Human-Animal Interactions at Zoological Institutions

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MPH Presentation
Interactive Exhibits

- Estimated 6 million people in the US visit petting zoos **EACH WEEK**
- Potential for zoonotic disease transmission
- Educational and enriching experience
- No federal laws protecting human health
  - Some local/state laws have been passed
- Legal implications
Zoonotic Diseases

• 868 of 1415 (61%) human pathogens are zoonotic

• > 50 of these are in the US, including:
  - Avian influenza
  - E. coli
  - Monkey pox
  - *Chlamydophila psittaci*
  - Rabies
  - *Salmonella*
  - *Toxoplasma*
  - *Cryptosporidium*
  - *Leptospira*
  - MRSA
  - Q fever
  - Ringworm
  - *Sarcoptes scabei*
  - Tularemia
Objective

• Determine what human disease prevention measures are in place with interactive exhibits at zoological institutions

• Determine if annual budget influences these measures
Questionnaire Design

- Approved by AZA Animal Health Committee
- 36 questions, primarily Yes/No
- 3 sections
  - General information (5 questions)
  - Petting zoo exhibit (20 questions)
  - Walk-through aviary exhibit (11 questions)
Participants

• Sent to 166 AZA institutions
• 56 (33.7%) responded
  – 12 had neither exhibit type
• 44 (26.5%) had exhibits of interest
## Participating Institutions

| Little Rock Zoo (AR)            | Fort Wayne Children's Zoo (IN)          | Turtle Back Zoo (NJ)              |
| Happy Hollow Zoo (CA)           | Indianapolis Zoo (IN)                   | Seneca Park Zoo (NY)              |
| San Francisco Zoo (CA)          | Mesker Park Zoo (IN)                    | Staten Island Zoo (NY)            |
| Granby Zoo (Canada)             | Potawatomi Zoo (IN)                     | Cincinnati Zoo (OH)              |
| Toronto Zoo (Canada)            | Rolling Hills Wildlife Adventure (KS)   | Columbus Zoo (OH)                 |
| Pueblo Zoo (CO)                 |                                          | Toledo Zoological Gardens (OH)    |
| Mystic Aquarium (CT)            | Sedgwick County Zoo (KS)                | Oklahoma City Zoo (OK)            |
| Brandywine Zoo (DE)             | Sunset Zoo (KS)                         | Greenville Zoo (SC)               |
| Disney’s Animal Kingdom (FL)    | Louisville Zoo (KY)                     | Chattanooga Zoo (TN)              |
| Lion Country Safari (FL)        | Baton Rouge Zoo (LA)                    | Dallas Zoo (TX)                   |
| Zoo Miami (FL)                  | John Ball Zoo (MI)                      | Ellen Trout Zoo (TX)              |
| Zoo Atlanta (GA)                | National Aquarium (MD)                  | Houston Zoo (TX)                  |
| Honolulu Zoo (HI)               | St. Louis Zoo (MO)                      | Fossil Rim (TX)                   |
| Niabi Zoo (IL)                  | Lincoln Children's Zoo (NE)             | Gladys Porter Zoo (TX)            |
| Scovill Zoo (IL)                | Riverside Zoo (NE)                      | Milwaukee County Zoo (WI)         |
Association of Zoos & Aquariums (AZA)

- Established 1924
- Mission – advancement of zoos & aquariums in conservation, education, science, and recreation
- 224 accredited institutions
  - ~2400 animal exhibitors on record with USDA
- 175 million visitors in 2008, 50 million children
AZA Accreditation

• Detailed application followed by multi-day inspection and Accreditation Commission meeting
• Repeat process every 5 years
• Requires maintenance of standards during the 5-yr accreditation period
  – Can result in probation or loss of accreditation
## Petting Zoo Responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is visitor entry and exit the same?</td>
<td>65.0</td>
<td>35.0</td>
</tr>
<tr>
<td>Do visitors and animals share the same space?</td>
<td>77.5</td>
<td>22.5</td>
</tr>
<tr>
<td>Do animals have an “escape” area?</td>
<td>92.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Is feeding the animals by the public available?</td>
<td>55.0</td>
<td>45.0</td>
</tr>
<tr>
<td>Is exhibit fencing routinely disinfected?</td>
<td>12.5</td>
<td>87.5</td>
</tr>
<tr>
<td>Are visitors monitored by staff while inside the exhibit?</td>
<td>82.5</td>
<td>17.5</td>
</tr>
<tr>
<td>Is food or drink available within 100 feet of exhibit?</td>
<td>27.5</td>
<td>72.5</td>
</tr>
<tr>
<td>Is food or drink prohibited inside the exhibit?</td>
<td>85.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Are signs visible educating about zoonotic dangers?</td>
<td>42.5</td>
<td>57.5</td>
</tr>
<tr>
<td>At the exhibit exit:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is hand washing station with soap and running water available?</td>
<td>80.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Is signage on hand washing techniques posted?</td>
<td>77.5</td>
<td>22.5</td>
</tr>
<tr>
<td>Is sanitizing gel available?</td>
<td>70.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Is hand sanitation recommended (by staff or signage)?</td>
<td>85.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Are animals routinely examined by a veterinarian?</td>
<td>97.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Are animals left on exhibit if showing signs of loose stool?</td>
<td>22.5</td>
<td>77.5</td>
</tr>
</tbody>
</table>
Exhibit Design

- Same entry/exit (26/40; 65.0%)
  - Affects positioning of signage, sinks, etc.
- Share same space (31/40; 77.5%)
  - Increases stress on animals
- “Escape” area present (37/40; 92.5%)
  - Reduces stress
- Fencing disinfected (5/40; 12.5%)
  - Reduces pathogens
  - Reasons why not?
Exhibit Design (cont.)

- Feeding animals available (22/40; 55.0%)
  - Encouraged interaction increases risks
- Food/drink prohibited (34/40; 85.0%)
  - Avoid putting things in mouth
- Food/drink available w/in 100 ft (11/40; 27.5%)
  - Encourages eating/drinking if close to exhibit
- Visitors monitored (33/40; 82.5%)
  - Liability
  - Serves as additional reminder
Hand Sanitation at Exhibit Exit

- Washing station w/soap and water (32/40; 80.0%)
  - Protective benefit to reducing disease risk
  - Design for all visitors (ie, children, handicapped, etc)
- Sanitizing gel (28/40; 70.0%)
  - Effective in human health care
  - Requires removing visible organic material first
- Some form of sanitation (39/40; 97.5%)
- Hand sanitation recommended (34/40; 85.0%)
Signage

• Explaining zoonotic dangers (17/40; 42.5%)
  – Discouraging hand-to-mouth activities
  – Awareness decreases risk
  – Awareness increases hand hygiene compliance

• Detailing proper hand washing techniques (31/40; 77.5%)
  – Signs and verbal reminders increase hand hygiene compliance
  – Easy to read
  – Age and language appropriate
Medical Care

• Routine veterinary exams (39/40; 97.5%)
  – Fecal flotation (38/40; 95.0%)
  – Fecal direct smear (29/40; 72.5%)
  – Performing neither of the above (1/40; 2.5%)

• Rabies vaccine (34/40; 85.0%)
  – Not relevant at 2 institutions

• Left on exhibit w/loose stool (9/40; 22.5%)
  – Aquatic animals
  – Animals with obvious diarrhea will be removed
  – Animals remain on exhibit, but area may be closed
## Walk-through Aviary Responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is interaction with the birds available/encouraged?</td>
<td>41.2</td>
<td>58.8</td>
</tr>
<tr>
<td>Are signs visible educating about zoonotic dangers?</td>
<td>14.7</td>
<td>85.3</td>
</tr>
<tr>
<td>Can visitors come in contact with bird feces?</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Is hand sanitation available near the exhibit exit?</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Are animals routinely examined by a veterinarian?</td>
<td>85.3</td>
<td>14.7</td>
</tr>
</tbody>
</table>
Walk-through Aviary Responses

- Interaction/feeding encouraged (14/34; 41.2%)
- Visitors contact feces (34/34; 100.0%)
  - Exposure to psittacosis, fungal spores
- Zoonotic disease signs (5/34; 14.7%)
- Hand sanitation (17/34; 50.0%)
- Routine veterinary exams (29/34; 85.3%)
  - Fecal flotation (23/34; 67.6%)
  - Fecal direct smear (31/34; 91.2%)
  - Performing neither of the above (3/34; 8.8%)
Disease Linked to Exhibits

• Petting Zoos
  – No illnesses linked to exhibits
  – Animals test positive for *E. coli* O157:H7 (2/40; 5.0%)
    • Goats in petting zoo
    • Pigs not in interactive portion

• Walk-through aviaries
  – Minor bites (1/34; 2.9%)

• Mild cases not reported?
Conclusions

- Benchmarks for comparison
- Most of the respondents currently have human-disease-prevention measures already in place
- No significance (P > 0.05) found with budget
- Areas of concern
  - Environmental disinfection
  - Rabies vaccination for **ALL** mammals
  - Hand sanitation, particularly at aviary exhibits
Where to go from here?

• Small sample size
• Re-approach institutions that did not participate
• Expand to include non-AZA institutions
• Expand questions asked
  – Signage details
  – Quarantine testing and protocols
Acknowledgments

• Committee members
  – Dr. Derek Mosier
  – Dr. David Renter
  – Dr. James Carpenter

• Sunset Zoo staff
  – Mr. Scott Shoemaker, Zoo Director
  – Dr. Robert Klemm, Director Research and Conservation

• Mr. Heath Yates

• Mrs. Landa Colvin-Marion
References

References (cont.)

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Questions

You’ll have to speak up, I don’t hear very well!