

RESEARCH RODENT TRANSPORTATION: ACADEMIC RELIANCE ON TRANSPORTATION FOR PROGRAM CONTINUITY

THE NEED FOR RESEARCH ANIMALS: Academic research institutions have become increasingly reliant on safe and efficient animal transportation to support their programs of medical and scientific discovery. This reliance is the result of a changing research environment that includes technological advances that make genetically modified animals more accessible and more applicable to multiple areas of investigation. Today, academic research institutions anecdotally report that transgenic mice make up more than 60% of their research animals. Consequently, inter-institutional transport of these animals constitutes a growing part of commercial animal transportation. Large-scale, in-house animal breeding whether of genetically modified or standard animal models is costly and requires significant investment in infrastructure (space and equipment) as well as staff (labor/training). As a consequence, the movement of animals between institutions has proven to be more economical and practical. Moreover, the rapid growth of research collaboration among institutions both nationally and internationally, has increased the need for safe, reliable and efficient transportation of live research animals. Repositories of cryopreserved genetically modified animals have been established over the last decade, providing a source of frozen embryos and germplasm for start-ups of research colonies. Although transferring animals using cryopreserved embryos or germplasm avoids some issues associated with shipping live animals, there are drawbacks to this option:

- Institutions receiving the embryos must have the capability to reconstitute them.
- At least 10 to 12 weeks is required from implantation until sexually mature offspring are available to begin the breeding colony.
- The percent of implanted embryos that result in live pups is quite variable, but success rates less than 50% are not uncommon.
- To compensate for potentially low rates of success, a large number of embryos must be harvested. This is not in keeping with the goal of reducing, refining, and replacing animals (i.e., the 3Rs) when compared to shipping live animals on an as-needed basis.

Although larger species such as dogs, cats and nonhuman primates are not used in great numbers, these larger animals play a vital role in research and also need to be transported from production sites to research institutions.

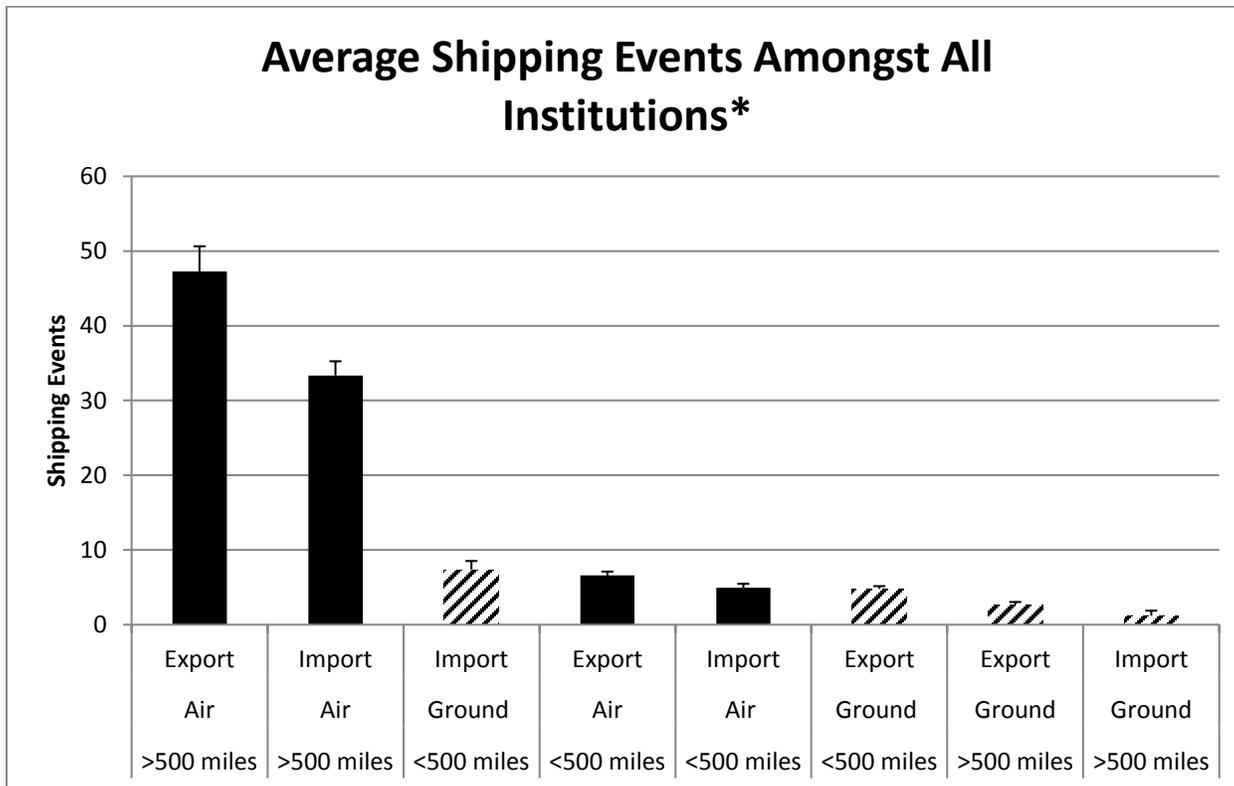
THE COMPLEXITY OF TRANSPORTING ANIMALS: Animal transportation requires a complex system of airlines, cargo carriers, courier services, local transport, and supplier-owned trucking services.

- Commercial breeders have trucking fleets to carry animals that they produce, with most animals going directly to the institutions. A small percentage is shipped by air, with trucking services required at the beginning and end of the route.
- Importantly, commercial breeders will only transport animals produced within their own facilities and will not carry animals of unknown/unconfirmed health status.
- Few independent transporter options for ground transportation are available to institutions other than to contract with companies doing local deliveries.
- Commercial transport services (freight forwarders) use a combination of air, and ground (local trucking) to complete the full journey, with air being by far the largest component.
- Some institutions contract directly with airlines to move animals and make their own arrangements for ground carriage components.

THIS STUDY: Data on a total of 5,829 individual shipping events from eight academic research institutions were collected and analyzed. The institutions represent different regions within the continental U.S. All are entirely U.S. based institutions, and while they vary in size, all have significant research programs. The data provided were limited to live

mice and rats and cover one to four years of transportation activity between 2013 and 2016. The information provided included whether the shipping event involved import or export from the institution; domestic or international shipment; air shipment with a ground component or ground shipment only; and the relative distances that animals were shipped.

This graphic representation of the data from seven institutions clearly shows that the majority of shipping events involved air transportation for both domestic and international animal movement. The data were remarkably similar for seven of eight participating institution which supports the conclusion that **academic research programs rely heavily on air transportation to accomplish their research missions**. A single institution had more ground events that the average due to reasons of its particular location and is therefore not included in the graph.



***The average number of air shipments per year for these academic institutions was 203. The average number of ground shipments per year for these academic institutions was 10.**

CHALLENGES: Challenges to airline transportation of research animals are impactful, and growing. One significant contributing factor in airline reluctance to ship research animals is animal protectionists’ pressure on airline executives and cargo managers with the implied threat of negative publicity and passenger service disruption.

However, economic pressures on the airlines and increasing competition for capacity are also factors that have led to reductions in availability of cargo space that is environmentally controlled and therefore suitable for shipping animals.

A search of air transportation policies on airline websites showed that nearly all major commercial airlines have developed policies against the carriage of nonhuman primates intended for research purposes. Moreover, many airlines have expanded that prohibition to cover dogs and cats intended for research, and a growing number prohibit the shipment of ANY animal intended for research purposes.

Ground transportation options are also extremely limited. As is true for airlines, the potential revenue from shipping research animals is small, and is generally deemed insufficient to drive a market based/competitive solution. The few small private companies that are in the ground transport business cannot meet the diverse route and scheduling requirements that would become necessary if all air carriage options were to disappear. Most of the academic institutions contacted could only identify one or two ground service providers in their area, and those providers were available for local animal movement only. Long-distance shipping by truck would be cost prohibitive to move small numbers of rodents since dedicated trucking fees can exceed \$3.00 per mile round trip.

Why are the options so limited?

- Airline finances: profitability. Shipping animals in the temperature controlled, pressurized section of the cargo hold uses capacity that can otherwise be used for items such as vegetables, flowers that entail lower risks and less labor.
- Airline finances: equipment. The airline industry is moving away from wide body aircraft, in favor of more cost effective and flexible single-aisle middle distance aircraft on most domestic and international routes. This means less cargo space that can accommodate live animal shipments.
- Regulatory complexity. New regulations accompanied by increased scrutiny and enforcement activity are creating a challenging for airlines willing to transport animals. Documentation, training requirements, and inspections frequently cost the airlines more than the revenue they receive from moving live animals. In addition, shipping animals exposes the carrier to the risk of significant fines and reputational damage for regulatory violations or unintentional harm to animals.
- Pressure from the public and anti-research groups. The animal rights community is very vocal and has been very effective in mobilizing its supporters in efforts to convince airlines that the public would refuse to fly with them airline if they are involved in the movement of research animals.

IMPACT ON YOUR INSTITUTION: Individual academic institutions are urged to take steps to monitor and assess their internal needs for transportation and the availability of current transportation options. This assessment should be used as a basis for internal review, discussion and development of contingency plans for research continuity. Developing an effective network of advocates, ground and air transporters, and government regulators will aid in long term stability and success of a transportation system.

CONCLUSION: Challenges to animal transportation issue have been increasing over a period of many years. Since these challenges are the product of many factors, it would be highly unrealistic to expect a quick or easy solution, but if the trend continues, it could have a devastating impact on research programs. The inability to obtain and transfer research animals would slow ongoing research and dramatically inhibit inter-institutional collaborations. In the absence of reliable transportation options, more vivarium space and staff time would have to be dedicated to internal breeding colonies, adding significantly to the cost of research and limiting resources available for the science itself. Furthermore, the increased difficulty of obtaining specialized animal modes of certain diseases could curtail research in some critical areas.