Shipping Rodents and Rabbits
Terms

- **Consignor** = **Shipper** = the institution shipping the animals
- **Consignee** = Institution receiving the animals
- **Carrier** = the company transporting the animals. In the case of air the airline is the primary carrier. If a trucking company picks up or delivers animals to the airport they are the secondary or intermediate carrier.
Important Considerations When Shipping Rodents and Rabbits

- Make sure the animals are fit to travel
  - No physical or metabolic conditions that would preclude them from traveling
  - Identify any special requirements for travel
- Determine what guidance documents and regulatory requirements apply (e.g. LAR CR 81 and CR 84)
- Develop a written journey plan
- Use a species appropriate container
- If shipping in pairs or groups establish their compatibility before shipping
Examples of Rodent Shipping Containers are in the “LAR”
COMMERCIAL SHIPPING CONTAINERS
Over-shippers

- Shipping containers with over-shippers
  - One or more primary containers with a secondary covering
  - Over-shipper adds structural strength and resistance to microbial contamination as well as moisture and thermal protection
Shipping Container Dimensions:

- “The animal(s) must be able to move about freely within the containers so as to make normal postural adjustments and have adequate air space over the highest part of the body to allow air movement and to prevent injury from contact with the top of the container.”
Container Construction

- **Body of the container**: IATA standards allow the use of the following materials
  - Cardboard with moisture resistant coating
  - Molded plastic (including, but not limited to, polyethylene, polycarbonate, polystyrene)
  - Corrugated plastic composite board
  - Laminated plastic composites
  - Fiberglass
  - Aluminum

- **Performance standards**
  - Designed to allow stacking of at least 8 fully loaded containers without damage or crushing
  - Interior surfaces — smooth, moisture resistant, durable
- **Interior surfaces**: covered by wire; solid, smooth plastic; plastic film or other materials that resist gnawing
  - Wire mesh—small grid size to prevent access to container body and prevent entrapment of appendages
  - Finished wire edges to prevent injury
    - Animals & people
Wire must not allow animals to gain purchase with their teeth

- No free edges of wire
- No unfastened wire seams
- No elevated seams or wrinkles in wire

If wire is not continuous but just covers filter opening, must be fastened into container construction materials so no access to free edges.

- Chemically weld wire into surface or cover free edges
- Hamsters must have 1, and preferably 2, layers of wire
When non-reusable material such as cardboard is used, all critical junctions must be fastened with **durable fasteners**. 

- Staples of appropriate gauge
- Strong, nontoxic water resistant glue
- Durable water resistant stitching

**Penetration of floor** by fasteners or stitching **should be avoided**
Container lid

- Must be secured in place using permanent fasteners, water resistant glue, reinforced tape, or stitching
- If lid is not lined with wire mesh, must be made of plastic or have a plastic film liner (transparent if viewing window)
Observing the animals while in transit

- Viewing window required
  - Often in lid of container but can be in the sidewall
  - Often covered by protective flap which must be able to be re-secured after inspection
Floor

- Must be formed in such a manner that the junction of the floor to the walls does not form a channel for liquids generated within the container to escape the container
  - Must be constructed/coated in such a way that *liquids cannot pass across its surface*
    - *Michelman coating*
    - *Drop-in secondary floor*
    - *Absorbent pads below wire mesh covering floor*
Divided Shipping Containers

- Must prevent access between compartments
- Must be divided in such a way that sufficient cross ventilation is maintained.
- Do not mix species or strains in the same container
Ventilation

- Placement and type of ventilation openings can vary
- Ventilation apertures on at least 3 of the walls of the container
- Total ventilation space should be at least 14% of the total combined surface area of the side walls (16% for USDA covered species)
- Additional or replacement ventilation may be provided on the top/lid of the shipping container
  - May replace all or a portion of the ventilation apertures on the sides of the primary enclosure
- Must have filters completely covering the ventilation openings in the primary container
- If a secondary container (over shipper) used, may or may not have filters depending upon design
- Filters should be permanently glued or bonded or otherwise affixed to preclude movement of unfiltered air
- Filter should be protected from direct animal access (e.g., wire covered)
Ventilation

- If perforated plastic used to protect filter material from animal access, *size and number of perforations* should be equal to the net size of the ventilation opening as specified previously.
- Filters should be constructed of *water resistant as well as tear resistant* materials (e.g., spun bond polyester).
- If *filters* are *affixed* to the *outside* of the container, they must be protected from damage.
AIR CIRCULATION TO DISSIPATE HEAT

- Spacer bars and offsets
  - Should be integral part of container or permanently affixed
  - Assures adequate ventilation
    - Air channels of $\frac{3}{4}$ inch or greater on at least 2 sides
Shipping Container

HEATED AIR

Fresh Air
Convection

Conduction
Radiation
AIR FILTERS

NEW FILTER

REUSED FILTER (AUTOCLAVED)
Truck Air Distribution

Air Distribution Plenum

Air Channels
Animals usually can cope / adapt to the environment we present them during shipment without long lasting effects
TEMPERATURE
The Number And Size Of The Animals In The Container Influences The Effective Ambient Temperature In The Container

![Graph showing the relationship between ambient temperature and number of animals in a container.]
Thermoregulatory Effector Responses

- Range of Normothermia
- Cold Death
- T Core
- Heat Death
- LCT
- UCT
- TNR
- T = T Core

From Chris Gordon
Labeling

- Each container must have affixed at least one label that states “Live Animals” or “Laboratory Animals”
  - All SPF, axenic (germ free) or gnotobiotic (defined flora) animals for laboratory use should have the “laboratory animals” label instead of the “live animals” label.
  - All labeling in English
LIVE ANIMALS

CONTENTS

Color: Bright Green On Light Background
Minimum Dimensions: 4X6 in.

Laboratory Animals

These animals are in a FILTER CONTAINER to exclude germs.

If it is necessary to inspect them for any purpose, this must only be done under the direction of the consignee. If they are otherwise opened, or if they are given food or water, their health may be affected.

DO NOT OPEN, FEED OR WATER

Color: Bright Red On Light Background
Minimum Dimensions: 4X6 in.
- “This Way Up” labels must be placed on all four sides of the container whenever possible.
- Labels may be imprinted on the container
- Labeling on small containers must not occlude ventilation openings.
Shipping Containers

- New containers should be constructed to **hold species to be shipped**
  - Hamsters can chew through mouse/ rat-proof containers
    - e.g., 747 and hamsters
  - If in doubt, test containers by packing and holding
  - When rodents run out of food and water they look for light and chew their way out
    - Need to be sure that a sufficient amount is provided for the entire journey
Container Take Home Messages

- **DON’T REUSE SHIPPING CONTAINERS!**
  - Loss in structural integrity with disinfection
  - No assurance of disinfection
  - May not be able to adequately reseal
- **You are ultimately are responsible for escape in shipment**
- **Select a container to match microbiological status**
- **Containers that comply with IATA construction standards are available commercially**
Bedding

- Purpose is to **absorb moisture** produced by the animals or by any food or water sources.
- Should be **appropriately disinfected** and should be **clean and dry**.
- **Don’t skimp** on the amount!
  - For journeys lasting more than one day the amount provided should be proportionately increased.
- Given the distractions associated with travel, rodents do not often use enrichment items or nesting materials.
FOOD AND WATER SOURCES
FOOD + WATER SOURCES

GELLED WATER
Feeding and Watering

Food

- Same pelleted or extruded dry rodent food as used in home colonies
  - Commercially available, pre-sterilized diet also available
- Can be placed loosely within shipping container—no special feeder required
- If extended length of shipping anticipated and substantial amounts of food and water are supplied, care must be taken in their placement and the affixing of them to the container so as not to cause injury to the animals.
Water

- Water kits
  - can readily leak
  - Plastic container, zip lock pouch filled with water and a drinking valve

- Gelled water (agar/colloid stabilized water) may contain additional nutrients including energy sources (e.g., simple or complex carbohydrates)
  - Stabilizing agents can be added to inhibit spoilage
  - Not a nutritionally complete diet

- Fruits and vegetables have moisture but at a cost
  - Physical hazard to the animals since can’t be affixed to the container
  - Dry out quickly when sliced
  - Can’t be disinfected
Emergency Feeding & Watering During Transit

■ Sufficient food and water must be packed with the animals to allow for delivery delays
  – Should be provided with sufficient food and water to last for *24 hours longer than journey*
  – There should be *no need to open container during transit* if appropriate pre-planning is done
- If delays exceed 24 hours, *containers must only be opened under appropriate scientifically controlled conditions* to prevent contamination in order to provide appropriately disinfected food and water or for repacking.
Guidance On Shipping Density
# DENSITY GUIDELINES – MICE

<table>
<thead>
<tr>
<th>Gram Range</th>
<th>Space Per Animal</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 30</td>
<td>cm^2</td>
<td>in^2</td>
</tr>
<tr>
<td>Up to 30</td>
<td>40</td>
<td>6</td>
</tr>
<tr>
<td>&gt; 30</td>
<td>52</td>
<td>8</td>
</tr>
<tr>
<td>Gram Range</td>
<td>Space Per Animal cm²</td>
<td>Space Per Animal in²</td>
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<tr>
<td>------------------</td>
<td>----------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>50 or less</td>
<td>90</td>
<td>14</td>
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<tr>
<td>51 to 75</td>
<td>110</td>
<td>17</td>
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<tr>
<td>76 to 100</td>
<td>115</td>
<td>18</td>
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<tr>
<td>101 to 125</td>
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<tr>
<td>126 to 150</td>
<td>145</td>
<td>22</td>
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<td>151 to 175</td>
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<td>27</td>
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<tr>
<td>176 to 200</td>
<td>232</td>
<td>36</td>
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<tr>
<td>201 to 225</td>
<td>232</td>
<td>36</td>
</tr>
<tr>
<td>226 to 250</td>
<td>232</td>
<td>36</td>
</tr>
</tbody>
</table>
### DENSITY GUIDELINES

<table>
<thead>
<tr>
<th>Species</th>
<th>Weight of Animal (grams)</th>
<th>Space per Animal</th>
<th>Height of Box</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>cm²</td>
<td>in²</td>
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<tr>
<td>Guinea Pigs</td>
<td>Up to 350</td>
<td>194</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>351–600</td>
<td>323</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>601–800</td>
<td>387</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>&gt;800</td>
<td>497</td>
<td>77</td>
</tr>
<tr>
<td>Hamsters</td>
<td>Up to 50</td>
<td>77</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>51–80</td>
<td>97</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>&gt;80</td>
<td>129</td>
<td>20</td>
</tr>
<tr>
<td>Gerbils</td>
<td>Up to 35</td>
<td>58</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>36–50</td>
<td>77</td>
<td>12</td>
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<td></td>
<td>51–60</td>
<td>97</td>
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<td></td>
<td>61–70</td>
<td>129</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>&gt;70</td>
<td>161</td>
<td>25</td>
</tr>
</tbody>
</table>
SHIPPING DOCUMENTS
Shipping by Air

- Always check the rules
  - Remember the system is highly regulated by government agencies and other oversight; it is not designed for the shippers convenience
  - For example, need to get to the airport 2 hours ahead of time (USDA) but not more than 4 hours
    - Check with carrier for instructions
- There are a maze of requirements when shipping internationally – failure to meet them may halt your animals’ movement at any point during the journey
Shipping by Air

- Can go directly to domestic airlines to make shipping arrangements or can use freight forwarders/customs brokers
- **Seasonal bands** due to temperature can leave very narrow windows for shipment
  - Other cargo including pets may take priority – shipment gets bumped
- Some airlines will not carry lab animals as a matter of policy
International Shipment

- Veterinary Certificate (aka. health certificate, certificate of veterinary inspection)
  - Usually required
  - May require an official (export country) certificate to be filled out and signed by the government

- Usually applies to regulated species but can apply to all animals
Receiving Country Requirements

- Some countries have their own health certificate forms, require specific wording or other types of descriptions or assurances
- Certificate of origin and journey declarations may be required (e.g., Hungary and Germany)
- Some require certain current tests results to be included with the shipment
Receiving Country Logistics

- Always best to have the receiving party (consignee) coordinate documentation and receiving arrangements
- Depending upon the species, the receiving country may impose quarantine
- Some countries have special requirements, forms, licenses, declarations or certification of housing arrangements for genetically modified animals.
MOUSE PASSPORT

- Product of the National Centre for the Replacement, Refinement and Reduction of Animals in Research – [www.nc3rs.org.uk](http://www.nc3rs.org.uk)
- Not a legal document used to cross borders
- Really a “detailed packing list with assembly instructions and an operating manual”
Mouse Passport (Cont.)

- Details on GEMs needed to establish a new colony often not found in papers describing the model
  - Can result in loss or alteration of the model, welfare issues, overproduction, health issues, waste of time and resources etc.

- Current document needs to be expanded to assure that all necessary details are captured
  - Needs to minimize subjective evaluations; Need detailed “fill in the blank” approach
Mouse Passport (Cont.) – Content Examples

- Nomenclature/lineage
- Background strain
- # Backcrosses
- Inbred/outbred
- Model type e.g.:
  - Knock-in
  - Multiple construct
  - Chem. Mutant, etc.
- Contact info
- What was sent + ID
- Clinical description
- Strain origin
- Genotyping info
- Immune status
- Health status & monitoring program
- Phenotype and behavioral description
- Husbandry details
- Breeding info + strategy
- Special requirements