Boundary Conditions: Designing and operating laboratory access controls for safety

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Boundaries contribute to lab functionality

- Difference between “Designed for…” and “Can accommodate…”
  - Dimensions - area, length, ceiling height
  - Specifications - floor loading, vibration

- Boundaries can be designed for
  - Ventilation controls (maintain negative to halls)
  - Fire protection boundary (fire rated walls)
  - Radiological, biological, laser, etc. containment/control
  - Security

- “Virtual” Boundaries
The most banal topic ever?
Lab doors and windows

• What do you have to keep in?
  – Hazardous materials
  – Stray laser light, noise, fields
  – Intellectual property/sensitive info

• What do you want to keep out?
  – Unqualified/untrained personnel
  – Uncontrolled environments
  – Food and drink

• What needs to pass through?
  – People
  – Equipment
  – Communications (alarms?)

Does your organization permit…
- covering of windows?
- propping of doors?
(Just) Passing through

- **Routine use considerations**
  - Frequency of use
  - What are they carrying / pushing?
  - Where does it lead (conflicts?)

- **Non-routine**
  - Equipment addition or removal
  - Emergency use (postings, crash bars...)

- **Other considerations**
  - Doorways leading to the doorways
  - Wood/stainless door near magnetic fields; hermetic seals
To lock or not to lock?

- Are administrative controls sufficient?
- Are there requirements (institutional or regulatory?)
- Will administration of system be a burden?
- What happens when power fails?
- Will emergency access be hindered?
# Types of Access Controls

<table>
<thead>
<tr>
<th>Lock Type</th>
<th>Access Mode</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>No controls or administrative</td>
<td>No direct cost</td>
<td>No control</td>
</tr>
<tr>
<td>Standard lock</td>
<td>User possesses key</td>
<td>Resilient</td>
<td>Key control burdensome</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Loss of keys</td>
</tr>
<tr>
<td>Cipher / keypad</td>
<td>User knows code</td>
<td>Sharing of codes</td>
<td>Process to change codes</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Sharing of codes</td>
</tr>
<tr>
<td>Electronic</td>
<td>User possess digital code</td>
<td>Easy to modify access</td>
<td>Highest upfront cost</td>
</tr>
<tr>
<td>(wired / Wireless)</td>
<td></td>
<td>Ability to track access/usage</td>
<td>Maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Integrate with systems (training)</td>
<td></td>
</tr>
<tr>
<td>Interlocked</td>
<td>Logically connected to system</td>
<td>Safety of worker (or equipment</td>
<td>Complexity?</td>
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</table>
Postings

- Fundamental hazard communication
  - Significant hazards
  - Required controls
  - Contact points

- Quick guide for unfamiliar persons
  - Consistent labeling allows for universal use
  - Use of images / icons (GHS) for ready recognition

- Diminishes in value for routine users
  - Sign blindness – Changes must be significant
# KEEP OUT! (or Come on in)
Controlling who gets in or not

<table>
<thead>
<tr>
<th>Personnel</th>
<th>Access Modes</th>
<th>Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researchers</td>
<td>Unrestricted</td>
<td>Work Scope</td>
</tr>
<tr>
<td>Managers / ESH</td>
<td>Escorted</td>
<td>Training / Qualification</td>
</tr>
<tr>
<td>Facility support</td>
<td>Limited</td>
<td>Entry/Exit Protocol</td>
</tr>
<tr>
<td>Vendors / Repair</td>
<td></td>
<td></td>
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<tr>
<td>Emergency personnel</td>
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</tbody>
</table>
Who controls the controls?

- Traditionally assigned to organization’s security / police or facilities
  - Focus on property protection
  - Authority based

- For laboratory – individual responsible for space should control (PI, Space Manager, …)
  - Focus includes safety and security
  - Qualification based – integrates with work

- Processes/Logic required
  - Providing/revoking access
  - Identifying control points
  - Periodic reviews
Summary

• Labs are typically designed for a specific function
  – Workflows / Use cases often overlooked

• Access controls can be engineered controls for defining safety and security envelope of laboratory

• Well thought lab boundaries can enhance the functionality and flexibility of laboratory spaces
Questions?