

Safety Starts with U

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Article

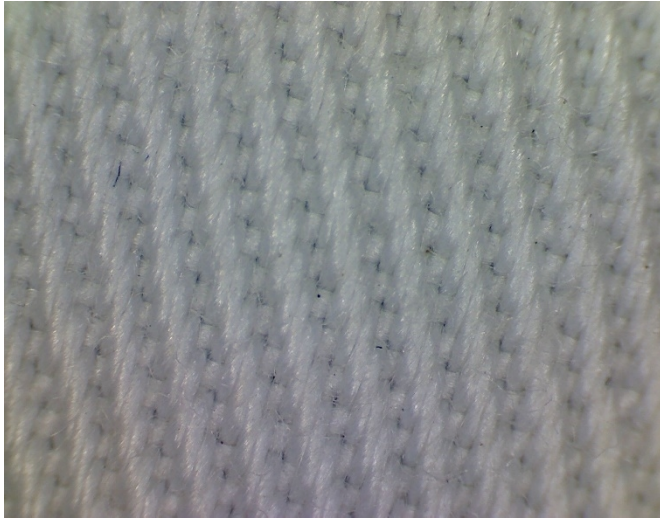
The Joint Safety Team at the University of Minnesota, Twin Cities: A Model for Student-Led Safety

Adeline Espinasse,^{*,+} Ashish Jayaraman,^{*,+} Spencer A. Reisbick, Celina M. Harris, Yangming Kou, Hongyun Xu, Constance B. Anderson, Taysir K. Bader, and Anna A. Sitek^{*}

Taysir Bader
The Art and State of Safety Journal Club
April 7th, 2021

Safety Moment: Why Lab Coats Matter!

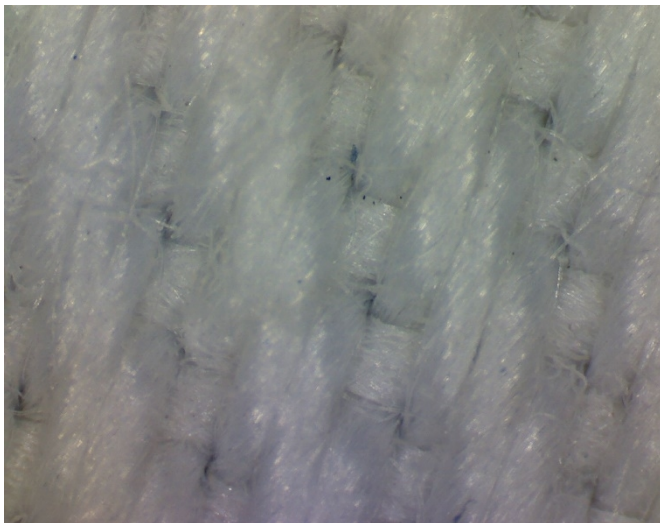
Lab Coat
50X



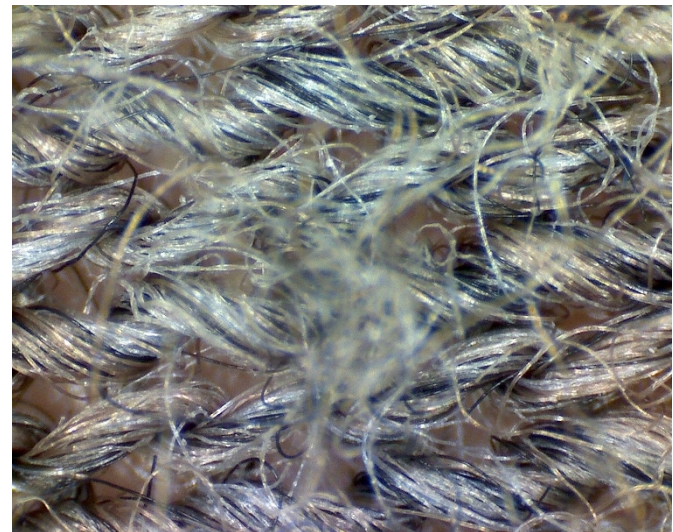
T-Shirt
50X



Lab Coat
200X



T-Shirt
200X



Features of a Good Lab Coat

At least 35% Cotton
(100% if working
with open flames)

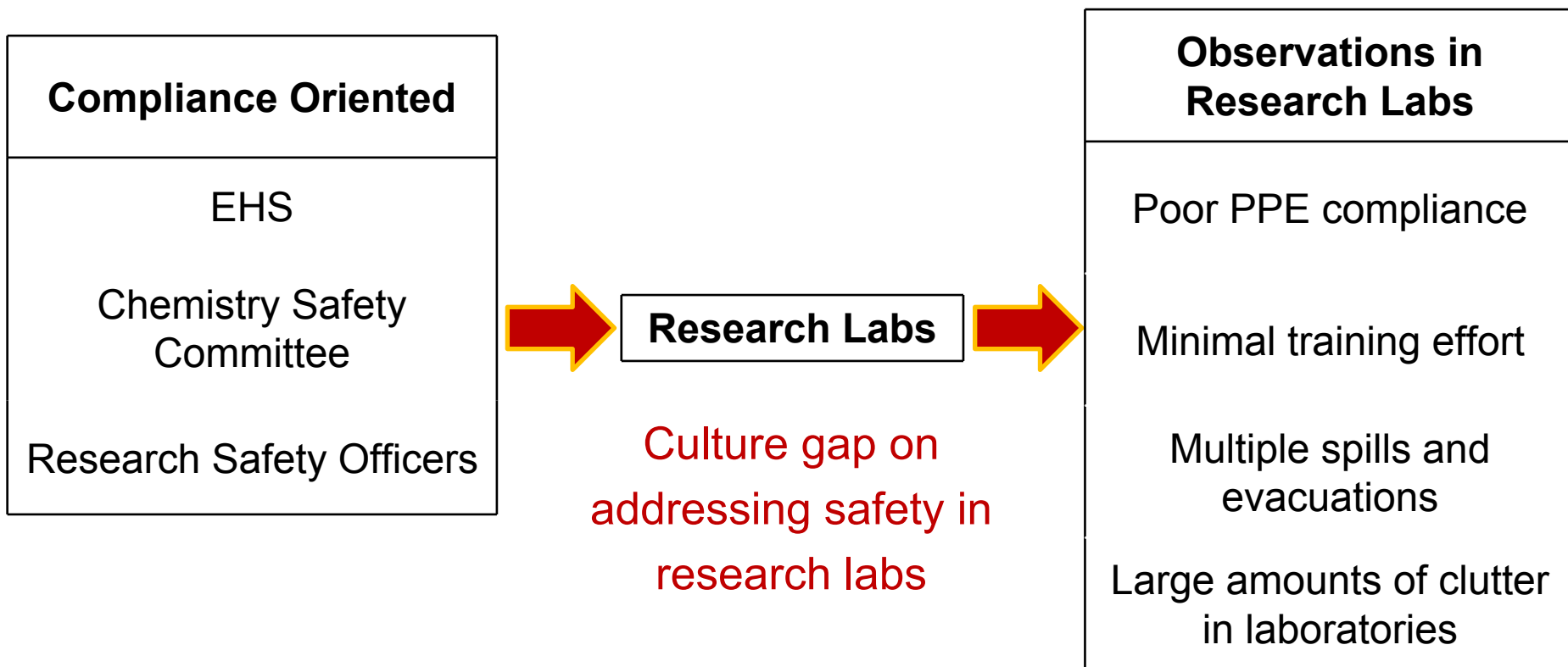
Gripper Closures

High Top Button

Knitted Cuffs



CHEM and CEMS Safety 2011 and Prior



Starting the Initiative

Partnership:



Offered suggestions and demonstrated industrial safety values

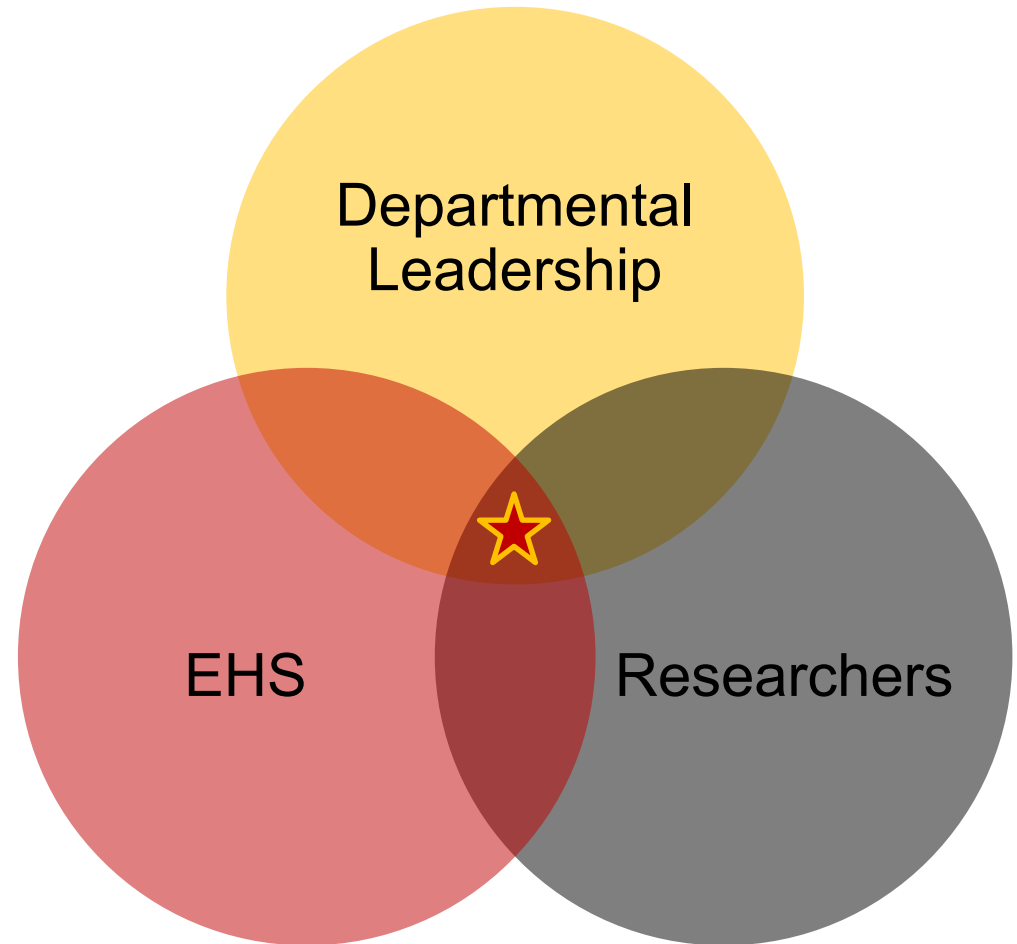


Setting the Groundwork

★ Lasting Changes

Joint Safety Team (JST)

Student-led initiative
between CHEM and CEMS
supported by departmental
leaders and EHS



Defining Goals

The mission of the JST is to increase safety awareness and improve the safety culture in the Departments of Chemistry (CHEM) and Chemical Engineering & Materials Sciences (CEMS) at the University of Minnesota

Informal moto: Make safety cool!

C A R E

Compliance

Define and enforce standard roles and expectations through biannual lab audits

Awareness

Enhance safety through signage, safety moments, posters, and email communication

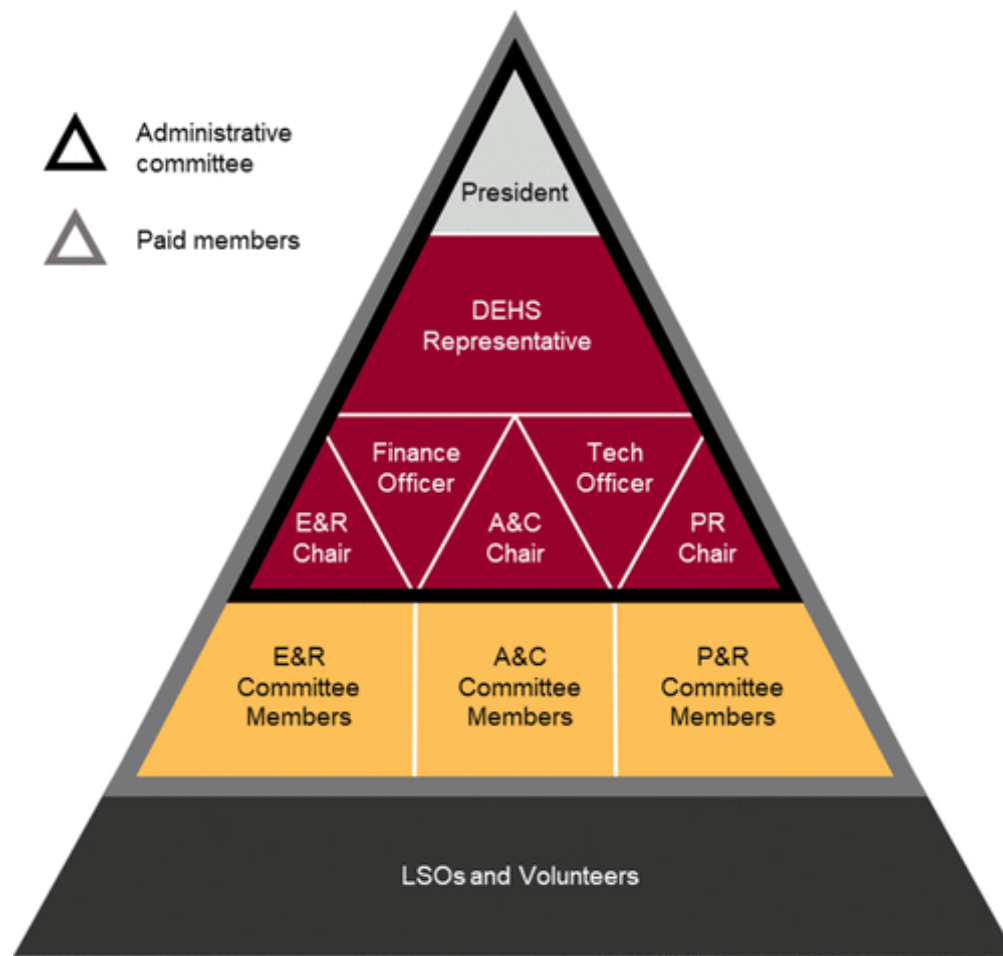
Resources

Provide easy access to information and establish a system for maintaining records

Education

Provide frequent and relevant training

JST Organization



JST is compiled of Lab Safety Officers (LSOs) from each research group (~ 90 people) as well as volunteer undergraduates, graduates, and postdocs.

Analysis & Compliance: Surveys

Annual surveys are taken to access how:

- Graduate students and postdocs view safety in own lab
- Most common/recent safety concerns
- Improve the JST
- Data collection to compare results to previous years

JST Safety Survey - Fall 2014

Form Description

1. Are you regularly exposed to laboratory settings?
If you click 'no,' feel free to skip questions that are not applicable to you. This question will help us to categorize survey responses.

☐ Yes, I work in a laboratory at least some of the time
☐ No, I do not work in a laboratory.

2. If you see a labmate participating in unsafe lab practices, which of the following reasons most likely prevents you from discussing better lab practices with that labmate?

☐ seniority
☐ personality differences
☐ don't want to disrupt labmate
☐ lab practice isn't too dangerous
☐ not my responsibility to regulate/patrol others
☐ I'll definitely say something
☐ Other:

3. State the degree to which you agree with the following statement: "The safety posters give me useful, practical information that I can use day-to-day."

1 2 3 4 5

Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

4. My advisor actively supports safety concerns by doing one or more of the following. If you are the advisor, state the actions you take to show your support.

Analysis & Compliance: Lab Signage

Each research group post a **standardize** sign to provide contact information, PPE requirements, and hazards before entering the lab



Laboratory Information	Building & Room
	Principal Investigator, phone/email
	Lab Safety Officer, phone/email
	Description
Minimum PPE Required	
Hazards	In an emergency, call 911. In non-emergency situations, contact the LSO or PI.

Analysis & Compliance: Biannual Student-led Lab Walkthroughs

Allows Lab Safety Officers (LSOs) to examine labs for:

- General safety concerns
- Proper lab signage
- Different safety practices

Principal Investigator: _____

JST Auditor: _____

Lab Safety Officer: _____

Room(s): _____

Safety Item	Exemplary	Acceptable	Needs Attention	Comments
Researchers wearing correct PPE				
No food or drink in lab				
Aisles and hallways clear of chemicals and clutter				
Electronics near possible leakage sources raised off floor				
Hood sashes low				
Proper lab signage (emergency contacts, PPE requirements)				
Samples and chemicals in secondary containment where appropriate				
Samples and chemicals segregated by hazard				
Samples and chemicals labeled (name, date, hazards)				
Liquid chemicals stored below eye level (if possible) and in secure position				

Education and Resources Committee

Education

- Bi-Monthly LSO Meetings
 - Special topic seminars (SOPs, Schleck lines, Lasers, Spills, first aid)
 - Annual LSO training

Resources

- LSO Guidebook
- Labeling system for samples
- Safe Operating Cards (SOCs)
- Clean-out events



Education & Resources: LSO Guidebook

LSO Guidebook

- Defining LSO roles and responsibilities
- Guidelines on writing and maintaining SOPs
- Record keeping
 - EHS training records
 - Lab specific training records
- Addition resources and templates

Roles and Responsibilities of a Lab Safety Officer

Each active laboratory at the University of Minnesota must have a lab safety officer (LSO). The LSO serves as a resource for ensuring safe practices in the lab as well as serve as a role model for safety. Larger groups may have more than one LSO if needed in order to fulfill all duties.

Responsibilities of an LSO are divided into a few groups...

JST Responsibilities:

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Eyewash Inspection

Weekly Checklist

Recommended 3 min weekly flush and 15 min monthly flush (to ensure continuous water flow and inhibit growth of bacteria)

Check that:

- area around the eyewash station is clear of obstruction, debris or tripping hazards
- eyewash station operates correctly:
 - activating arm operates smoothly and remains open when released
 - water flows continuously, with each nozzle expelling water in roughly equal amounts and equal height
 - water is clear and colorless

Date	Initials

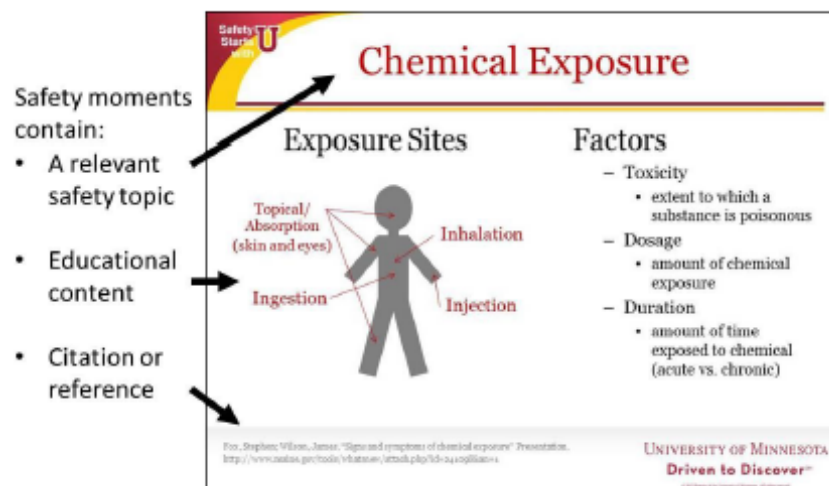
Date	Initials

Date	Initials

Public Relations Committee

Committee Mission:

- Maintain stall wall moments and safety posters
- Help implement and keep track of safety moments
- Maintain a social media presence



J. Chem. Educ. 2013, 90, 11, 1414–1417. Student Involvement in Improving the Culture of Safety in Academic Laboratories
<https://doi.org/10.1021/ed400305e>

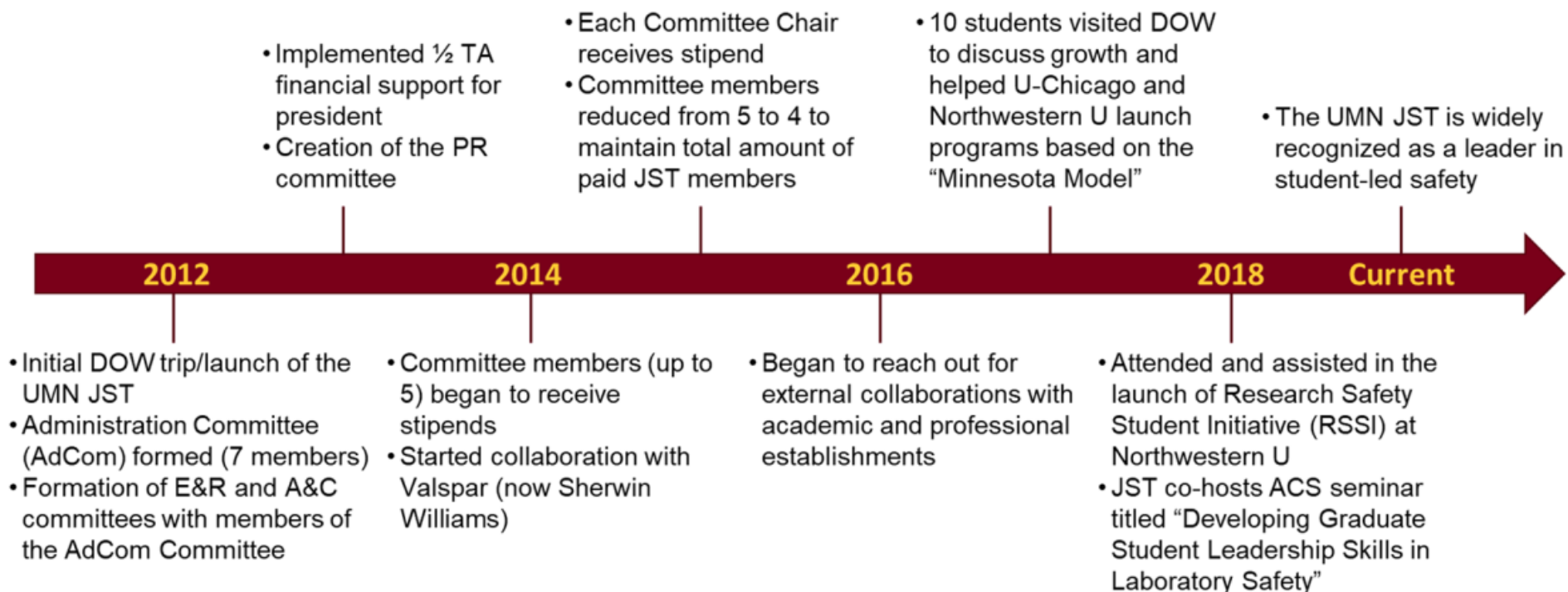
UNIVERSITY OF MINNESOTA
Driven to Discover™

Goals of CC Committee

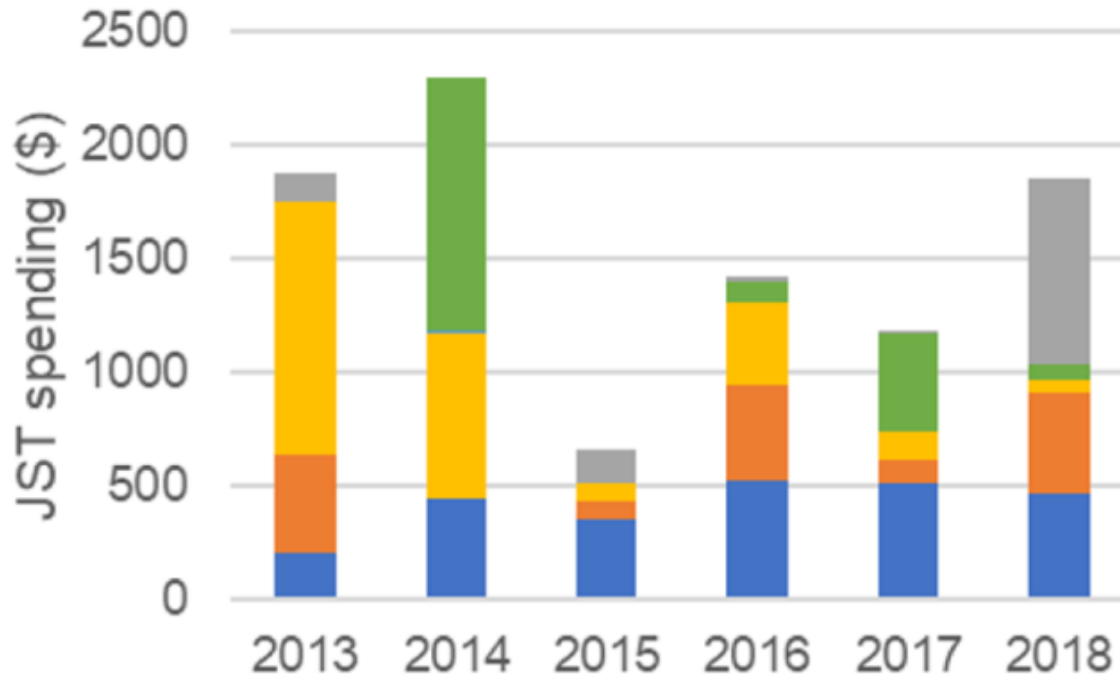
- Manage industrial patroonships
 - Organize tours to Valspar
 - Establish safety themed luncheon series
- Help local PUIs establish safety teams closely related to ours, and invite their students to participate in our events
- Help local organizations establish safer SOPs for chemical

Received funding from ACS (Innovative Project Grant) and seeking industry funding

Growth of the JST



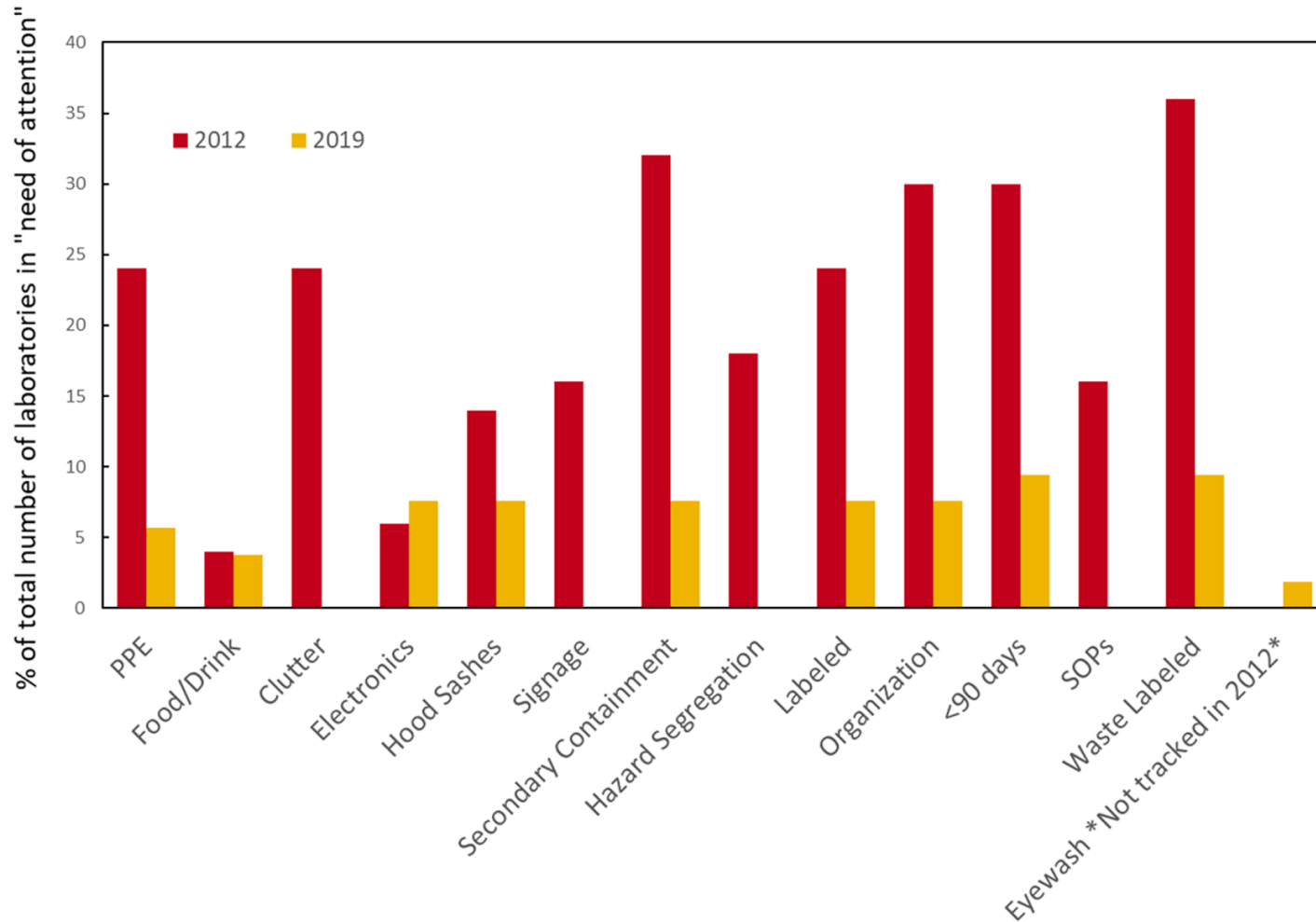
JST Spending



Mean is \$1500. Does not include stipends

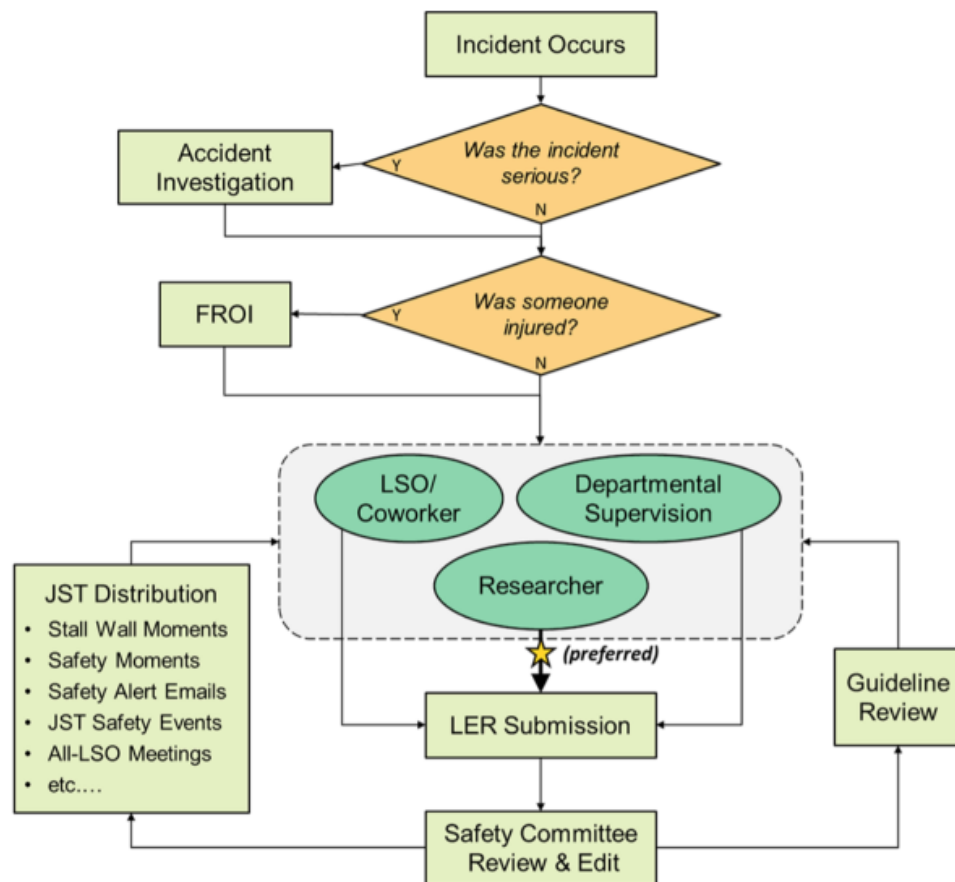
- Food and Provisions
- Award items
- Printing
- Chemicals
- Office supplies
- Other supplies

Measured Impact of the JST



Learning Experience Reports

Learning Experience Reports



Elements That Were Key to Success

- Support from departmental leadership
- Support from DEHS
- Guidance from DOW
- Community of graduate students feeling unsafe in their work environment and wanting change



Inform & Reform

Current Challenges

- High turnover of members
- Key EHS staff members leaving UMN
- Departments not willing to pledge any more financial support
- LSOs becoming complacent, and partaking to improve resumes rather than safety culture
- Training of new LSOs
- Unattendance of JST events

Recent UMN Incident

- Fischer Esterification carried out on two new substrates (propargyl alcohol and alkyne) on 35 g scale in sulfuric acid at 70 °C. The mixture detonated after 30 minutes. The researcher was not wearing a lab coat, and the hood sash was raised due to another experiment being carried out simultaneously. The researcher suffered cuts and first-degree burns. Lab mates helped researcher to safety shower and contacted emergency services
 - Scale up sequentially
 - Recognize additional hazards associated with scale and high energy functional groups
 - Isolate high-risk reactions
 - Read several MSDS (only some listed that propargyl alcohols can be explosive with Bronsted acids)
 - Always wear lab coats!
- Report and lessons learned was shared with us 4 months after the fact. Several JST members were very unhappy about this (including myself)
 - EHS representee not attending AdCom meetings
 - No communication with safety committee
 - LER not submitted by LSO

Future Plans and Presidential Agenda

- Improve LSO appreciation
 - LSO open forums
 - LSO socials (when safe to do so)
 - Exclusive networking events
- Branch out to other colleges within UMN to help them establish their own LSTs
- Outreach to local PUIs and high schools
- Improve collaboration with other organizations
- Establish a more rigorous LSO training procedure
 - Short film
 - Yearly refresher training
 - LSO liaison program
- Establish more industry collaborations and improve funding