The OSHA Lab Safety Standard
2015

OSHA Lab Standards in Practice
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Boston Children’s Hospital
GOAL OF PROJECT

• To understand how elements of the OSHA Lab Standard are being carried out in various institutions.
INTRODUCTION

• How is the laboratory standard applied in the field?
• Two surveys about aspects of the OSHA Lab Standard
• Boston Children’s Hospital EH&S approach to implementing aspects of the standard
SURVEY PROJECTS DESCRIPTION

- Two Surveys:

- Both about Attitudes, Usefulness, Adherence to Rules
  - OSHA Lab Standard Compliance and Usefulness
  - PPE Survey
  - Different Audiences
    - 1st Mostly Safety Professionals
    - 2nd Lab Personnel at Boston Children’s Hospital and associated research laboratories
WHO RESPONDED TO THE LAB STANDARD SURVEY?

- 62% Central Environmental Health and Safety staff
- 18% Departmental or College level Environmental Health and Safety staff
- 19% Laboratory safety representatives
- 1% Laboratory worker with no designated safety responsibilities
Single campus-wide CHO

60%

27%

Chemical Hygiene Officers are assigned to specific colleges or departments

14%

Each lab is expected to have their own Chemical Hygiene Officer.

Answered: 86  Skipped: 8
RESPONSIBILITIES OF THE CHO

Primarily technical, focused on risk assessment and hazard management

Primarily administrative, focused on program development and management

Split between these responsibilities

Answered: 90   Skipped: 4

32%  48%  23%

0%  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%
WITH WHICH PARTS OF THE LABORATORY COMMUNITY DOES THE CHO WORK?

- Lab staff and/or students: 82%
- Safety representatives for specific laboratories: 51%
- Lab supervisors in their area of responsibility: 66%
- Laboratory administration and facility managers: 66%
- Institution wide lab safety issues (e.g. haz waste management, emergency planning): 49%

Answered: 91   Skipped: 3
FORMAT OF THE CHP

- 68%: Single complete Chemical Hygiene Plan
- 20%: Expected to be written at the department or college level, using institutional plans as a basis
- 12%: Entirely written at the lab level

Answered: 92  Skipped: 2
USE RANKING OF THE CHP

- 35%: A reference work for institution specific information and procedures
- 8%: An operating document for daily laboratory work
- 22%: A basis for laboratory safety training
- 34%: A "roles and responsibilities" document that forms the basis for safety oversight at the institution
HOW OFTEN IS THE CHP REVIEWED?

- 52% At least annually
- 25% Occasionally

Specific laboratory safety programs that support the CHP are routinely updated, but the CHP itself is seldom updated.

- 10% Not updated
- 2% Don’t know
HAZCOMM - GHS

- 41. 5% said somewhat
- 25% said yes
- 19% said no
- 15% said unclear

Hazard Communication (HazCom): OSHA 1910.1200:
Ensure chemical hazard information is classified and conveyed to employee(s) via Training, SDS & Labeling. The 2012 OSHA changes align with the UN Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Staff can access safety data sheet information:
DO LAB WORKERS GET CLEAR GUIDANCE ABOUT PPE?

Answered: 93  Skipped: 1

- Yes  80%
- No  10%
- Don't know  10%
PPE Survey

• Conducted between November 8 and December 8, 2014
• Approximately 100 responses
• The denominator in the responses varies due to:
  – open ended questions where more than one item was listed
  – not every question was answered by every respondent
HOW MUCH TIME DO YOU USE AT LEAST ONE KIND OF PPE?

- Almost all the time (>90%): 68%
- 70% to 90%: 16%
- 10% to 30%: 5%
- 50% to 70%: 4%
- Less than 10%: 2%
- 30% to 50%: 2%

Percentage of time
WHAT PPE DO YOU TYPICALLY WEAR AT WORK?

Types of PPE

- Gloves: 95%
- Lab coats, gowns: 91%
- Safety Glasses: 49%
- Surgical Masks: 23%
- Face shield: 19%
- Other: 7%
- Respirators: 4%
- None: 4%

N=98 (open ended question, more than one response).
WHAT CAN BE DONE TO INCREASE/IMPROVE PPE USE?

<table>
<thead>
<tr>
<th>Ideas for Improvement</th>
<th>Percent of total answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>58%</td>
</tr>
<tr>
<td>Safety Audits</td>
<td>37%</td>
</tr>
<tr>
<td>Other</td>
<td>35%</td>
</tr>
<tr>
<td>PI Oversight</td>
<td>35%</td>
</tr>
<tr>
<td>Instructions</td>
<td>32%</td>
</tr>
<tr>
<td>Incentives</td>
<td>26%</td>
</tr>
<tr>
<td>Enforcement</td>
<td>19%</td>
</tr>
<tr>
<td>Employee</td>
<td>5%</td>
</tr>
</tbody>
</table>

(more than one answer, n=144)
WHAT FACTORS DO CURRENT AVAILABLE EYE WEAR LACK?

- Comfort: 41%
- None: 15%
- Style: 15%
- Choice: 11%
- Other: 10%
- Construction: 8%
- Durability: 1%
What factors do current gloves lack?

- None: 41%
- Durability: 23%
- Comfort: 16%
- Other: 8%
- Construction: 7%
- Choice: 3%
- Style: 1%
WHAT FACTORS DO CURRENT LAB COATS LACK?

- Durability: 3%
- Construction: 8%
- Choice: 13%
- Comfort: 13%
- Other: 16%
- Style: 16%
- None: 30%
Are the following activities performed in the lab?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Activity Description</td>
</tr>
<tr>
<td></td>
<td>Working with small volumes (&lt; 1 liters) of corrosive liquids.</td>
</tr>
<tr>
<td></td>
<td>Working with large volumes (&gt; 1 liters) of corrosive liquids, small to large volumes of acutely toxic corrosives, or work which creates a splash hazard.</td>
</tr>
<tr>
<td></td>
<td>Working with small volumes (&lt; 1 liters) of organic solvents or flammable organic compounds.</td>
</tr>
<tr>
<td></td>
<td>Working with large volumes (&gt; 1 liters) of organic solvents, small to large volumes of very dangerous solvents, or work which creates a splash hazard.</td>
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<tr>
<td></td>
<td>Working with irritants, sensitizers, mutagens, teratogens or other toxic hazardous chemicals (solid, liquid, or gas).</td>
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<tr>
<td></td>
<td>Working with acutely toxic or hazardous chemicals (solid, liquid, or gas).</td>
</tr>
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<td></td>
<td>Working with an apparatus with contents under pressure or vacuum.</td>
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<td></td>
<td>Working with air or water reactive chemicals.</td>
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<tr>
<td></td>
<td>Working with potentially explosive chemicals.</td>
</tr>
<tr>
<td>Hazard Type</td>
<td>Activity Description</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------</td>
</tr>
</tbody>
</table>
| Physical    | Dispensing liquid nitrogen from primary to secondary containers designed for cryogenic materials | -Major skin, tissue or eye damage  
- Frostbite | Use in a well ventilated area | Safety Glasses  
Lab Coat  
Nitrile Gloves |
| Physical    | Removing vials from liquid nitrogen | -Vials may explode upon rapid warming  
-Cuts to face and neck | Use vials approved for cryogenic material | Face Shield  
Temperature Resistant Gloves |
| Physical    | Recovering vials and/or specimen boxes lost in Dewar’s | -Major skin, tissue or eye damage  
- Frostbite | Use “Cryo Grabbers” to extract lost science |  
| Physical    | Connecting tanks to Dewar and/or manifold systems | -Major skin, tissue or eye damage  
- Frostbite | N/A |  

# Northern Blot

*(Gel Preparation)*

## Laboratory Hazard Assessment Training Tool for Personal Protective Equipment Use

<table>
<thead>
<tr>
<th>Hazard Type</th>
<th>Activity Description</th>
<th>Potential Hazard</th>
<th>Safety Controls</th>
<th>Applicable PPE</th>
</tr>
</thead>
</table>
| Physical    | Heating agar with formaldehyde on a hotplate | - Burns resulting in skin or eye damage  
- Inhalation hazard (carcinogen) | Chemical fume hood required | ![Safety Glasses](lab_coat.png)  
 ![Lab Coat](nitrile_gloves.png)  
 ![Nitrile Gloves](heat_resistant_gloves.png)  
 ![Heat Resistant Gloves](hot_hands.png) |
| Chemical    | Use of DEPC (diethyl pyrocarbonate), formaldehyde and ethidium bromide | - Skin or eye damage (irritant)  
- Inhalation hazard (carcinogen) | Chemical fume hood or down draft table required | ![Safety Glasses](lab_coat.png)  
 ![Lab Coat](nitrile_gloves.png)  
 ![Nitrile Gloves](heat_resistant_gloves.png)  
 ![Heat Resistant Gloves](hot_hands.png) |
WHAT CAN BE DONE TO IMPROVE USABILITY OF ONE-PAGERS?

Percent of total answers (more than one answer), n=98

- Our lab does not have PPE one-pagers: 32%
- More pictures: 28%
- Other: 23%
- Improve format: 16%
- Embedded in SOPs: 14%
- Improve wording: 11%
CONCLUSIONS

• Safety professionals have chosen ways to comply with the Lab standards that suit their individual institutions.
• Chemical Hygiene Officer, Chemical Hygiene Plan
• CHO responsibilities are technical and administrative.
• Benefit these elements of the Lab Safety Plan have on the laboratory personnel.
• Boston Children’s Hospital Approach provides a unique way to bring chemical safety to the lab workers as one pagers.

• Thank you to Ralph Stuart, DCHAS, Chad Pires, Nick Kielbania, Lou Diberardinis, Pete Reinhart