The availability of state-level data on interstate cattle movements in the United States

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Abstract

Knowledge about the patterns of animal movement – particularly feeder-cattle movement – within the USA is necessary in order to anticipate how diseases might be spread geographically. This study was conducted to explore the availability of interstate-level movement data which might be used to develop a more coherent national picture of interstate feeder-cattle movement. State Statistical Offices of the National Agricultural Statistics Service, 1996 (NASS) and Departments of Agriculture in all 50 states were contacted to determine the type of information collected regarding the import and export of feeder cattle. Eighteen of the 50 states contacted recorded updated import and export information by using certificates of veterinary inspection and (occasionally) entry permits for verification. The 18 states were: Alabama, Colorado, Florida, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Maryland, Massachusetts, Minnesota, New Jersey, Pennsylvania, Texas, West Virginia, Wisconsin, and Wyoming. Profiles of import and export data from Kansas, Texas, Colorado and Iowa (the primary receivers of 51% of total 1995 imports) were developed. These four states received at least 50% of their cattle imports from <9 different states. As a result, approximately half of the nation's import movement can be explained by a total of 13 states and Mexico (excluding duplicates). Also, >50% of the exports from Kansas, Texas, Colorado, and Iowa go to \leq 3 states. This import and export information confirms conclusions of others that cattle tend to move toward the center of the USA. However, if more states kept comprehensive, up-to-date records of movement information, knowledge about cattle-movement patterns in the USA would be importantly increased. The lack of specific notations on certificates of veterinary inspection can lead only to perceived trends; the present records have limited value in tracking animal movement.

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1. Introduction

Knowledge about the patterns of animal movements – particularly, feeder-cattle movement – is essential for predicting the geographical spread of animal disease within the USA. Understanding the potential patterns of animal disease spread may help to decrease the economic and clinical impacts associated with disease outbreaks. This can be ultimately accomplished through both knowledge and emergency preparedness. In addition, such information may be useful in defending trade regionalization schemes and in targeting industry quality assurance efforts.

Data on animal movements in the USA are highly fragmented and limited in geographic as well as historic scope. As a result, there persists a need to evaluate alternative data sources for the development of an up-to-date, comprehensive assessment of animal movement. The main objective of this study is to explore the availability at the state level of data on cattle movement. It is our belief that the data potentially could be used in the development of a broader and more coherent national picture of interstate feeder-cattle movement and also aid in assessing the feasibility of an interstate-movement database.

2. Materials and methods

In the USA, all livestock shipped across state boundaries on public highways may enter that state only if accompanied by a valid certificate of veterinary inspection and/or entry permit (Fig. 1). These import and export regulations are desirable in order to protect the domestic livestock populations already residing in the state of entry and the general public from exposure to infectious and contagious diseases that might be introduced through the importation of infected animals. Examples of diseases that are of primary concern to the cattle industry include Tuberculosis and Brucellosis (diseases which threaten public health and are not easily controlled through standard livestock management practices). Certificates of veterinary inspection (showing that the livestock in the shipment are free from signs of infectious or contagious diseases) are issued by accredited veterinarians before the animals (feeder cattle, in this case) are allowed to move across state lines (Colorado Commission of Agriculture). These certificates can provide abundant information, as they commonly include the premises of origin and destination, proposed date of shipment, species and number of livestock in the expected shipment, and additional health-related information. Duplicates of completed certificates

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1 Cattle and calves on feed are animals for abattoir being fed grain or other concentrates. We focused our efforts on these cattle, as they are perceived to move frequently and data on the movement of these cattle are limited in geographic scope.

2 Premovement authorization into the desired state of destination obtained from the destination State Veterinarian. This authorization asserts the conditions under which the movement may be made (Colorado Commission of Agriculture).

3 Licensed veterinarians approved, designated, or certified by USDA APHIS Veterinary Services and the State Veterinarian to perform all functions as required under the disease control laws and regulation of the state in which they practice and the USA Department of Agriculture (Colorado Commission of Agriculture).
**Fig. 1. Certificate of veterinary inspection.**
are collected by the exporting and importing states’ Departments of Agriculture. Information acquired from fully completed certificates could thus be instrumental in obtaining a more comprehensive overview of the patterns of interstate animal movement.

The State Statistical Offices of NASS and the Departments of Agriculture in all 50 states were contacted to see if they recorded the number (and state of origin) of feeder cattle that came into their state (imports) as well as the number (and the intended state of destination) of feeder cattle that left their state (exports) in 1995. A copy of what was available was requested from the states that did record such information.

The assessment of the patterns of interstate movement of feeder cattle primarily focused on states with large percentages of imports in 1995 (together totaling at least half of the nation’s imports) according to the *Meat Animals – Production, Disposition, and Income 1995 Summary* published by NASS. The percentage of imports for each state was calculated by dividing the state’s import number by the total number of imports in the USA. If states lacked comprehensive movement records, we used other states’ records of exports to determine these states’ imports. Export records from 1995 for the same ‘major-movement’ states were also explored. In addition, grazing permits kept by the United States Department of Agriculture’s Forest Service and Bureau of Land Management were considered as possible sources of cattle-movement information.

3. Results

3.1. Interstate-movement information available based on the states contacted

Eighteen of the 50 states contacted recorded import and export information. The 18 states were: Alabama, Colorado, Florida, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Maryland, Massachusetts, Minnesota, New Jersey, Pennsylvania, Texas, West Virginia, Wisconsin, and Wyoming (Fig. 2).

The 18 states maintain updated records of movement information through the use of certificates of veterinary inspection and, occasionally, entry permits for verification. Unfortunately, not all of these states classify their import records based on the livestocks’ function (e.g. feeding, grazing, breeding, or slaughter cattle) Appendix A.

3.2. Interstate-import information available from Kansas, Texas, Colorado and Iowa

Primary receivers of 51% of total 1995 imports were: Kansas (19%), Texas (17%), Colorado (10%), and Iowa (6%) (National Agricultural Statistics Service, 1996). Nebraska (17%) and Oklahoma (6%) (National Agricultural Statistics Service, 1996) were also major receivers of 1995 interstate imports – but were not taken into account

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4 The Department of Agriculture is a generic term used to describe the functional role that the department carries out; this term will be used throughout the remainder of this paper, when in fact some states may call the department by a different name.

5 We focused on 50% of the movement because of the limited availability of information.
because these states do not keep track of the intended premises of origin and destination and the numbers of animals associated with those movements. Despite using other states’ records of exports to determine their imports, we could only account for 18% of Nebraska’s and 13% of Oklahoma’s imports.

The livestock classification (e.g. feeding, breeding, slaughter, or dairy cattle) is not consistent among the states. Kansas’ records include all classes of cattle whereas Texas’ records exclude cattle designated for slaughter and dairy cattle. Colorado’s records include all beef cattle and calves except those that are going to stockyards or slaughter. Iowa’s records include only feeder cattle.

Approximately 51% of Kansas’ imports (including all classes of cattle and calves) came from Oklahoma (18%), Missouri (15%), Texas (13%), and Kentucky (6%) in 1995. Fifty percent of Texas’ imports (excluding slaughter cattle) came from Mexico (31%) and New Mexico (20%). Colorado received 54% of its imports in 19946 from 5 states: Oklahoma (14%), Kansas (12%), Wyoming (11%), Texas (10%), and New Mexico (8%). However, 50% of Iowa’s imports came from 8 different states: South Dakota (11%), Montana (21%), Missouri (9%), Kentucky (6%), North Dakota (5%), Nebraska (4%), Virginia (4%), and Wyoming (3%). Approximately half of the nation’s interstate import movement can be explained by a total of 13 states and Mexico.

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6 Colorado’s 1994 records were used instead of 1995 data because 1994 was the last year that Colorado’s State Statistical Office compiled import information from certificates of veterinary inspection.
3.3. Interstate-export information available from Kansas, Texas, Colorado and Iowa

As was true for imports, the livestock classification for exports is inconsistent among the different states examined. Kansas’ and Colorado’s records include all classes of cattle, whereas Texas’ records specifically indicate that the numbers recorded include those cattle going to slaughter but do not include dairy cattle. Iowa’s records include only feeder cattle.

Approximately 55% of Kansas’ exports go to Nebraska. Sixty percent of Texas’ exports go to Kansas (30%), Oklahoma (15%), and New Mexico (14%). Fifty-eight percent of Colorado’s exports go to Kansas (38%) and Nebraska (20%) whereas 59% of Iowa’s exports go to Nebraska.

Greater than 50% of the exports from Kansas, Texas, Colorado, and Iowa go to ≤3 states. Based on the numbers of cattle associated with these exports, it is evident that more cattle come into Kansas, Texas, Colorado and Iowa than leave these states. This is sensible based on the location of the abattoir industry in the USA.

3.4. Movement information available from the forest service and bureau of land management

Authorization to graze cattle on provisional Forest Service land is granted to ranchers within close proximity. Thus, Forest Service grazing permits are of little value in studying the overall patterns of interstate cattle movement.

Records associated with grazing permits available from the Bureau of Land Management provide information as to the individual responsible for moving cattle on and off the land, the number of cattle authorized to graze during a given time, and when the cattle are to be moved on and off the land. The address of the individual who obtained the permit is not public information and that address might not be the same as the location from which the cattle originated or to which they went.

4. Discussion

Our results confirm the conclusions of others: cattle tend to move toward the center of the USA (Fig. 3). However, the summary data of animal imports and exports may be misleading when compared to the animals’ origins and/or destinations; perhaps cattle are being brought into a state, regrouped, and then redistributed elsewhere. If more states kept complete, up-to-date records of movement information, knowledge about cattle-movement patterns in the USA would be importantly increased.

In theory, certificates of veterinary inspection have the potential to serve as a strong foundation for understanding the overall patterns of animal movement. However, the information requested on certificates of veterinary inspection varies among states – leading to several challenges when examining the data at a national level. For example, some states’ certificates of veterinary inspection ask for the specific use (e.g. feeding, grazing, slaughter, breeding or exhibition) of the livestock and purpose (e.g. inter- or intrastate movement, show, sale or change of ownership) of movement – while others ask
for the general species of the livestock included on the certificate (e.g. cattle, sheep, horse, swine or poultry). Often, the age and sex of the animals are not specified; the owner, consignee, and destination addresses are not always the same as the actual location of animal origin or destination.

Receipt of a certificate of veterinary inspection by the state’s Department of Agriculture only indicates the intention to move animals. Occasionally, a certificate will be received by a state’s Department of Agriculture; however, the livestock owner may have decided not to move the animals, may have postponed the movement, or may have moved different numbers of animals than indicated on the certificate.

Most cattle moving directly from farm to slaughter do not require a certificate. As a result, interstate movement for slaughter purposes is not adequately represented by studying only certificates of veterinary inspection. Certificates of veterinary inspection (as they presently exist) do not allow us to track the movement of feeder calves to areas for grazing purposes and their further redistribution to feedlots or the redistribution of cattle from sale yards.

Despite the differences between state certificates, we believe that they still provide valuable information regarding the patterns of interstate animal movement. The Departments of Agriculture and State Statistical Offices which record movement information, at the request of NASS, have a reference for their marketing and livestock needs. These states may use this information to find out who is purchasing cattle and their

Fig. 3. Summary map of imports to Kansas, Texas, Colorado, and Iowa.
destination. They may also use this information in outbreak and compliance investigations.

Use of electronic information or an automated system for the entry of these certificates may prove to be instrumental in increasing the amount and consistency of record keeping. For example, an electronically entered certificate of veterinary inspection could be indexed by the consignee/consignor address, origin or destination state, date of shipment, species or number of animals in the shipment. Such technology would make documents easier to locate, retrieve, and exchange – not to mention the time and space that would be saved.

5. Conclusion

In conclusion, the lack of specific notations on certificates of veterinary inspection can only give trends and thus the present records have limited value in tracking animal movement. There are things that could be done to increase their value but these improvements will require consistency across states, standardization of procedures and data, and record keeping at unknown costs.

Acknowledgements

The authors thank the various State Statistical Offices of NASS and Departments of Agriculture for their support and cooperation in making this project a success.

Appendix A

Summary of information regarding the availability of data, the number of imports and exports in 1995, how import and export data were classified, and additional comments

<table>
<thead>
<tr>
<th>State</th>
<th>Data available</th>
<th>Imports (×10^3)</th>
<th>Exports (×10^3)</th>
<th>Classification</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>Yes or No</td>
<td>37.0</td>
<td>330.5</td>
<td>Cattle for feeding</td>
<td>Data are for Fiscal Year 1995–1996, broken down by state</td>
</tr>
<tr>
<td>Colorado</td>
<td>Yes</td>
<td>1730.0</td>
<td>354.0</td>
<td>Exports: all cattle; Imports:</td>
<td>Import data are based on 1994 statistics only, export data are based on 1995 statistics</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Excludes shipment to stockyards and</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>slaughter plant</td>
<td></td>
</tr>
<tr>
<td>Florida</td>
<td>Yes</td>
<td>66.9</td>
<td>667.7</td>
<td>All cattle and calves</td>
<td></td>
</tr>
<tr>
<td>Hawaii</td>
<td>Yes</td>
<td>91.0</td>
<td>32.7</td>
<td>Beef cattle</td>
<td></td>
</tr>
<tr>
<td>Idaho</td>
<td>Yes</td>
<td>330.4</td>
<td>256.2</td>
<td>Beef cattle</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>Yes/No</td>
<td>Import</td>
<td>Export</td>
<td>Description</td>
<td>Data breakdown</td>
</tr>
<tr>
<td>--------------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>------------------------------------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Illinois</td>
<td>Yes</td>
<td>323.4</td>
<td>—</td>
<td>Cattle for feeding</td>
<td>Data are broken down by month and state</td>
</tr>
<tr>
<td>Indiana</td>
<td>Yes</td>
<td>169.5</td>
<td>15.7</td>
<td>Cattle for feeding and calves</td>
<td>Data are broken down by month and state</td>
</tr>
<tr>
<td>Iowa</td>
<td>Yes</td>
<td>1179.8</td>
<td>185.4</td>
<td>Cattle for feeding</td>
<td>Data are broken down by month and state</td>
</tr>
<tr>
<td>Kansas</td>
<td>Yes</td>
<td>4400.0</td>
<td>817.0</td>
<td>All cattle and calves</td>
<td>Data are broken down by state</td>
</tr>
<tr>
<td>Maryland</td>
<td>Yes</td>
<td>3.0</td>
<td>1.4</td>
<td>Beef cattle</td>
<td>Data are broken down by state and month</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>Yes</td>
<td>3.8</td>
<td>3.6</td>
<td>All cattle</td>
<td>Data broken down by state</td>
</tr>
<tr>
<td>Minnesota</td>
<td>Yes</td>
<td>440.3</td>
<td>2.5</td>
<td>Cattle for feeding and calves</td>
<td>Data are broken down by state</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Yes</td>
<td>1160.0</td>
<td>2,243.0</td>
<td>All cattle</td>
<td>Data are broken down by state and month</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>Yes</td>
<td>0.167</td>
<td>1.193</td>
<td>Beef cattle</td>
<td>Data are broken down by state and month</td>
</tr>
<tr>
<td>Texas</td>
<td>Yes</td>
<td>3976.0</td>
<td>1452.0</td>
<td>Imports – data exclude slaughter and dairy cattle</td>
<td>Data are broken down by month and state</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Exports – data include slaughter cattle and excludes dairy cattle</td>
<td></td>
</tr>
<tr>
<td>West Virginia</td>
<td>Yes</td>
<td>28.0</td>
<td>40.8</td>
<td>All cattle</td>
<td>Data are broken down by state</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>Yes</td>
<td>62.0</td>
<td>106.2</td>
<td>All cattle and calves</td>
<td>Import data are broken down by state, but export data are not</td>
</tr>
<tr>
<td>Wyoming</td>
<td>Yes</td>
<td>388.9</td>
<td>—</td>
<td>All cattle and calves</td>
<td>Data are broken down by month and state</td>
</tr>
</tbody>
</table>

**References**
