responding.

2. In your opinion, what were the primary arguments of those in support of these operations?
3. In your opinion, what are the primary arguments of those in opposition of these operations?
4. What were your general feelings about the operations when they located in the county?
  - a. Generally positive? Generally negative? Please explain.
5. How did the community feel about the operations when they located in the county?
  - a. Generally positive? Generally negative? Please explain.

Now we would like to get an idea of how you and the community feel about the operations after they have been in the county for some time.

6. What are your general feelings about the operations now?
  - a. Generally positive? Generally negative? Please explain.
7. How does the community currently feel about the operations?
  - a. Generally positive? Generally negative? Please explain.
8. What are your thoughts about additional large-scale swine and dairy operations coming to your community?
  - a. Generally positive? Generally negative? Please explain.

*Key-Informant Interviews: Informed Consent and Questionnaire, continued**Health Impacts of the Legislation*

So far we have asked a few general questions about large-scale farming operations, but now I would like you to think more specifically about the general impacts and health impacts of large-scale farming operations in your community.

1. Do you think the presence of swine/dairy operations in your community has had any impacts on your community? What about the county? If so, please describe both positive and negative impacts in your responses.
2. Do you think large-scale farming operations have any impact(s) on the health of your community/county? If so, please describe. Please explain both positive and negative impacts in your responses.
  - a. Positive
  - b. Negative
3. Do you think additional large-scale farming operations would have any impact(s) on the health of your community/county? If so please describe. Please explain both positive and negative impacts in your responses.

Preliminary analysis of large-scale swine and dairy operations identified a few areas that could be impacted. Now, we would like to get your observations on if your community/county has experienced any impacts in the following areas.

For counties that have a mix of swine and dairy operations: Do you and/or the community feel differently about swine and dairy operations? If so, please explain. If yes, please make a distinction between swine and dairy operations when responding.

To your knowledge, how have the following areas been impacted by large-scale farming operations, if at all? Please explain:

4. Property Values
  - a. Property Values
  - b. Property Taxes
  - c. Local Government Revenue
  - d. School Revenue
  - e. Graduation Rates
5. Employment
  - a. Jobs (operations, community, county)  
Some research indicates that operations sometimes supports other community businesses.
  - b. Health Insurance, other benefits
  - c. Wages (operations, community, county)
  - d. Work environment
6. Economic Development
  - a. Economic development (e.g., large business investments in the community)
  - b. Community resources
7. Water
  - a. Water quantity (operations, community, county)
  - b. Water availability (community, county)
  - c. Water quality (operations, community, county)

## *Key-Informant Interviews: Informed Consent and Questionnaire, continued*

8. Waste Production
  - a. Amount produced (operations)
  - b. Air quality (operations, community, county)
  - c. Soil quality (operations, community, county)
9. Antibiotic Use
  - a. Use by large-scale operations
  - b. Resistance (operation employees, community, county)

Now we will ask you a few questions about health considerations related to large-scale farming operations in your community.

10. Do you think that health considerations are part of the dialogue around the large-scale farming operations in your community/county? If not, what health considerations are important, if any?
11. Do you think that large-scale swine/dairy/both farming operations in your community has impacted certain groups over others (e.g., minorities, youth, elderly, etc.)? If so, please explain. If not, why?
12. Do you think that this legislation would impact some groups of people over others (e.g., minorities, youth, elderly, etc.)? If so, please explain. If not, why?

## *Community Input*

As we mentioned earlier, KHI and KUSM-Wichita are conducting this HIA to better understand how large-scale farming operations could impact health. This HIA will specifically address the health impacts associated with increased number of locations where swine and dairy operations might operate in the state.

1. What kind of information would be useful to include in this HIA (e.g., economic impacts, certain data)?
2. What kind of information would be most useful to you as a community member?

## *Closing Questions*

1. Is there anything else you would like to add?
2. Are there others that you recommend we contact?

Thank you for your time! If you have any questions, please call (785) 233-5443 and ask for Sheena Smith.

## Part II. Survey Methodology

In order to supplement findings from the key-informant interviews, the HIA Team conducted a survey using Qualtrics, a web-based survey software. The survey included a mix of open and closed-ended questions. It was developed by the HIA team and pilot tested by reviewers for question clarity, flow and accuracy. Reviewers included staff at KHI with survey methodology experience and several members of the HIA Advisory Panel. Feedback was incorporated into the survey. The HIA team utilized a “snowball” method. The survey was distributed through several means: 1) various organizations with members that would likely have knowledge regarding the topic (e.g., Kansas Association of Counties, Kansas Association of Local Health Departments), 2) Advisory Panel members, and 3) from a list compiled for key informant interviews by the HIA team. The survey was available to respondents from July 24 to September 10, 2014. Overall, 64 people responded to the survey. Out of those that responded, 23 individuals had lived in a county with a presence of either large-scale swine and/or dairy operations. Those respondents provided their perspectives on potential impacts of large-scale swine and dairy operations in a variety of areas including economic, environmental and health impacts. Their responses were analyzed and coded according to common themes in Microsoft Excel, and reported in the aggregate to maintain confidentiality. The survey questionnaire and additional survey findings can be found on pages 101–111.

### *Corporate Agriculture HIA Survey: Survey Questionnaire*

The Kansas Health Institute (KHI) is an independent, nonprofit health policy and research organization that informs policymakers about important issues affecting the health of Kansans. KHI, in collaboration with the University of Kansas School of Medicine – Wichita, is conducting a Health Impact Assessment (HIA).

An HIA is a policy tool that combines the best available research, data and community input in order to estimate a decision’s potential positive and negative health impacts (physical and mental). An HIA informs the policy-making process, but does not take a position. This HIA will examine health impacts of state legislation that proposes changes to the Kansas Corporate Farming Law, which includes allowing any agricultural business to operate anywhere in the state of Kansas.

The purpose of this survey is to bring diverse perspectives into the HIA. While there could be various possible impacts related to the proposed legislation, it has been projected that there would likely be an increase in the number of large-scale swine and dairy operations in the state, should it pass. In order to fully understand the health effects of an increased number of large-scale livestock operations, we would like to get your perspectives on impacts of existing large-scale swine and dairy operations in your community. For your reference, a link to the legislation is included below:

[http://bit.ly/KSleg\\_SB191](http://bit.ly/KSleg_SB191)

This survey should take about 15 minutes of your time. Survey responses will be kept strictly confidential and all results will be reported in the aggregate only. If you have any questions about this survey or the HIA project, please contact Sheena Smith by email ([ssmith@khi.org](mailto:ssmith@khi.org)) or phone (785) 233-5443.

Thank you for your time and input!

Corporate Agriculture HIA Survey: Survey Questionnaire

Please indicate if you currently live or have lived in one of these counties in the past 10 years (listed below). If not, please select "other".

- Cheyenne, Clay, Finney, Grant, Gray, Greeley, Hamilton, Haskell, Hodgeman, Kearny, Meade, Morton, Norton, Pratt, Scott, Seward, Stanton, Stevens, Thomas, Wallace, Washington, Wichita
- Other

To your knowledge, is there currently either a large-scale swine farming operation or a large-scale dairy farming operation in your county? (Large-scale operations in Kansas range from approximately approximately 3,700 to 100,000 and 1,000 to 60,000 or more dairy cows or more swine.)

- Yes
- No

In general, when did these large-scale swine and/or dairy operation(s) arrive in your county? Please select one choice for each type of operation, if present in your county. (Large-scale operations in Kansas range from approximately 1,000 to 60,000 or more dairy cows and approximately 3,700 to 100,000 or more swine.)

	Swine Operations	Dairy Operations
Within the last 5 years	<input type="checkbox"/>	<input type="checkbox"/>
Within the last 10 years	<input type="checkbox"/>	<input type="checkbox"/>
Within the last 15 years	<input type="checkbox"/>	<input type="checkbox"/>
Longer than 15 years	<input type="checkbox"/>	<input type="checkbox"/>
Don't know	<input type="checkbox"/>	<input type="checkbox"/>
Not present in my county	<input type="checkbox"/>	<input type="checkbox"/>

Large-Scale Livestock Operations in Your County

What were your general feelings about large-scale livestock operation(s) when they located in the county? Please select one choice for each type of operation.

	Swine Operations	Dairy Operations
Generally positive	<input type="checkbox"/>	<input type="checkbox"/>
Neutral	<input type="checkbox"/>	<input type="checkbox"/>
Generally negative	<input type="checkbox"/>	<input type="checkbox"/>
No operation of this type in my county	<input type="checkbox"/>	<input type="checkbox"/>

In your opinion, how did people living in your county feel about the large-scale livestock operation(s) when they located in the county? Please select one choice for each type of operation.

	Swine Operations	Dairy Operations
Generally positive	<input type="checkbox"/>	<input type="checkbox"/>
Neutral	<input type="checkbox"/>	<input type="checkbox"/>
Generally negative	<input type="checkbox"/>	<input type="checkbox"/>
No operation of this type in county	<input type="checkbox"/>	<input type="checkbox"/>
Don't know	<input type="checkbox"/>	<input type="checkbox"/>

Corporate Agriculture HIA Survey: Survey Questionnaire, continued

What are your general feelings about the large-scale livestock operation(s) in your county now? Please select one choice for each type of operation.

	Swine Operations	Dairy Operations
Generally positive	<input type="checkbox"/>	<input type="checkbox"/>
Neutral	<input type="checkbox"/>	<input type="checkbox"/>
Generally negative	<input type="checkbox"/>	<input type="checkbox"/>
No operation of this type in county	<input type="checkbox"/>	<input type="checkbox"/>

How do you think other people who live in your county currently feel about the large-scale livestock operation(s)? Please select one choice for each type of operation.

	Swine Operations	Dairy Operations
Generally positive	<input type="checkbox"/>	<input type="checkbox"/>
Neutral	<input type="checkbox"/>	<input type="checkbox"/>
Generally negative	<input type="checkbox"/>	<input type="checkbox"/>
No operation of this type in the county	<input type="checkbox"/>	<input type="checkbox"/>
Don't know	<input type="checkbox"/>	<input type="checkbox"/>

What are your feelings about adding new or expanding existing large-scale livestock operation(s) locating in your county? Please select one choice for each type of operation.

	Swine Operations	Dairy Operations
Generally positive	<input type="checkbox"/>	<input type="checkbox"/>
Neutral	<input type="checkbox"/>	<input type="checkbox"/>
Generally negative	<input type="checkbox"/>	<input type="checkbox"/>
Don't know	<input type="checkbox"/>	<input type="checkbox"/>

*Large-Scale Swine Operations in Your County*

Do you think the presence of large-scale swine operation(s) has had any impact(s) on your county?

- Yes
- No
- There are no large-scale swine operations in my county

Please describe any impact(s) (positive and/or negative) that the presence of large-scale swine operation(s) has had on your county.

Do you think the presence of large-scale swine operation(s) have had any impact(s) (positive and/or negative) on the health of people in your county?

- Yes
- No

*Corporate Agriculture HIA Survey: Survey Questionnaire, continued*

Please describe any health impact(s) (physical and/or mental) (positive and/or negative) the presence of large-scale swine operation(s) have had on the health of people in your county.

Do you think there would be any health impact(s) (physical and/or mental) (positive and/or negative) from adding new or expanding existing large-scale swine operations in your county? Please explain.

- Yes \_\_\_\_\_
- No \_\_\_\_\_
- Don't know \_\_\_\_\_

*Large-Scale Dairy Operations in Your County*

Do you think the presence of large-scale dairy operation(s) has had any impact(s) on your county?

- Yes
- No
- There are no large-scale dairy operations in my county.

Please describe any impact(s) (positive and negative) large-scale dairy operation(s) has had on your county.

Do you think the presence of large-scale dairy operation(s) have had any impact(s) on the health of your county?

- Yes
- No

Please describe any impact(s) (positive and negative) dairy operation(s) have had on the health of your county.

Do you think there would be any health impact(s) (physical and/or mental) (positive and/or negative) from adding new or expanding existing large-scale dairy operations in your county? Please explain.

- Yes \_\_\_\_\_
- No \_\_\_\_\_
- Don't know \_\_\_\_\_

Corporate Agriculture HIA Survey: Survey Questionnaire, continued

Areas of Impact

Large-scale livestock operations: potential areas of impact research and preliminary analysis identified potential areas (economic, water, waste production, etc.) that may be impacted by the presence of large-scale swine and/or dairy operation(s).

Now, we would like to get your opinions on whether any of these identified areas have been impacted by the presence of swine and/or dairy operations in your county.

For analysis purposes, please choose which type of large-scale livestock operation(s) that are present in your county. (Large-scale operations in Kansas range from approximately 1,000 to 60,000 or more dairy cows and approximately 3,700 to 100,000 or more swine.) Please think of this type of operation when answering the following questions about potential impacts. If you have both types of operations present in your county, please select “both”. If you have multiple large-scale operations, please think of their cumulative impact when answering questions about potential impacts.

- Swine
- Dairy
- Both

Please answer the following questions related to potential impacts of large-scale swine operations in your county.

Do you think the following areas have been impacted by large-scale swine operations in your county? If so, how?

Impact				
	Increased	No Impact	Decreased	Don't Know
Property Values (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Property Taxes (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local Government Revenue (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School Revenue (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High School Graduation Rates (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you think the following areas related to employment have been impacted by large-scale swine operations in your county?

Impact				
	Yes	No	Don't Know	Please Describe
Jobs (provided by operations)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Health Insurance (provided by operations)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Do you think the following areas related to community development been impacted by large-scale swine operations in your county? If so, how?

Do you think the following areas related to water have been impacted by the presence of large-scale swine operations in your county? If so, how?

	Impact			
	Increased	No Impact	Decreased	Don't Know
Water quantity (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water availability (for use by people that live in the county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water quality (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you think the following areas related to waste (manure) production been impacted by the presence of large-scale swine operations in your county? If so, how?

	Impact			
	Increased	No Impact	Decreased	Don't Know
Amount of waste produced by the operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air quality (e.g., pollution, odor)(county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soil quality (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you think that the presence of large-scale swine operation(s) in your county has impacted some segments of the population over others (e.g., minorities, youth, elderly, etc.)?

- Yes
- No
- Don't know

Which segments of the population (e.g., minorities, youth, elderly, etc.) do you think the presence of large-scale swine operation(s) in your county has impacted? Please explain.

Corporate Agriculture HIA Survey: Survey Questionnaire, continued

Please answer the following questions related to potential impacts of large-scale dairy operations in your county.

Do you think the following areas have been impacted by large-scale dairy operations in your county? If so, how?

Impact				
	Increased	No Impact	Decreased	Don't Know
Property values (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Property taxes (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local government revenue (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School revenue (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High school graduation rates (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you think the following areas related to employment have been impacted by large-scale dairy operations in your county?

Impact				
	Yes	No	Don't Know	Please Describe
Jobs (provided by operations)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Health insurance (provided by operations)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Do you think the following areas related to community development have been impacted by large-scale dairy operations in your county? If so, how?

Impact				
	Increased	No Impact	Decreased	Don't Know
Economic activity (e.g., business creation or expansion, additional revenue)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Community resources (e.g., social services, availability of housing)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you think the following areas related to water have been impacted by the presence of large-scale dairy operations in your county? If so, how?

	Impact			
	Increased	No Impact	Decreased	Don't Know
Water quantity (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water availability (for use by people that live in the county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water quality (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you think the following areas related to waste (manure) production have been impacted by the presence of large-scale dairy operations in your county? If so, how?

	Impact			
	Increased	No Impact	Decreased	Don't Know
Amount of waste produced by the operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air quality (e.g., pollution, odor)(county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soil quality (county)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you think that the presence of large-scale dairy operation(s) in your county has impacted some segments of the population over others (e.g., minorities, youth, elderly, etc.)?

- Yes
- No
- Don't know

Which segments of the population (e.g., minorities, youth, elderly, etc.) do you think the presence of large-scale dairy operation(s) in your county has impacted? Please explain.

### Closing Questions

Please answer the following questions about other topics related to large-scale swine and/or dairy operations in your county.

Please provide any additional comments you would like to add regarding the presence of large-scale swine and/or dairy operations in your county.

Please indicate the sector you primarily work in.

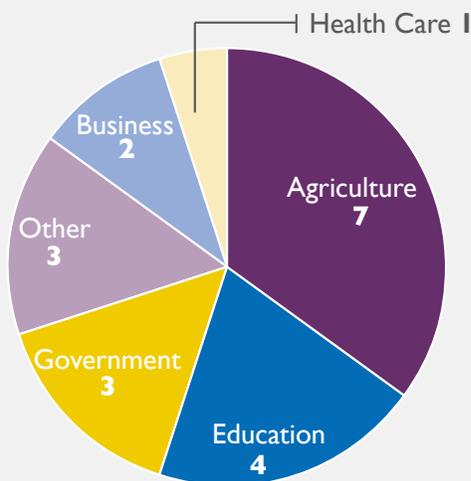
- Agriculture
- Business
- Education
- Health care
- Academia
- Government (city, county, state)
- Insurance/Finance
- Housing
- Other \_\_\_\_\_

## Part III. Additional Survey Findings

### Description of Respondents

The survey was sent using a “snowball” method, therefore it was not possible to calculate a response rate, as there was no record of how many people received the survey. A total of sixty-four people responded to the survey. Respondents that answered “yes” to living in a county with a presence of either swine or dairy operations within the past 10 years were given the option of answering further questions in the survey. Those that answered “no” were not asked further questions since they would not have been applicable to those respondents. Out of those that responded, 23 individuals had lived in a county with a presence of either large-scale swine and/or dairy operations while 35 did not. Those respondents provided their perspectives on potential impacts of large-scale swine and dairy operations in a variety of areas including economic, environmental and health impacts. Survey respondents were also asked to identify what sector they were from. Twenty respondents provided information on their sectors, which are depicted in *Figure D-2*.

*Figure D-2. Survey Respondents by Sector.*



Note: Not all respondents provided information about the sector in which they worked.

Source: KHI HIA Corporate Farming Project, 2015.

### Feelings about Large-Scale Livestock Operations

When asked about their general feelings regarding large-scale swine and dairy operations at the time they located in their counties, respondents gave a range of responses. For swine operations, the majority of respondents indicated their feelings were “generally negative,” while responses were more mixed for dairy operations. For those that had dairy operations in their counties, a majority responded their feelings were “generally positive” or “neutral” (*Figure D-3*, page 85). When asked their general feelings toward large-scale swine and dairy operations after they have been in the county for some time, respondents’ feelings shifted slightly, with more feeling “generally negative” about large-scale swine and dairy operations. When asked about their feelings regarding additional swine operations locating in their counties, 18 respondents felt “generally negative”, and five felt “generally positive” or “neutral”. Although those living in counties with large-scale dairies were evenly split concerning their feelings about existing operations, a greater number felt “generally negative” about adding new or expanding existing operations. Five respondents felt “generally positive” or “neutral” (*Figure D-4*, page 85).

“You cannot be outside when the wind is blowing the smell towards you.”

– Survey Respondent

“The operations generate relatively cheap fertilizer for a few farmers very close by.”

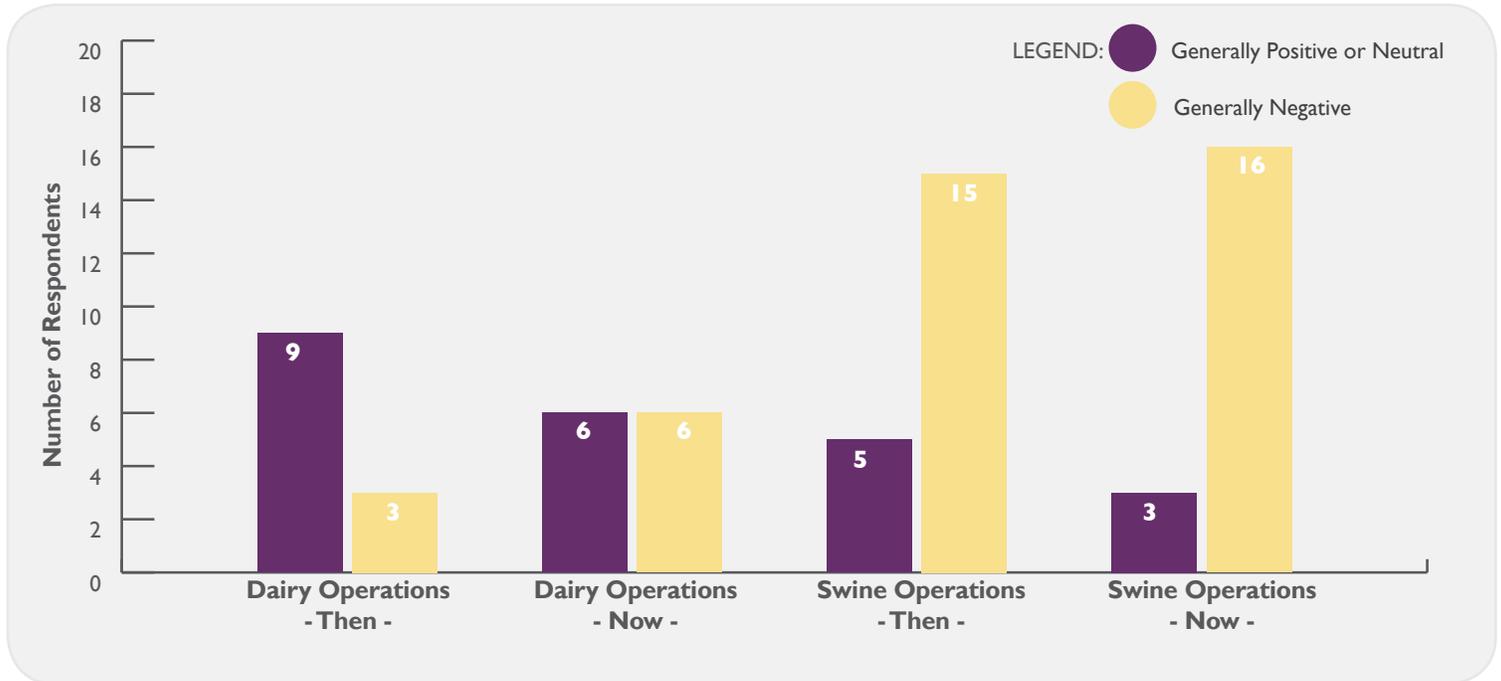
– Survey Respondent

“The air quality is not as good as it was even ten years ago.”

– Survey Respondent

”

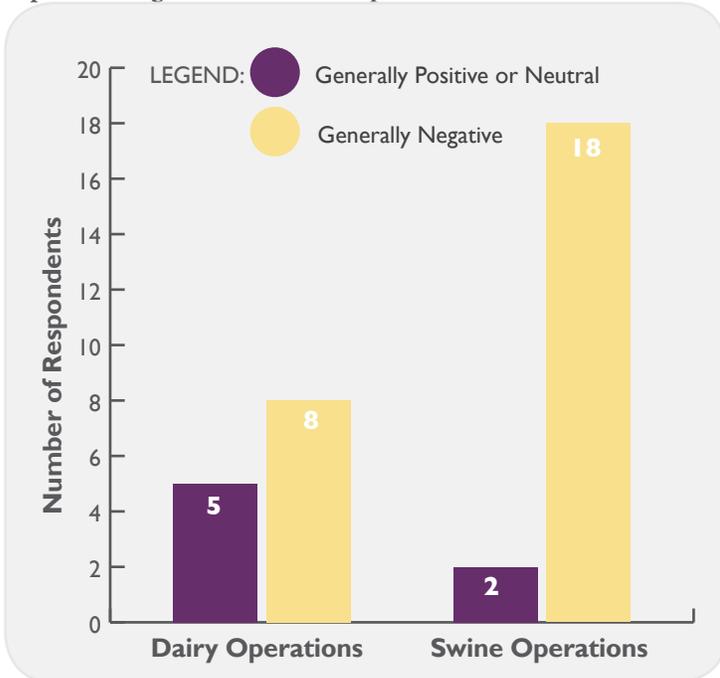
Figure D-3. Survey Respondents' Feelings about Large-Scale Livestock Operations When They Located in Counties and After Operations had Been Present for Numerous Years.



Note: Number of total responses differ by the type of livestock operation located in a respondent's county. Number of respondents: "Dairy – Then" = 12; "Dairy – Now" = 12; "Swine – Then" = 20; "Swine – Now" = 19. Three respondents selected "no operation of this type in my county."

Source: KHI HIA Corporate Farming Project, 2015.

Figure D-4. Survey Respondents' Feelings About Additional or Expanded Large-Scale Livestock Operations.



Note: Number of total responses differ by type of livestock operation located in a respondents' county. Three respondents selected "don't know" for dairy operations.

Source: KHI HIA Corporate Farming Project, 2015.

## Feelings About Impacts of Large-Scale Swine Operations

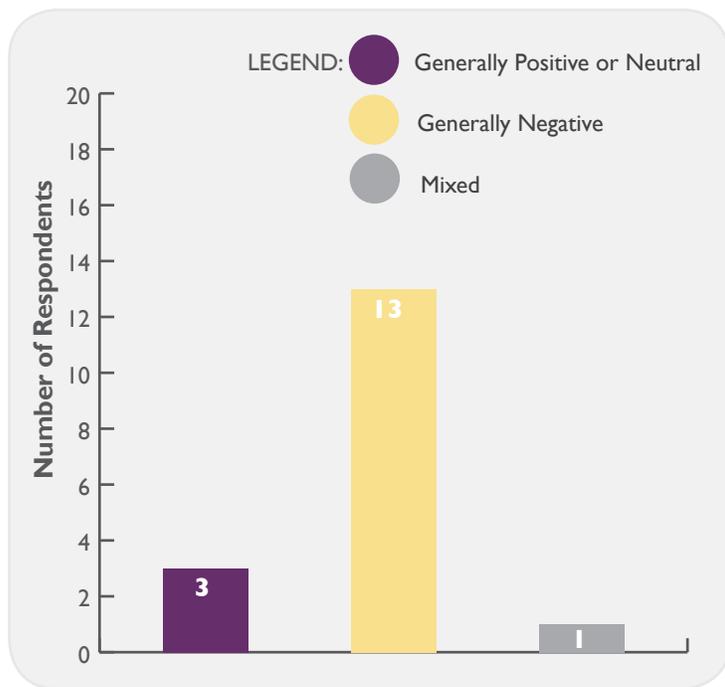
### General Impacts

Respondents were asked if they felt large-scale swine operations in their county had any impacts on the county. Eighteen individuals felt that it had, while one did not. Out of those that felt there was an impact, 13 thought it had been negative, three positive and one felt there had been both positive and negative impacts (Figure D-5, page 86). Positive impacts included additional jobs and in one instance, additional grain markets developed to support the work of the operation. Other impacts cited were on air quality (bad odor), roads, the school systems and diminished quality of life for residents living nearby the operations.

“The county roads are not maintained well enough for the increased traffic, and livestock requires lots of transportation for feed, care, marketing, etc.”

– Survey Respondent

Figure D-5. General Impacts of Large-Scale Swine Operations.



Note: Number of total responses differ by type of livestock operation located in a respondents' county. Three respondents selected "don't know" for dairy operations.

Source: KHI HIA Corporate Farming Project, 2015.

### Health Impacts

Respondents were also asked if they felt large-scale swine operations in their county had any health impacts on the county. Fewer respondents felt that there had been specific health impacts than general impacts, with 12 responding yes and six responding no. Out of those that identified health impacts, seven identified them as negative impacts. Health impacts mentioned included risk of accidents for employees of the operations, increased risk of respiratory illnesses due to decreased air quality, decreased water quality, decreased health and effects on mental health for those living nearby the operations. When asked if new or additional facilities would have any health impacts for the county, 16 respondents said there would be, while three did not believe that would be the case. They stated that the health impacts previously mentioned would likely be exacerbated with adding new or expanding existing facilities.

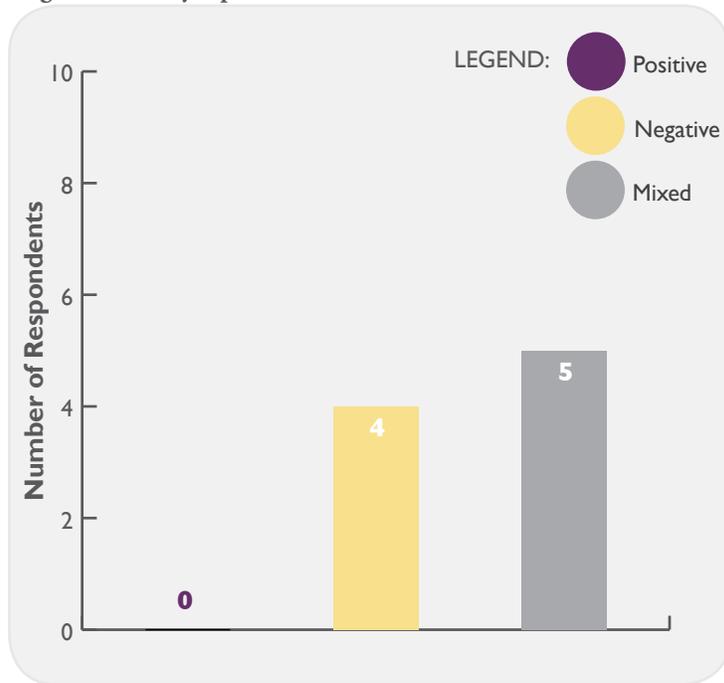
“Some of the residents have experienced physical discomfort or symptoms due to the impacts of these operations, such as vomiting, upset stomach, headaches, etc.”  
– Survey Respondent

## Feelings About Impacts of Large-Scale Dairy Operations

### General Impacts

Survey respondents living in counties with large-scale dairy operations also stated there had been general impacts on their respective counties. Out of 13 respondents, 10 reported there had been impacts, while three thought there had been none. Out of those that chose to provide additional comments, they were more diverse than comments given concerning large-scale swine operations, with four stating negative impacts and five reporting both positive and negative impacts (Figure D-6). General impacts cited included increased demand for water, roads and housing for additional people moving into the counties to work at the operations. They also mentioned economic benefits and that tax revenue was a benefit to the county.

Figure D-6. Survey Respondents' Feelings About General Impacts of Large-Scale Dairy Operations.



Source: KHI HIA Corporate Farming Project, 2015.

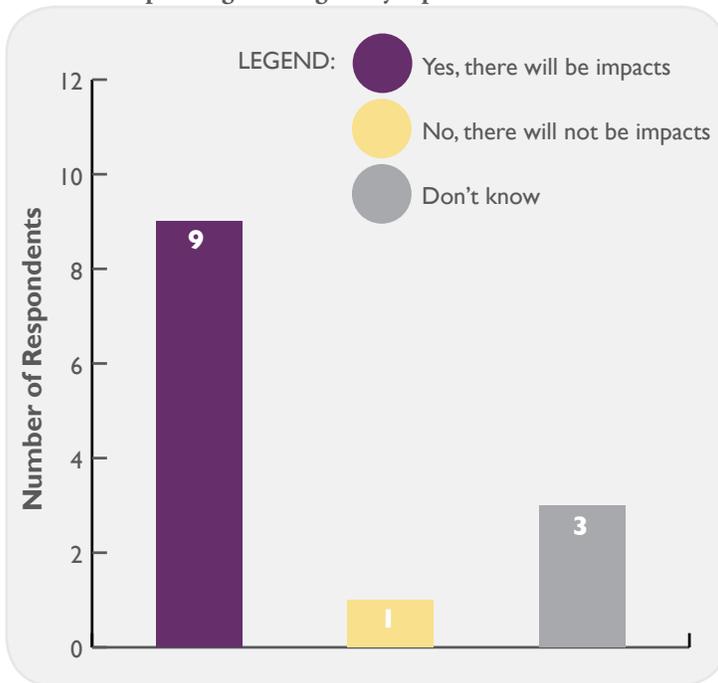
“Additional facilities means there will be additional health issues.”  
– Survey Respondent



## Health Impacts

Respondents were also asked if they felt large-scale dairy operations in their county had any health impacts on the county. Out of 12 responses, seven individuals thought there had been impacts, while five did not think so. Of the seven respondents that cited health impacts, six reported negative issues while one was unsure. Respondents mentioned several health impacts including decreased safety on roads near dairies, decreased quality of life due to odor and decreased water availability for those living near the dairies. When asked about whether there would be any health impacts if the number of dairy operations increased or dairy operations expanded, nine thought there would be, one didn't believe so and three were unsure (Figure D-7).

Figure D-7. Survey Respondents' Feelings About the Health Impacts of New or Expanding Existing Dairy Operations.



Source: KHI HIA Corporate Farming Project, 2015.

“Additional operations would make it difficult for young farmers and ranchers to get started in the business.”

– Survey Respondent

“I have never heard of anyone complaining about the dairy operations.”

– Survey Respondent

“They [dairy operations] have a positive impact on the economy, but a negative impact on social services.”

– Survey Respondent

“The tax revenue, of course, helps the county, but we have no housing to hold all of the immigrant workers that come here to work for them.”

– Survey Respondent

Figure E-1. Data Sources and Measures.

DATA SOURCE	MEASURE(S)
General Demographics And Socioeconomic Status	
U.S. Decennial Census, QuickFacts (retrieved in March 2014)	<ul style="list-style-type: none"> <li>• Population, 2012 estimate</li> <li>• Population density 2012 — persons per square mile</li> <li>• Persons under 5 years, percent, 2012</li> <li>• Persons under 18 years, percent, 2012</li> <li>• Persons 65 years and over, percent, 2012</li> <li>• White alone, not Hispanic or Latino, percent, 2012</li> <li>• Hispanic or Latino, percent, 2012</li> <li>• Foreign born persons, percent, 2012</li> </ul>
U.S. Census Bureau, American Community Survey, 5-year (2008–2012)	<ul style="list-style-type: none"> <li>• Median age, 2008–2012</li> <li>• Median household income, 2008–2012</li> <li>• Homeownership rate, 2008–2012</li> <li>• Median value of owner-occupied housing units, 2008–2012</li> </ul>
U.S. Census Bureau, Small Area Estimates of Income and Poverty (2012)	<ul style="list-style-type: none"> <li>• Percent persons below poverty level, 2012</li> <li>• Median household income, 2012</li> </ul>
U.S. Decennial Census	<ul style="list-style-type: none"> <li>• Population, 2000</li> <li>• Population, 2010</li> </ul>
Kansas Department of Children & Families, Public Assistance reports	<ul style="list-style-type: none"> <li>• Persons receiving TANF, General Assistance, SNAP or childcare assistance benefits, 2013</li> </ul>
U.S. Department of Agriculture, Food Environment Atlas	<ul style="list-style-type: none"> <li>• Low-income individuals receiving SNAP benefits, percent, 2007</li> </ul>
Farm Operations	
U.S. Department of Agriculture, Agricultural Census 2007 and 2012	<ul style="list-style-type: none"> <li>• Farms total</li> <li>• Family farms</li> <li>• Nonfamily farms</li> <li>• Corporate farms</li> <li>• Cattle feedlots</li> <li>• Market value of agricultural products sold, crops</li> <li>• Market value of agricultural products sold, livestock, poultry, and their products</li> <li>• Cattle and calves inventory, beef cow</li> <li>• Cattle and calves inventory, milk cow</li> <li>• Cattle and calves inventory, milk cow, 500 or more</li> <li>• Swines and swines inventory</li> <li>• Swines and swines inventory, 1,000 or more</li> <li>• Hired labor</li> <li>• Wages for hired farm workers</li> </ul>
Kansas Department of Health and Environment, National Pollutant Discharge Elimination System permits and annual reports (2008 and 2013)	<ul style="list-style-type: none"> <li>• Number of farms</li> <li>• Number of animal units (swine, milk cow and beef cow)</li> <li>• Number in tons, manure produced</li> <li>• Number in gallons, waste-processing water</li> <li>• Solid/Liquid waste applied or exported</li> </ul>

Figure E-1, continued

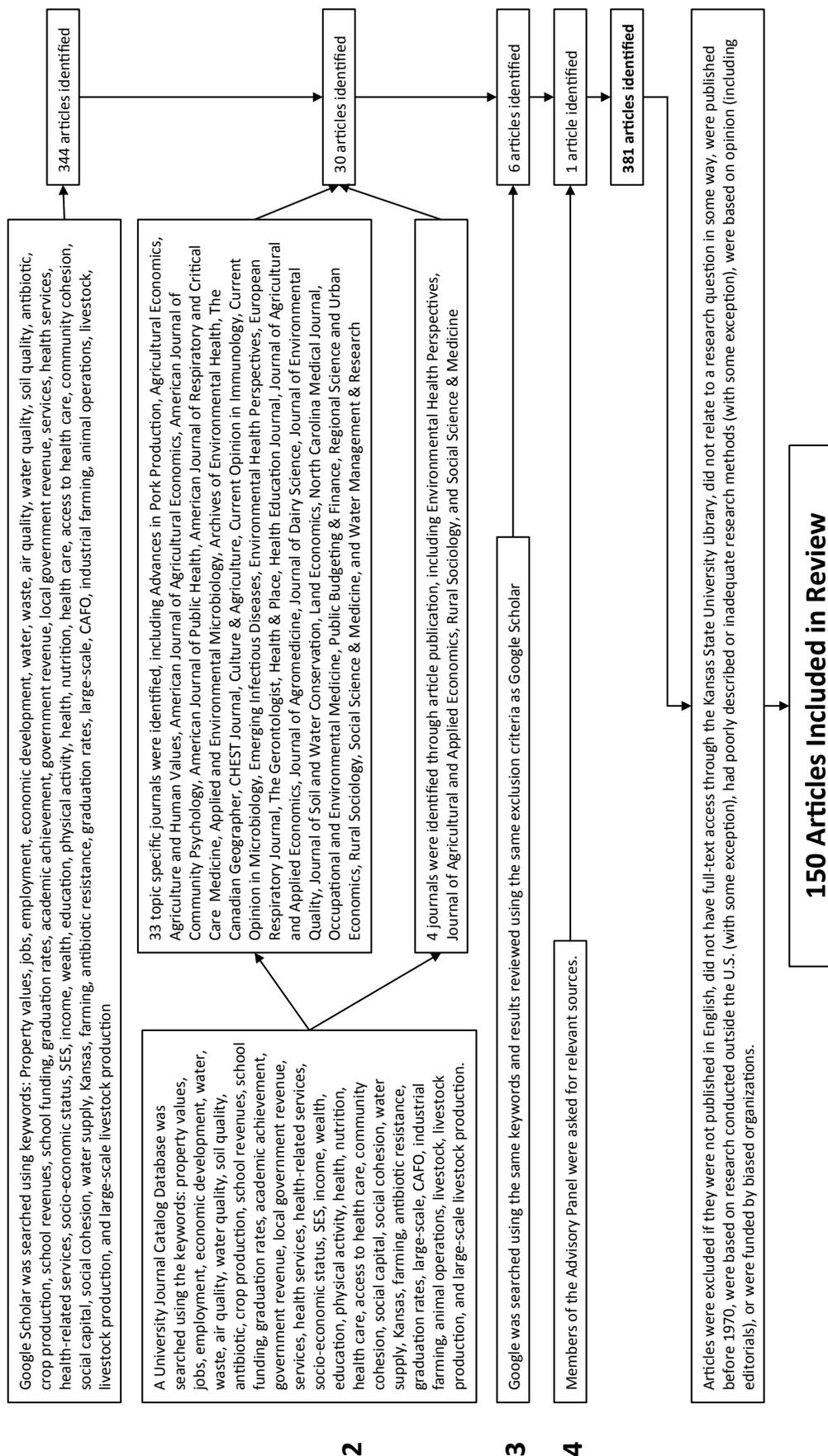
DATA SOURCE	MEASURE(S)
<b>Property Values/Taxes</b>	
Kansas Department of Revenue	<ul style="list-style-type: none"> <li>Total property value, dollars</li> <li>Residential real property assessed value</li> <li>Agriculture property taxes levied</li> <li>Commercial property taxes levied</li> </ul>
Kansas State Department of Education, School Finance Reports	<ul style="list-style-type: none"> <li>K-12 students enrolled for free or reduced price school meals, percent, 2012–2013</li> <li>K-12 headcount enrollment, 2008–2009 and 2012–2013</li> <li>Expenditures per pupil report, 2012–2013</li> </ul>
Kansas Statistical Abstract, 2012	<ul style="list-style-type: none"> <li>Taxable retail sales (nominal sales), in million dollars, 2011</li> </ul>
Kansas State University, Department of Agricultural Economics data	<ul style="list-style-type: none"> <li>Livestock revenues, 2004–2013</li> <li>Crop revenues, 2004–2013</li> <li>Per capita income, 2004–2013</li> </ul>
<b>Jobs And Employment</b>	
Bureau of Labor Statistics	<ul style="list-style-type: none"> <li>Local Area Civilian Labor Force and Unemployment estimates, 2008 and 2012</li> </ul>
Kansas Statistical Abstract, 2012	<ul style="list-style-type: none"> <li>Annual payroll, dollars, 2010</li> <li>Farm employment, 2011</li> </ul>
<b>Health Insurance and Access</b>	
U.S. Census Bureau, Small Area Estimates of Health Insurance, 2012	<ul style="list-style-type: none"> <li>Percent population age under 65 that are uninsured</li> </ul>
Agency for Health Care Research and Quality, Medical Expenditures Panel Survey (MEPS)	<ul style="list-style-type: none"> <li>Percent of private-sector employees in establishments that offer health insurance by industry groupings and state, 2013</li> </ul>
Kansas Behavioral Risk Factor Surveillance System (BRFSS), 2012	<ul style="list-style-type: none"> <li>Health insurance coverage</li> <li>General health status</li> <li>Physical unhealthy days in past 30 days</li> <li>Mental unhealthy days in past 30 days</li> <li>Usual source of medical care</li> <li>Overweight and obesity</li> <li>Physical activity</li> <li>Having a flu shot in past 12 months</li> </ul>
County Health Rankings	<ul style="list-style-type: none"> <li>Primary care providers per 100,000 population, 2011</li> </ul>
<b>Education</b>	
Kansas State Department of Education, K-12 Reports	<ul style="list-style-type: none"> <li>High school graduation rate (4-year cohort), 2012</li> <li>Percent, reading proficiency for 5th grade students, 2012</li> </ul>
U.S. Census Bureau, American Community Survey, 5-year (2008-2012)	<ul style="list-style-type: none"> <li>Education attainment for age 25+, 2008–2012</li> </ul>
<b>Nutrition and Physical Activity</b>	
Centers for Disease Control and Prevention, Diabetes Interactive Atlas	<ul style="list-style-type: none"> <li>Obesity, percent adults, 2010</li> <li>Leisure-time physical inactivity, percent adults, 2010</li> </ul>
U.S. Department of Agriculture, Food Environment Atlas	<ul style="list-style-type: none"> <li>Fast-food restaurant availability and expenditures, 2011</li> <li>Grocery store availability, 2011</li> </ul>
Feeding America	<ul style="list-style-type: none"> <li>Food insecurity, 2012</li> </ul>

Figure E-1, continued

DATA SOURCE	MEASURE(S)
Environmental Health	
Kansas Water Office and Kansas Department of Agriculture, Water Information Management and Analysis System (WIMAS) program	<ul style="list-style-type: none"> <li>• Water use, irrigation, 2008–2012</li> <li>• Water use, stock water, 2008–2012</li> <li>• Water use, total, 2008–2012</li> </ul>
Population Health	
Kansas Department of Health and Environment, Kansas Information for Communities, Kansas Health Matters	<ul style="list-style-type: none"> <li>• Age-adjusted-mortality rates (all cause), per 100,000 population, 2010–2012</li> <li>• Age-adjusted hospital admission for infectious and parasitic diseases, per 10,000 population, 2011</li> <li>• Age-adjusted hospital admission for chronic obstructive pulmonary disease, 2011</li> <li>• Age-adjusted hospital admission for respiratory disease, 2011</li> <li>• Percent of pregnant women receiving adequate prenatal care 2010–2012</li> </ul>
County Health Rankings	<ul style="list-style-type: none"> <li>• Age adjusted years of potential life lost before age 75 per 100,000 population, 2008–2010</li> </ul>

Source: KHI HIA Corporate Farming Project, 2015.

Figure E-2. Literature Review Search Protocol.



Source: KHI HIA Corporate Farming Project, 2015.

Figure F-1. Prohibitions and Exemptions Under the Kansas Corporate Farm Law.

Type of Business Entity	Type of Crop	Agricultural Production Method	Prohibited, Exempt or County Option
<b>Corporations, trusts, limited liability companies, limited partnerships and corporate partnerships</b>	In general, agricultural crops, poultry, eggs, milk, fruit, horticultural crops, forage crops, livestock. This table details special rules for specific crops below.	The method of agricultural production may be a factor, as detailed in this table.	In general, prohibited from direct or indirect ownership, acquisition, obtainer, or lease of agricultural land.
<b>Corporations, trusts, limited liability companies, limited partnerships and corporate partnerships</b>	Timber, forest products, nursery products, sod, seed for sale or resale, seed to grow alfalfa near an alfalfa processing entity.		Exempt from prohibition on direct or indirect ownership, acquisition, obtainer or lease of agricultural land, because not considered to be farming.
<b>Family farm corporations, authorized farm corporations, limited liability agricultural companies, family farm limited liability agricultural companies, limited agricultural partnerships, family trusts, authorized trusts, testamentary trusts</b>	Agricultural crops, poultry, eggs, milk, fruit, horticultural crops, forage crops, livestock.		Exempt from prohibition on direct or indirect ownership, acquisition, obtainer or lease of agricultural land.
<b>Agricultural business entities</b>	Term not used in the law.	Term not used in the law.	Term not used in the law.
<b>Corporations and limited liability companies</b>	Livestock fed for slaughter in a feedlot. <sup>320</sup>	Feedlot (a lot, yard, corral or other area in which livestock fed for slaughter are confined).	May hold or lease agricultural land.
<b>Corporations and limited liability companies</b>	Poultry or rabbits raised in a confinement facility. Poultry means chickens, turkeys, ducks, geese or other fowl.	Poultry confinement facility (includes the structures and related equipment used for housing, breeding, laying of eggs or feeding of poultry in a restricted environment and such agricultural land as is necessary for proper disposal of liquid and solid wastes and to isolate the facility to reasonably protect the confined poultry or rabbits from exposure to disease). A rabbit confinement facility also includes structures and related equipment for raising and processing rabbits.	May hold or lease agricultural land.
<b>Corporations and limited liability companies</b>	Vegetables, flowers, herbs, or plants used for medicinal purposes grown in a medium other than soil.	Hydroponics	May hold or lease agricultural land.
<b>Trusts, limited partnerships and corporate partnerships</b>	Livestock fed for slaughter in a feedlot; poultry or rabbits raised in a confinement facility; vegetables, flowers, herbs or plants used for medicinal purposes grown in a medium other than soil.	Feedlot, poultry confinement facility, rabbit confinement facility, hydroponics.	Prohibited from direct or indirect ownership, acquisition, obtainer or lease of agricultural land.

Figure F-1, continued

Type of Business Entity	Type of Crop	Agricultural Production Method	Prohibited, Exempt or County Option
<b>Corporations and limited liability companies</b>	Swine grown in a swine production facility.	Swine production facility (includes the land, structures and related equipment used for housing, breeding, farrowing or feeding of swine. Includes such agricultural land as is necessary for proper disposal of liquid and solid wastes in environmentally sound amounts and to isolate the facility to reasonably protect the confined swine from exposure to disease).	Exemption for agricultural land held or leased by this type of business in a county that voted to allow swine production facilities before adoption of the current statute.
<b>Corporations, trusts, limited liability companies, limited partnerships and corporate partnerships</b>	Dairy cows grown in a dairy production facility; milk.	Dairy production facility (includes the land, structures and related equipment used for housing, breeding, raising, feeding or milking dairy cows. Includes such agricultural land as is necessary for proper disposal of liquid and solid wastes and to isolate the facility to reasonably protect the confined cows from exposure to disease).	Exemption for agricultural land held or leased in a county that voted to allow dairy production facilities.
<b>Corporations, trusts, limited liability companies, limited partnerships and corporate partnerships</b>	Dairy cows grown in a dairy production facility; milk.	Dairy production facility (includes the land, structures and related equipment used for housing, breeding, raising, feeding or milking dairy cows. Includes such agricultural land as is necessary for proper disposal of liquid and solid wastes and to isolate the facility to reasonably protect the confined cows from exposure to disease).	Exemption for agricultural land held or leased in a county that voted to allow dairy production facilities.
<b>Corporations, trusts, limited liability companies, limited partnerships and corporate partnerships</b>	Any agricultural product, for example, poultry and swine, when raised pursuant to a production contract.	Production contract (this is more a matter of financial and managerial structure, rather than agricultural production method).	Prohibitions and exemptions on ownership of land apply only to the contract grower, not to the business entity that enters into a contract with the grower, provided the production contract does not entail a transfer of interest in the land.

Source: *Legal Review of Proposed Changes to the Kansas Corporate Farming Law (Senate Bill 191, 2013)*, Jill Krueger, J.D., Public Health Law Center, Minnesota.

Figure G-1. HIA Monitoring Plan for Changes to the Kansas Corporate Farming Law.

Indicator	Monitoring Agency	Data Source	Timing
Livestock Operations			
Density of large livestock operations (dairy, swine)	Kansas Department of Agriculture/Kansas Department of Health and Environment	Permit applications and renewals	Annual
Economic			
Number of total jobs	Kansas Department of Labor	Monthly Labor Report	Annual
Number of agricultural jobs	Kansas Department of Labor	Monthly Labor Report	Annual
Per capita income	Bureau of Economic Analysis (U.S. Department of Commerce)	Local Area Personal Income Statistics	Annual
Residential property values/taxes	Kansas Department of Revenue	Statistical Report of Property Assessment and Taxation	Annual
Agricultural and commercial real property values/taxes	Kansas Department of Revenue	Statistical Report of Property Assessment and Taxation	Annual
Unemployment rates	Kansas Department of Labor, Bureau of Labor Statistics (U.S. Department of Labor)	Local Area Unemployment Statistics	Annual
Population	U.S. Census Bureau	Population Estimates	Annual
Poverty rates	U.S. Census Bureau	Small Area Income and Poverty Estimates	Annual
Utilization of social services	Kansas Department of Children and Families	County Packets	Annual
Health			
Age-adjusted mortality rates	Kansas Department of Health and Environment	Death records	Annual
Hospital admission rates for respiratory diseases	Kansas Department of Health and Environment	Kansas Information for Communities	Annual
Antibiotic-resistant infections	Kansas Department of Health and Environment	Notifiable Disease Reporting System	Annual
Environmental			
Air quality	Kansas Department of Health and Environment	Monitoring – primary data collection	Ongoing
Water quality	Kansas Department of Health and Environment	Monitoring – primary data collection, for both surface and ground water	Ongoing
Subtherapeutic use of antibiotics in livestock operations	Kansas Department of Agriculture	Would require new data collection	Annual

Source: KHI HIA Corporate Farming Project, 2015.

## Additional Data Information

Figure H-1. Livestock Operations in Selected Counties, 2012.

County	Dairies with ≥1,000 animal units	Total dairy animal units on those farms	# Swine operations with ≥3,700 animal units	Total swine animal units on those farms	# Permitted beef feedlots	Total beef animal units on those farms
Study Counties						
Cheyenne	1	4,920	0	0	3	32,000
Clay	0	0	1	4,958	0	0
Finney	1	6,300	0	0	12	334,659
Grant	1	11,680	2	58,320	5	317,060
Gray	3	60,520	1	15,360	13	274,765
Greeley	2	8,170	1	105,600	4	47,500
Hamilton	6	83,340	0	0	5	111,780
Haskell	1	52,000	0	0	11	449,999
Hodgeman	1	5,252	0	0	8	65,849
Kearney	3	18,200	3	30,240	6	59,098
Meade	1	10,370	0	0	3	31,400
Morton	0	0	5	51,826	1	6,000
Norton	0	0	2	8,520	4	10,000
Pratt	0	0	1	5,545	3	44,450
Scott	1	3,720	3	30,240	26	313,419
Seward	1	6,472	1	5,584	5	152,500
Stanton	3	27,239	1	4,729	5	68,930
Stevens	1	7,320	4	40,686	5	61,448
Thomas	1	7,240	0	0	9	52,899
Wallace	0	0	1	8,640	2	5,000
Washington	3	8,917	0	0	4	12,159
Wichita	0	0	7	159,840	6	184,013
Control Counties						
Clark	0	0	0	0	3	35,900
Decatur	0	0	0	0	3	54,500
Ford	0	0	0	0	17	184,749
Gove	0	0	0	0	4	60,998
Kiowa	0	0	0	0	1	9,500
Lane	0	0	0	0	3	59,750
Logan	0	0	0	0	2	7,500
Marshall	0	0	0	0	1	2,900
Ness	0	0	0	0	0	0
Rawlins	0	0	0	0	2	10,000
Sheridan	0	0	0	0	8	76,457

Source: Kansas Department of Health and Environment, National Pollutant Discharge Elimination System (NPEDS) Permits, extracted by HIA team, March 2014.

## Process Evaluation

The evaluation was conducted by the University of Kansas School of Medicine-Wichita (KUSM-W).

### *Introduction*

As the field of health impact assessments (HIAs) has grown, it has established and strengthened HIA practices and methodologies. The Society of Practitioners of Health Impact Assessment (SOPHIA) has developed practice standards that outline minimum elements that must be included in HIAs and benchmarks for effective practices.

These practice standards are referenced in the development and implementation of HIAs, but the academic literature is lacking the inclusion of these practice standards as a tool for HIA evaluation. The evaluation for this project was conducted by the University of Kansas School of Medicine-Wichita (KUSM-W), which explicitly used the HIA practice standards as the backbone of this process evaluation. This evaluation was conducted on the first three elements (screening, scoping, and assessment) of the Kansas Health Institute's HIA on Senate Bill 191 (which proposed amending the Kansas Corporate Farming Law).

### *Methods*

The process evaluation was designed to assess the fidelity to which KHI adhered to HIA practice standards in the conduct of the HIA. Additionally, this evaluation assessed overall satisfaction with specific elements of the HIA and effectiveness of strategies utilized by KHI to coordinate HIA Advisory Panel participation.

An evaluation survey was administered to the project's HIA Advisory Panel members (n=12) that worked with the KHI on the HIA. In consultation with the staff at KHI and the technical support team from the Oregon Public Health Institute, a 24-item quantitative survey was developed by KUSM-W and formatted onto the electronic survey platform, Survey Monkey. The survey included quantitative and open-ended items regarding the amount of time they had spent participating in the HIA, satisfaction with the HIA, and adherence to HIA practice standards. Surveys were initially distributed on July 8, 2014. On July 21, 2014, a reminder

e-mail was sent to those who had not yet responded to the survey. The survey data collection period was closed on July 23, 2014.

### *Results*

Ten of the 12 advisory panel members responded to the survey for a response rate of 83 percent. Respondents assessed the amount of time spent participating in the HIA. Most respondents (70 percent) indicated they had spent at least 11 hours working on the HIA, and 90 percent reported that the time spent on the HIA was appropriate.

Respondents reported a strong degree of satisfaction with the HIA process. Using a four-point scale ranging from "completely satisfied" to "not at all satisfied," most (70 percent) reported they were "mostly satisfied" with the HIA meetings, and none indicated they were "not at all satisfied." All respondents reported being satisfied that everyone who needed to be invited to serve on the HIA Advisory Panel had been invited.

Respondents assessed the fidelity to which the HIA was conducted vis-à-vis the established practice standards. All respondents indicated that the three HIA steps that needed to have been conducted to date (screening, scoping, and assessment) had been at least partially included. Ninety-three percent of respondents indicated they had been allowed to provide at least some input in all three steps, and 77 percent of respondents indicated the right number of opportunities to provide input had been provided.

Respondents were asked to rate the conduct of the HIA in 15 areas using four potential response options (no/somewhat/yes/unsure) in order to assess the degree to which the practice standards had or had not been met. Respondents were most likely to indicate that each standard had been at least "somewhat" met. On average, 67 percent of respondents indicated "yes" that each standard had been met, 16 percent indicated each standard had not been "somewhat" met, 13 percent were "unsure" each standard had been met, and four percent indicated "no" each standard had not been met. Successfully identifying a geographic focus of the study and identifying populations affected were most strongly rated by participants, with 100 percent indicating "yes" the standard

had been met. The scoping process including a mechanism to incorporate new, relevant information was rated the lowest, with 40 percent of respondents indicating “no” the standard had not been met and an additional 40 percent indicating the standard had only been “somewhat” met. The combined 80 percent of respondents who felt this standard had not or had only been somewhat met, was twice the combined percentage of respondents who felt any other standard had not or had only been somewhat met.

### *Conclusions*

The evaluation instrument was designed to measure satisfaction with the process and specific elements of a HIA utilizing established practice standards. Respondents reported that their time spent was appropriate, as was the representation on the HIA Advisory Panel. A consistent pattern emerged of a majority of respondents reporting all practice standards had been met, with two in three respondents on average indicating each of the 15 standards had been met and the majority of respondents indicating 14 of the 15 standards had been met. There was one standard, involving feedback mechanisms to the scoping phase, that a majority of respondents did not indicate had been met. Likewise, a small, but consistent percentage of respondents indicated they were “unsure” a standard had been met, with at least 10 of the 15 standards having at least one “unsure” response. The overall

positive assessment of most of the standards, coupled with the one negatively assessed standard dealing with feedback and the consistent presence of “unsure” responses to the standards, indicates the one potential area for improvement. This area would center on what changes, if any, could have been made to some of the steps of the HIA so that it could have possibly been conducted more openly or explicitly so that more participants were aware of exactly what was going on during the project.

Even though only the first three steps of the process were complete before the evaluation, the feedback served as a form of communication back to participants. This gave KHI an opportunity to clarify what exact steps in the HIA process participants should have expected to see, and to signpost the continued evolution of the HIA as it moved into the remaining three steps. Results indicated that although the participants were largely positive in their assessment of the HIA as a whole, a little more transparency and clarification of the process in a step-wise manner could help engage participants even more strongly and help improve the conduct of the HIA as it concluded.

1320 Research Park Drive  
 Manhattan, Kansas 66502  
 (785) 564-6700



900 SW Jackson, Room 456  
 Topeka, Kansas 66612  
 (785) 296-3556

Jackie McClaskey, Secretary

Governor Sam Brownback

January 5, 2015

Kansas Health Institute  
 212 SW 8<sup>th</sup> Ave., Suite 300  
 Topeka, KS 66603

HIA Readers:

In recent months, the Kansas Department of Agriculture has been given the opportunity to serve as a member of the advisory panel considering a study titled “Potential Health Effects of Changes to the Kansas Corporate Farming Law.” We appreciate the opportunity to represent Kansas agriculture on the panel and provide specific feedback on the process and the assessment that has been completed.

First, SB191 covering the Kansas Agricultural Growth and Rural Investment Initiative, the focus of this study, is about business ownership structure. It’s about families and companies being able to manage and structure their businesses in the way that makes the most sense for them. Examples of benefits to families include multi-generational ownership opportunities regardless of degrees of relationship, ownership opportunities for non-family employees and long distance ownership options for family members. By allowing people to manage their businesses effectively, we send the message that Kansas is open for business and that we welcome business expansion and growth. In a state where 37 percent of the economy is driven by agriculture it is important that we be open to growth in farms, ranches and agribusiness. Kansas is ideally suited for animal agriculture and while SB191 makes it easier to engage in the business of animal agriculture it doesn’t remove the rules that those businesses have to play by. With the passage of SB191 the established state and federal regulations regarding separation distance, emergency response plans, operator training, lagoon operation, inspection schedules, odor control, nutrient utilization, antibiotic use and others would remain in place.

Second, in reading the health impact assessment, one could be left thinking that there is no positive economic impact that comes from growth in the dairy and pig business in Kansas. **This is simply not accurate.** Economic studies based on actual Kansas data show that for each additional dairy cow added in Kansas there is \$9,148 of direct output and a total of \$16,376 in economic output. For each additional hog finished in Kansas there is \$185 of direct output and a total of \$275 in economic output. There also some large, one-time shots of adrenaline to the Kansas economy when construction of agricultural facilities occur, regardless if it is for expansion of existing farms or the establishment of new farms. For hog farms, there is \$870 of economic activity generated per head of capacity added and \$3,650 per head of capacity for dairy farms. The economic activity described here presents itself in the form of jobs, investments, payroll dollars spent in local businesses, taxes paid and healthcare delivered, and is not tied to any specific type of ownership model.

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Third, when reviewing the recommendations of the assessment, several points make good business sense even though they aren't connected to the issue of ownership addressed by SB191. Designing water efficient facilities, using ventilation systems to control dust and developing a tool to help in siting a facility are all good ideas and likely have been implemented or are in the process of being integrated into many Kansas operations. Issues such as separation distance, nutrient loading and antibiotic use are already managed through state or federal law and don't require work at this time.

Our position is clear. Investment and growth in agriculture is good for Kansas. We believe that businesses should be able to structure as they see fit. We believe that Kansas should show that we are open for business and that we welcome all agriculture including animal agriculture and the positive economic impact that it brings. We believe that the economic prosperity that comes from utilizing the natural advantages that we have as an agriculture state lead to positive sociological outcomes including health for Kansans.

Thank you for your interest in agriculture and for allowing us to provide some specific comments to accompany the health impact assessment.

Respectfully submitted,

A handwritten signature in cursive script that reads "Jackie McClaskey".

Jackie McClaskey  
Secretary of Agriculture

## KHI Response to Kansas Department of Agriculture

Dear Kansas Department of Agriculture:

The Kansas Health Institute (KHI) would like to thank the Kansas Department of Agriculture (KDA) for serving on the HIA Advisory Panel. We appreciate your time, expertise and feedback during the process. We also would like to express our thanks to you for submitting a letter regarding the HIA report and the economic relevance of this potential policy change. We have carefully reviewed your comments and would like to offer the following information.

### Focus of the Study

Currently, the Kansas Corporate Farming Law prohibits direct or indirect ownership, acquisition, obtainer, or lease of agricultural land by specified business entities identified in Kansas Statute section 17-5904. The prohibition applies, with certain exceptions, to “a corporation, trust, limited liability company, limited partnership or corporate partnership.”

Senate Bill 191 (2013) would repeal K.S.A. 17-5904, which prohibits corporate ownership of agricultural land. This means that if Senate Bill 191 was enacted as written, any business entity could own, acquire, obtain, or lease agricultural land anywhere in the state.<sup>321</sup> However, these operations would still be subject to the requirements and processes established under other Kansas agriculture laws (e.g., zoning, environmental laws).

This change (allowing any agribusiness to operate anywhere in Kansas) could have various indirect impacts, which are described in the HIA report. The following areas might be impacted:

- Existing Kansas farms (e.g., multi-generational ownership opportunity regardless of degree of relationship).
- New out-of-state agricultural operations (e.g., swine, dairy, poultry and crop operations).
- Reporting requirements.
- Constitutionality of current Kansas Corporate Farming Law.

However, not all of these impacts may affect health in the state, and the goal of the HIA is to assess only those that might affect the health of Kansans. The HIA identified that an increase in large-scale swine and dairy operations are more likely to have diverse health effects (positive and negative) than other indirect effects listed above.

### Economic Impact

The HIA review of the economic impact of the proposed legislation was limited to indicators including property values (page 33), property taxes (page 33), jobs (page 27), and per capita income (page 35). For example, the economic analysis conducted as part of the HIA found that for employment, data analysis was mixed. Analysis showed a significant positive association between the number of large-scale swine facilities in a county and total employment, but no significant relationship with agricultural employment.

Other areas of review related to economic impact can be found within the report, and we would be happy to discuss any of these areas with you in more detail.

- Jobs (page 27)
- Real Property/Sales Taxes (page 33)
- Population (page 39)
- Per Capita Income (page 35)

## KHI Response to Kansas Department of Agriculture, continued...

It is important to note that the study has several limitations which should be considered when interpreting the findings. For many of the measures included in the economic analysis such as agricultural employment and property tax values, it was not possible to separate the possible impact of multiple agricultural sectors such as crop production, various types of livestock operations, or related agribusiness entities. Also, due to a lack of reliable information on dates when large-scale livestock operations were first established or underwent significant expansions, it is possible that the timeframes included in the analysis were not adequate to detect changes that might have occurred either earlier or later than the time periods examined. Lack of reliable data also affected the ability to assess potential effects associated with facility construction.

Additionally, for many of the measures included in this assessment, the impact of a large-scale swine or dairy facility is likely to be greatest on individuals and communities located in close proximity to the facility and not uniformly distributed across a county. Analysis of possible changes or relationships between variables at only the county level, rather than at community or individual level, is likely to mask relationships that could exist within counties or falsely identify associations based on population averages. Population-level observational studies such as this one (sometimes referred to as ecological studies) are useful for exploring patterns or generating hypotheses, but are limited in their ability to fully explore associations or prove causal relationships.

### **HIA Recommendations**

The goal of the HIA recommendations is to suggest actions that can enhance positive health effects and mitigate potential negative health effects related to the proposed policy, should it be enacted. While the primary direct effect of the 2013 legislation (Senate Bill 191 and its House version) would be on the ownership structure of agribusiness, there could be secondary effects on in-state and out-of-state agribusinesses.

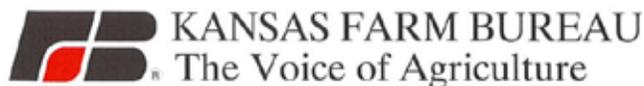
Based on the 2013 testimony on Senate Bill 191 provided by various stakeholder groups, including the Kansas Farm Bureau and the Kansas Department of Agriculture,<sup>322</sup> changes to the Kansas Corporate Farming Law (e.g., ownership structure of agribusinesses) could result in an increase in the number of large-scale livestock operations — specifically swine and dairy. The HIA report includes several findings related to this issue.

To maximize potential positive health effects and mitigate potential negative health effects associated with an increase in the number of large-scale dairy and swine operations, the HIA provided a set of evidence-based recommendations. In order to develop these recommendations, the HIA team reviewed existing state and federal regulations and identified areas for improvement. The HIA team also received input from the Advisory Panel members. The HIA recommendations were provided in cases where certain evidence-based practices were not implemented in Kansas (e.g., Kansas-specific siting tool), or in cases where additional evidence-based strategies could be implemented in order to maximize potential positive health effects (e.g., increasing the minimum separation distance from livestock operations to any habitable structure in existence, restricting subtherapeutic antibiotic use in livestock operations to antibiotic classes that are not used to treat human disease).

Thank you again for your letter, and for your participation in this important project.

Sincerely,

Kansas Health Institute



2627 KFB Plaza, Manhattan, Kansas 66503-8508 • 785-587-6000 • Fax 785-587-6602 • www.kfb.org

### Office of the President

January 9, 2015

Robert F. St. Peter  
President and CEO  
Kansas Health Institute  
212 SW Eighth Avenue, Suite 300  
Topeka, Kansas 66603-3936

Dear Mr. St. Peter,

Kansas Farm Bureau (KFB) is the state's largest general farm organization representing more than 40,000 farm and ranch families through our 105 county Farm Bureau Associations. KFB appreciates the opportunity to provide a brief response to the results of the KHI Health Impact Assessment Project titled "Potential Health Effects of Changes to the Kansas Corporate Farming Law" (HIA.)

KFB sent representatives to the Advisory Panel meetings with hopes that this project would prove to be an unbiased analysis of the health effects of the potential repeal of the Kansas Corporate Farming laws. Unfortunately, despite the objection of KFB representatives, the study went in a direction that ignores the realities of what the proposed legislation would have actually done and focuses simply on confined animal feeding operations that feed dairy cattle or swine, respectively. The analysis contained in this report fails to consider the multitude of other farming and ranching operations the changes to the corporate farming laws would impact. The report does nothing to analyze the potential for increased investment and capital in Kansas agriculture regardless of the type of farm or ranch.

This HIA contains many faults and errors that will make the report of little to no value in the policy discussion. The first and most obvious fault deals with the scope of the project. As mentioned previously, the HIA is a project regarding the impact of dairy and swine facilities. The study does not even take into account the ownership structure of the facilities. The corporate farming legislation debated by the legislature during the 2013 session simply dealt with ownership structure; it had nothing to do with the size or type of facility. A large dairy or swine facility can be owned by an individual or in a corporate form. The way the operation is managed does not necessarily change. The bills attempted to remove the impediments to certain types of ownership that merely add legal and planning costs that are unnecessary. Ownership of the facility is irrelevant to the size or the type of farming operation.

A change in the corporate farming laws will arguably have the largest impact on traditional crop farming, yet the HIA focuses solely on swine and dairy operations. There are a multitude of exemptions for animal agriculture to fit under today, but those exemptions are not available to

crop farming. KFB raised this point during nearly every Advisory Panel meeting. Each time the discussion was quickly dismissed. The researchers stated that this was the direction the report was going to be analyzed. By not analyzing the true question at hand, the study as a whole is irrelevant.

As stated above, the ownership of farmland by corporate entities was not even considered in the study. By focusing only on dairy and swine CAFOs, KHI simply missed the true effects of the proposed legislation. It can be argued that the changes proposed in the 2013 legislative session would have had a more direct impact on the ownership, financing, and operation of farmland than any type of confined animal feeding operation because the confined animal feeding operations already fit into many of the existing exemptions.

Regardless of the fact that the HIA completely misses the mark on the analysis of the changes to the corporate farming laws, the analysis that is conducted on swine and dairy confined animal feeding operations is concerning. Because the HIA is not a true analysis of the corporate farming changes, this letter will not address the specific fallacies contained in the report, but KFB would like to state, for the record, that the conclusions and recommendations included in the HIA are deeply flawed, and KFB does not support the recommendations and conclusions in this report.

The analysis reported in the KHI study is based on assumptions and does not rely on statistically significant data. The survey used relied on 23 individuals who were not randomly selected. It is quite apparent that these surveys were likely skewed to be anti-traditional agriculture. For these reasons, the data used from the surveys has no validity.

Furthermore, the HIA uses flawed data analysis because the sample size of information was so small. Additionally, the researchers chose the sample counties based on the existence or lack thereof of large dairies or swine operations in those counties. Once again, the researchers did not take into account the ownership structure of such facilities in the respective counties.

For these and a multitude of other reasons, the points made in the report are wholly invalid and do not necessitate an individualized response. It is unfortunate that this exercise has ultimately resulted in a wasted effort and the HIA will not provide any usefulness in the public policy debate surrounding corporate farming. I would like to once again assert that KFB in no way endorses the recommendations and conclusions brought forth in this study.

Sincerely,



Richard Felts  
President, Kansas Farm Bureau

## KHI Response to Kansas Farm Bureau

Dear Kansas Farm Bureau,

The Kansas Health Institute (KHI) would like to thank the Kansas Farm Bureau (KFB) for serving on the HIA Advisory Panel. We appreciate KFB's time, expertise and feedback during the project process, and for meeting with us in February to discuss your thoughts concerning the draft report. We also would like to express our thanks for submitting a letter regarding the report. We have carefully reviewed your comments and would like to offer the following information.

Changes to the Kansas Corporate Farming Law could result in direct and indirect effects. While the primary direct effect of the 2013 legislation (Senate Bill 191) would be related to the ownership structure of agribusinesses, there could be secondary effects to Kansas based on in-state and out-of-state agribusinesses that may choose to expand or locate in the state. The HIA focuses on those secondary effects that may result in several health impacts (both positive and negative).

### *Scope of the HIA*

#### **Ownership Structure and Size of Operations**

Changes to the Kansas Corporate Farming Law would allow Kansas farms to choose any business structure that suits their needs, thus increasing their ability to expand by raising capital and through investment opportunities.<sup>323</sup> Additionally, changes in the law would allow any out-of-state agribusiness to operate anywhere in Kansas.<sup>324</sup> While these changes would allow for any size of agribusiness to locate or expand in Kansas, testimony from the 2013 debate on this issue suggested that these operations may be large-scale. According to the 2011 U.S. Department of Agriculture data, large nonfamily farms are typically organized into four forms of business structures,<sup>325</sup> three of which are currently prohibited from direct or indirect ownership, acquisition, obtainment, or lease of agricultural land in Kansas. Passage of Senate Bill 191, would remove barriers for large nonfamily farms if they choose to locate in Kansas.

#### **Type of Agribusinesses**

The HIA focus was also informed by the 2013 testimony on Senate Bill 191 provided by various stakeholder groups, including the Kansas Farm Bureau and the Kansas Department of Agriculture.<sup>326</sup> Although testimony highlighted multiple potential impacts of Senate Bill 191, the most commonly identified impact was an increase in the number of large-scale livestock operations — specifically swine and dairy. Further, the current law sets forth a procedure that counties may permit or deny dairy and swine production facilities to be established within the county by a corporation, trust, limited liability company, limited partnership, or corporate partnership.

According to the 2013 testimony, existing exemptions for confined animal operations (livestock operations) have created some potential barriers for these types of corporations to enter the Kansas market. In their testimony, the Kansas Livestock Association suggested that "...we'd like to express our support for the repeal of the sections K.S.A. 17-5907 and K.S.A. 17-5908 that require county approval for corporations to operate dairy production facilities and swine production facilities. Let's omit the county-by-county approval process and make our state laws more inviting to entities wanting to locate their business in the state."<sup>327</sup> The potential impact of this barrier, in particular, on corporate swine and dairy operations is also demonstrated by how some counties voted on whether or not to allow corporate farming in their communities. According to various sources, about 20 counties have chosen to restrict corporate swine or dairy operations since the 1990s.<sup>328</sup>

Under Senate Bill 191, K.S.A. 17-5907 and K.S.A. 17-5908 would be repealed, thus removing legal barriers for these types of businesses to locate in Kansas. Additionally, literature suggests that Kansas has been historically engaged in raising swine and dairy cows due to the

## KHI Response to Kansas Farm Bureau, continued...

state's production of many feeds used for hogs (e.g., corn, wheat, alfalfa) and temperate climate (mild, dry winters<sup>329</sup>). Further analysis of potential health effects that could result from the passage of Senate Bill 191 determined that increase in the number of large-scale livestock operations (swine and dairy) could have various health effects compare to other projected impacts (e.g., increase in crop production).

### **Other Impacts**

According to the testimony provided by various key Kansas agricultural organizations, the passage of the Kansas Agriculture Growth and Rural Investment Initiative could indirectly impact several areas beyond swine and dairy operations.<sup>330</sup> However, not all of these impacts may affect health in the state, and the goal of the HIA is to assess only those that might affect the health of Kansans. Additionally, some of these impacts might occur as the result of other changes. For example, a potential impact on crop operations was referenced by several organizations in the 2013 testimony. However, the potential impact of the legislation on the crop industry was discussed in the context of the expansion of livestock production in Kansas. As a result, health effects associated with potential changes in crop production were not assessed due to the limited attention given in the testimony and the potential for smaller health effects in comparison to health effects associated with livestock operations.

### *HIA Methods*

In order to assess how an increase in the number of large-scale swine and dairy operations could impact the health of Kansans, the HIA included a literature review, data analysis, key-informant interviews and a survey, which were carried out in accordance with standard research practices.

For the data analysis portion of the study, the HIA team examined data for Kansas counties with existing large-scale swine or dairy operations. The purpose of this analysis was to assess the experience of Kansas counties with large-scale operations as related to various factors (e.g., jobs) that could impact health. Research suggests that large-scale livestock operations could have positive and/or negative impact on the health of communities regardless of their ownership structure. Thus, consideration of the ownership structure of the large-scale operations selected for the study wasn't essential for the HIA analysis.

The HIA also gathered insights and experiences of individuals from communities deemed most likely affected by large-scale swine or dairy operations through a small convenience sample<sup>331</sup> using either structured interviews or a survey. This information was used to provide additional context and background surrounding the policy topic. It is important to note that although the HIA included a summary of stakeholder perspectives, the findings of the HIA were made based on the literature review and data analysis, not from the survey or interviews.

Any limitations related to the literature review, data analysis, interviews and/or the survey are acknowledged in the report.

Thank you again for your letter, and for your participation in this important project.

Sincerely,

Kansas Health Institute



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 4021 SW 10<sup>th</sup> Street #337  
 Topeka, Kansas 66604  
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[www.kansasruralcenter.org](http://www.kansasruralcenter.org)  
[info@kansasruralcenter.org](mailto:info@kansasruralcenter.org)

January 5, 2015

Tatiana Lin

Kansas Health Institute

212 SW Eighth Ave. Suite 300

Topeka, Ks. 66603

Dear Ms. Lin:

We thank the Kansas Health Institute for weighing in on this important debate with their study “Potential Health Effects of Changes to the Kansas Corporate Farming Law”. Over the past three decades no other agricultural question has prompted as much debate and division among farm organizations and farmers and ranchers themselves as the corporate farm law question. Kansas has a long history of limiting corporate ownership of land and farming operations as part of protecting economic opportunities for individual farmers and ranchers. Currently the remaining meaningful limit on corporate ownership and control of resources is the right of individual counties to allow or disallow corporate ownership within the county. We believe the KHI study provides some meaningful analysis for furthering the debate.

The study attempts to answer three basic research questions: 1) will changes to the corporate farming law affect the number, size and density of Kansas livestock operations? 2) which livestock operations will be effected more than others? 3) and will changes in the size, number and density of these operations affect the health of Kansans?

While the findings do not present stark black and white answers to these questions, the findings do suggest that proposed changes in state law (as proposed in 2013’s SB 191) may result in increases in the number of large scale swine and dairy operations in the state, and these increases may impact health and property values, especially in those areas in closest proximity to the new facilities. In other words, while big changes may not be seen at a countywide level, individuals closest to the facilities are definitely impacted, and it stands to reason that if these facilities increase in number and livestock density increases, that health and other impacts will also increase.

The Kansas Rural Center would like to draw attention to the study’s statements as to how the proposed change in the law could impact the **entire** state, not just those counties where large scale swine and dairy operations are currently found. While the counties studied were predominantly in western Kansas and a part of north central Kansas because those are the areas where such facilities are currently found and where the data exists, it is important to note that a change in the law would apply to the **entire state**, not just western Kansas or other areas with limited population where such facilities are currently found.

KRC realizes that individuals may currently develop such large facilities anywhere in the state. Siting laws and negative reaction from neighbors limit such development to some extent, but KRC believes corporations will not likely have the same reservations about population and where they site facilities if the corporate farm law is changed.

In our view, the KHI study provides sufficient and important information raising questions and furthering the discussion and debate about changing the state's corporate farming law, especially in the area of allowing local citizens to maintain the county level option.

We thank KHI for the opportunity to participate and offer comments.

Sincerely,

A handwritten signature in cursive script that reads "Mary Fund". The signature is written in black ink on a light-colored background.

Mary Fund

Interim Executive Director

Kansas Rural Center

## KHI Response to Kansas Rural Center

Dear Kansas Rural Center,

The Kansas Health Institute (KHI) would like to thank the Kansas Rural Center (KRC) for serving on the HIA Advisory Panel. We appreciate KRC's time, expertise and feedback during the process. We also would like to thank KRC for submitting a letter regarding the HIA report. We are glad that KRC found the HIA analysis meaningful for furthering the debate on this issue. We also appreciate comments regarding the potential impact of the law on entire state and would like to offer the following information.

### **Impact on the State of Kansas**

The HIA found that changes to the Kansas Corporate Farming Law could impact the entire state, should large-scale livestock operations locate in counties other than those studied. However, in order to assess potential impacts, the HIA team selected counties that currently have large-scale dairy (more than 1,000 animal units) and swine operations (more than 3,700 animal units). These counties were primarily located in the southwestern part of the state, with some counties located in the north central Kansas.

Historically, growth of these operations occurred in these areas of the state, in part, due to favorable climate and sparse populations. In general, sparse populations allow opportunity for adequate separation of livestock operations from inhabited areas. As a result, the HIA anticipated that these areas could see growth of these operations. However, growth could occur in any part of the state with the passage of a bill like Senate Bill 191 (2013), which would allow any agribusiness to operate anywhere in the state.

Thank you again for your letter, and for your participation in this important project.

Sincerely,

Kansas Health Institute



## *Sierra Club*

Craig Volland – Chair  
609 North 72<sup>nd</sup> Street • Kansas City, KS 66112  
(913) 334-0556

*Kansas Chapter Agriculture Committee*  
[www.kansas.sierraclub.org](http://www.kansas.sierraclub.org)

12-24-14

Tatiana Lin  
Senior Analyst and Strategy Team Leader  
Kansas Health Institute  
212 SW Eighth Ave., Suite 300  
Topeka, KS 66603

Subject: Comment on Final Draft of KHI Assessment on Proposed Change in Kansas Corporate Farming Law:

Dear Ms. Lin,

In general the key findings and recommendations in the subject study are credible given the available sources of information. However we do want to cite a couple of limitations of the study and also an important additional implication of the proposed change to the law. When we use the term CAFOs, or concentrated animal feeding operations, we are referring to the large swine and dairy operations in your study.

**1. Impacts of high density of CAFOs.** You have indicated in the report that negative health impacts may be increased among a high density of dairy or swine operations. However, the data comparisons are between cohorts of 22 study and 11 control counties with widely varying densities of swine and/or dairy operations. This precluded assessing the density effect in, for example, the worst case, which is Wichita County with 7 large swine sites with about 160,000 animal units concentrated in the southwest quadrant.

You attempted to remedy this limitation by interviewing a total of twelve "key informants" across the four study counties containing the highest number of animals of each type. This is a small sample and only one of these persons was described as living near a CAFO. This is not surprising, however, since almost all of swine CAFOs in your study set began operation more than ten years ago, and many of the original neighbors are likely to have moved away.

**2. Water Use for Livestock.** In most cases, CAFOs in western Kansas need more water than that designated in the report as "stock water" use. CAFOs also require Irrigation water to grow the crops needed to take up nutrients in the wastewater. Because this wastewater over time can become highly saline, a considerable amount of irrigation water may be needed to ensure that the crops achieve the assumed yield.

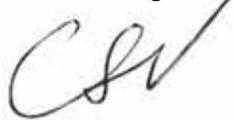
While this incremental use is unlikely to contradict your overall conclusion regarding regional aquifer depletion, it could have a significant impact commensurate with the size and/or density of new operations at locations where the aquifer is already substantially depleted.

**3. Statewide Implications of More Large CAFOs.** Readers of this report should be aware that the repeal of the current corporate agriculture law means that large numbers of big hog and dairy CAFOs can be placed *anywhere* in Kansas, not just in the relatively sparsely populated areas in the west. If you think this won't happen just consider that Smithfield Foods raises two million hogs per year in northwest Missouri in a network that includes the third largest swine operation in the United States. Thus the burdens on the neighbors of a CAFO cited in this report are a real possibility for citizens of central and eastern Kansas.

Nothing in this report justifies taking away the right of residents in any Kansas county to vote to keep out corporate hogs or dairies to safeguard their quality of life.

Thank you for the opportunity to participate on the advisory committee for this study and to review your report. I know it has been a complex undertaking.

With best regards,



Craig Volland  
Chair, Agriculture Committee  
Kansas Chapter, Sierra Club

## KHI Response to Sierra Club

Dear Sierra Club,

The Kansas Health Institute (KHI) would like to thank the Kansas Chapter of the Sierra Club for serving on the HIA Advisory Panel. We appreciate the Sierra Club's time, expertise and feedback during the process. We also would like to express thanks for submitting a letter regarding the HIA report. We have carefully reviewed the comments and would like to offer the following information.

### **Density of Livestock Operations**

The HIA assessed potential health impacts that could result from an increased number of large-scale swine and dairy operations in Kansas. Due to a lack of reliable information about the density of current large-scale operations in Kansas, the HIA didn't assess potential additional effects associated with changes in density of large-scale swine and dairy operations. This limitation is acknowledged in the HIA report.

### **Water Use for Livestock**

Due to a lack of data and time constraints, the HIA team assessed some, but not all issues related to water use. Specifically, the HIA didn't include an assessment of the potential impacts on irrigation water in the state. However, the report examined water use and availability as these may be impacted by an increase in the number of large-scale livestock operations. The report acknowledged that an increase in the number of large-scale swine and dairy operations could raise demand for locally grown feed crops, and additional water might be needed for irrigation.

### **Impact on the State**

The HIA found that changes to the Kansas Corporate Farming Law could impact the entire state. However, in order to assess these impacts, the HIA selected counties that currently have large-scale dairy (more than 1,000 animal units) and swine operations (more than 3,700 animal units). These counties were primarily located in the southwestern part of the state, with some counties located in north-central Kansas.

Historically, growth of these operations occurred in these areas of the state, in part, due to favorable climate and sparse populations. In general, sparse populations allow opportunity for adequate separation of livestock operations from inhabited areas. As a result, the HIA anticipated that these areas could see growth of these operations. However, growth could occur in any part of the state with the passage of a bill like Senate Bill 191 (2013), which would allow any agribusiness to operate anywhere in the state.

Thank you again for your letter, and for your participation in this important project.

Sincerely,

Kansas Health Institute

## ENDNOTES

1. The HIA Advisory Panel was formed for the duration of the HIA project. The HIA Advisory Panel members met during the course of the project and provided their feedback on the project's methodology, findings and recommendations. The HIA team considered perspectives of the Advisory Panel members throughout the process. However, the views expressed in this report are those of the author(s) and do not necessarily reflect the views of the Advisory Panel.
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3. The referenced key agricultural organization include: Kansas Department of Agriculture, Kansas Pork Association, Kansas Livestock Association, Kansas Farm Bureau, Kansas Rural Center, Kansas Farmers Union, Kansas Sierra Club and others.
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62. Upstream indicators: health insurance, socioeconomic status, community disruption, water quality and quantity, soil quality, and antibiotic resistance.
63. Downstream indicators: doctor’s visit/preventive care, nutrition/physical activity, crime, and reservoir/aquifer capacity.
64. Health Outcomes: overall morbidity/mortality, obesity-related mortality, chronic conditions, infectious diseases, mental health status, and respiratory conditions.
65. T-test — A statistical examination of two population means. A two-sample t-test examines whether two samples are different and is commonly used when the variances of two normal distributions are unknown and when an experiment uses a small sample size.
66. Ordinary least squares (OLS). This method minimizes the sum of squared deviations (vertical distances) between the observed responses in the dataset and responses predicted by the regression line.

## ENDNOTES

67. A fixed effects model. This is a statistical model that assumes that the impact of the “unobserved individual effects” on the response variable do not change over time. The unobserved individual effects are collectively represented by the intercept or constant term.
68. A random effect(s) model. This model on the other hand assumes that the impact of the “unobserved individual effects” on the response variable changes over time. In other words, the intercept or constant is a random variable that has its own distribution.
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## ENDNOTES

322. For example, the Kansas Department of Agriculture suggested that “We (Kansas) had interest from pork and poultry farms. Unfortunately, the restrictive corporate farming laws on the books are prohibitive and driving that business to other states.” The testimony given by the Kansas Pork Association provides another example of potential impacts of this legislation, “SB 191 sends a clear signal to investors that the state is really serious about bringing new livestock businesses and jobs to Kansas.” We believe new farms will also prove valuable.” Additional information about testimonies is available in *Figure 4*, page 12.
323. Ownership structures such as corporations, limited liability companies, limited partnerships and others, have several characteristics (e.g., limited liability, certain tax advantages) which makes them attractive for capital investment.
324. It is important to note that after the passage of a new law, agricultural businesses would still be subject to the requirements and processes established under other Kansas agriculture laws (e.g., local zoning laws, environmental regulations).
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330. There might be additional indirect impacts of this legislation. However, the 2013 testimony primarily highlighted these areas: existing Kansas farms (e.g., multi-generational ownership opportunity regardless of degree of relationship), new out-of-state agricultural operations (e.g., swine, dairy, poultry and crop operations), reporting requirements and constitutionality of Kansas Corporate Farming Law.
331. A convenience sample is nonprobability sampling which involves the sample being drawn from that part of the population which is close to hand. That is, a population is selected because it is readily available and convenient.

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