

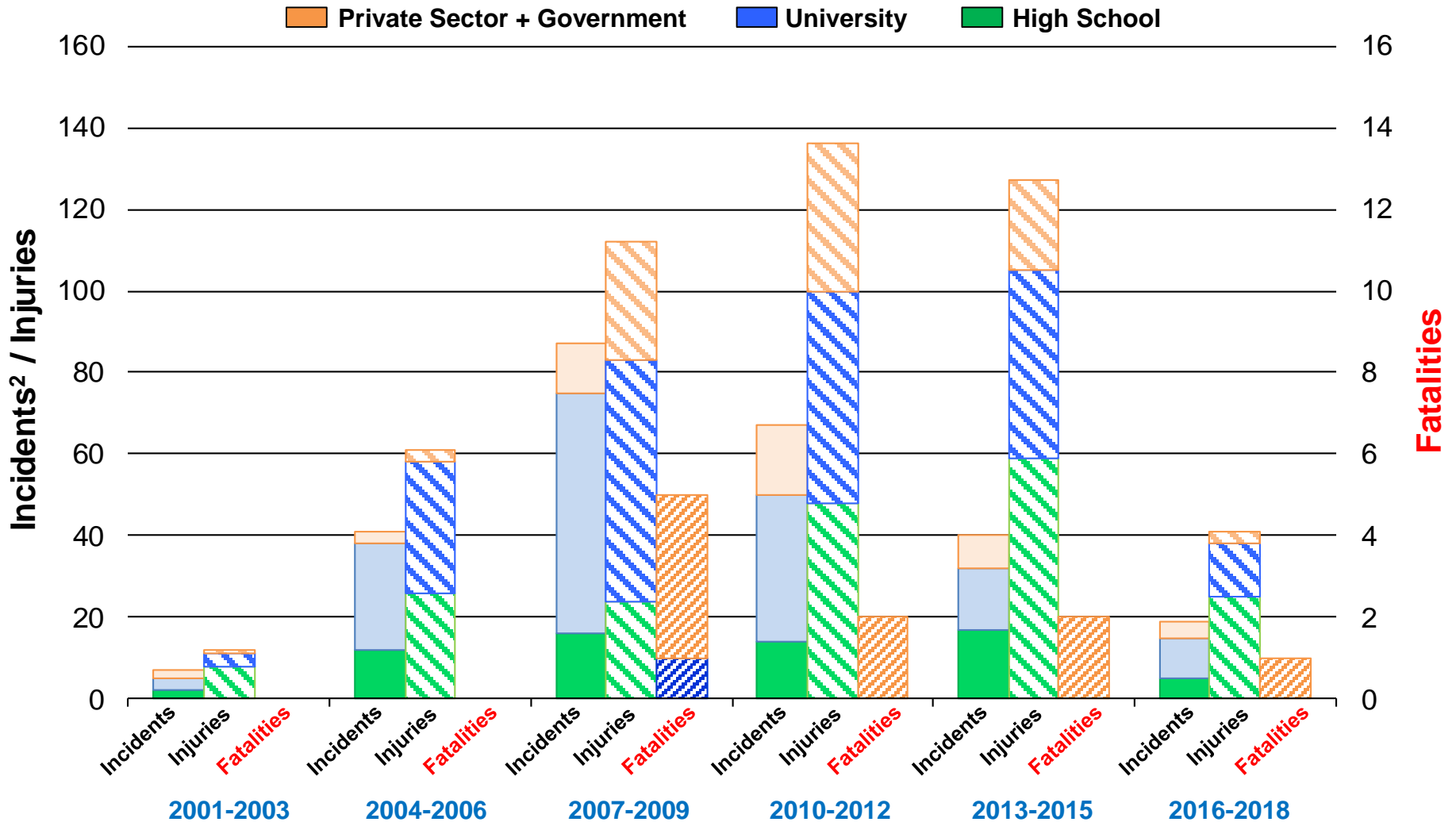
# Towards Safer Practices in Academic and Industrial Laboratories: a CISTAR/P2SAC collaboration

Sopuru Ezenwa, Ravi Joshi, Abhijit Talpade, Pushkar Ghanekar  
*Davidson School of Chemical Engineering, Purdue University*

*P2SAC Spring 2019 Conference  
May 7-8, 2019*



# Motivation: Lab safety incidents are still prevalent



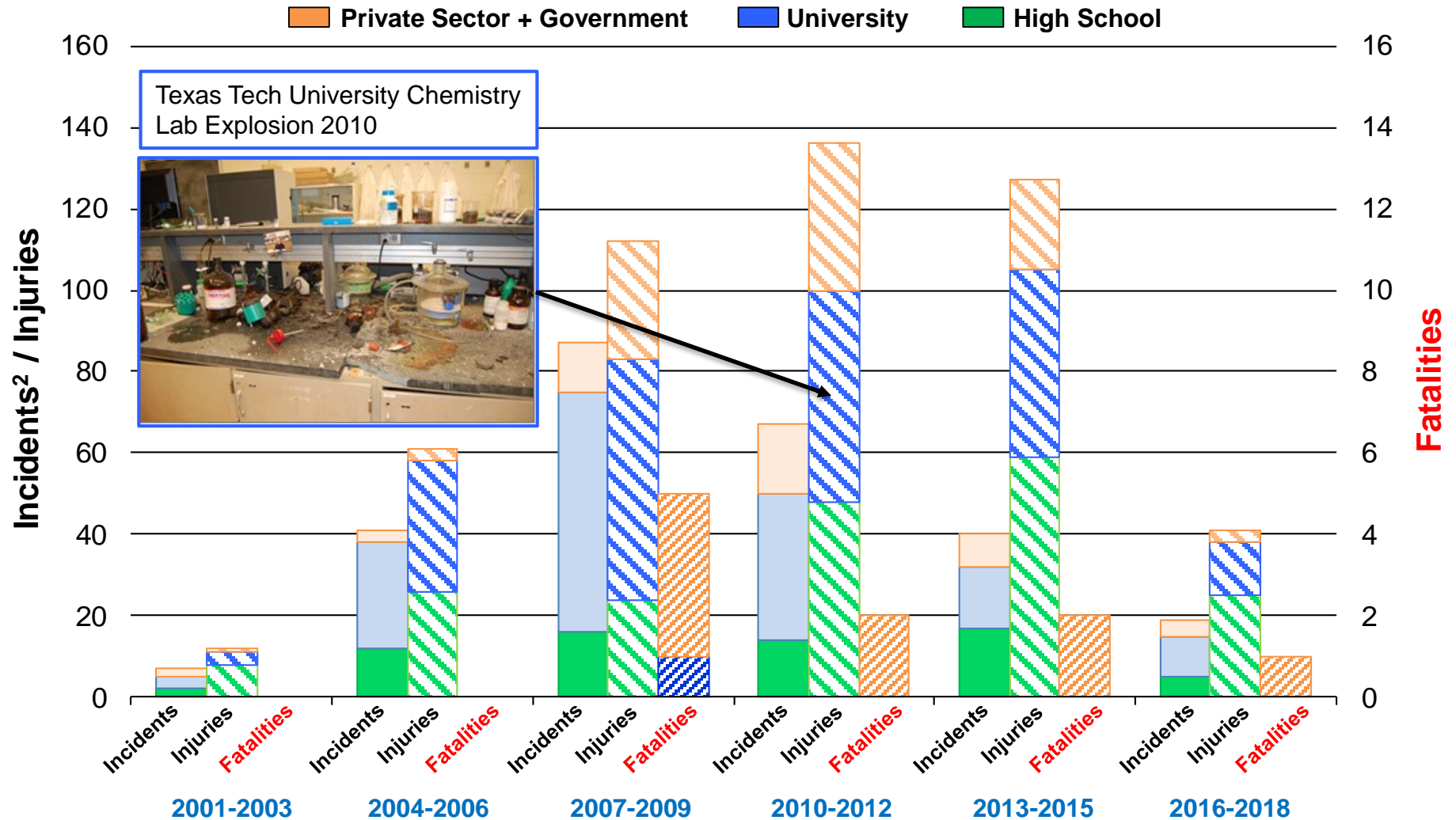
<sup>1</sup>Laboratory incident dataset from January 2001 through July 2018

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**Source – U.S. Chemical Safety Board, Dataset on Incidents in Public and Private Laboratories, August 2018**



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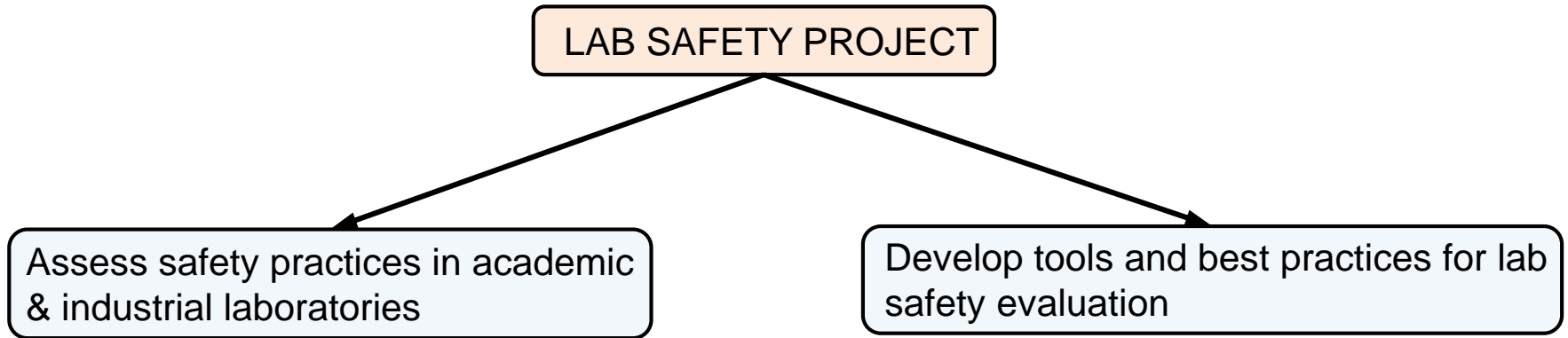
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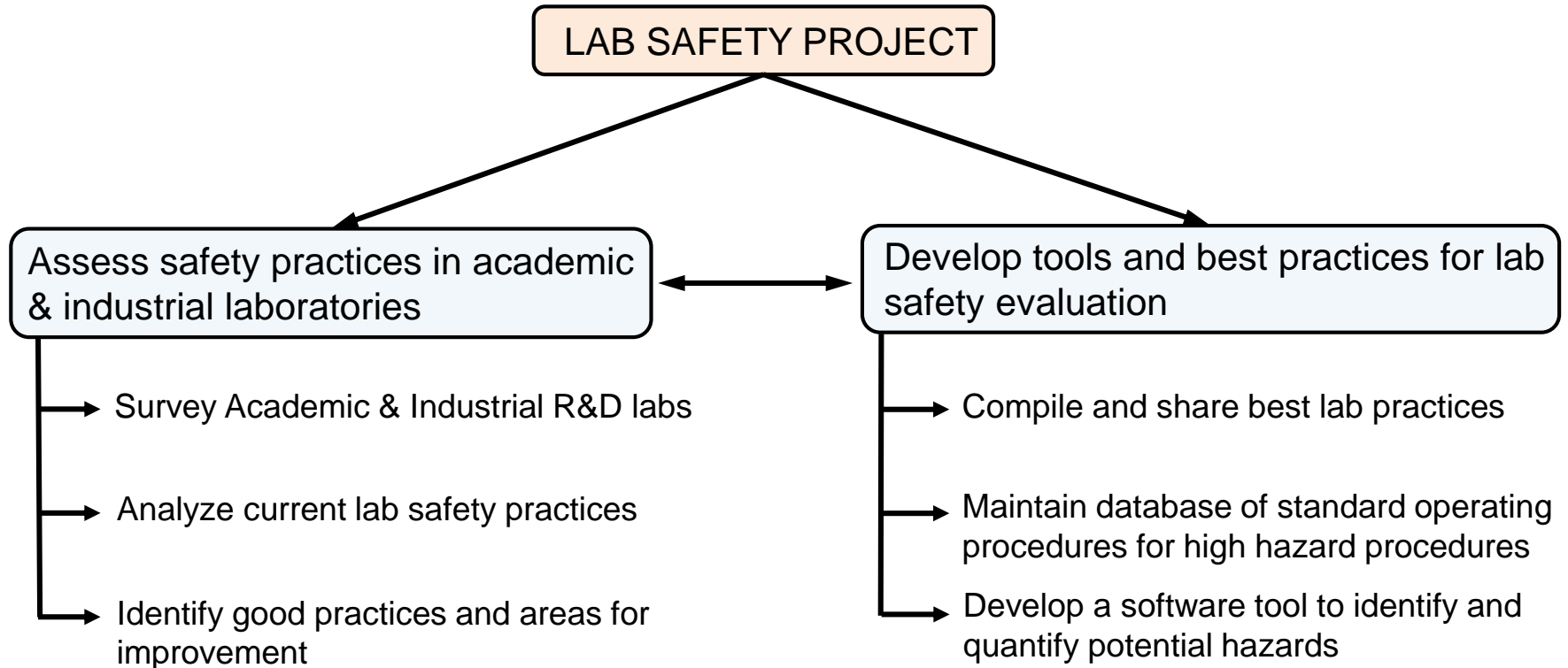
# Project overview

- NSF funded CISTAR/P2SAC initiative to improve safety practices in research labs
- Team of 4 graduate students, 2 faculty advisors and an industry collaborator



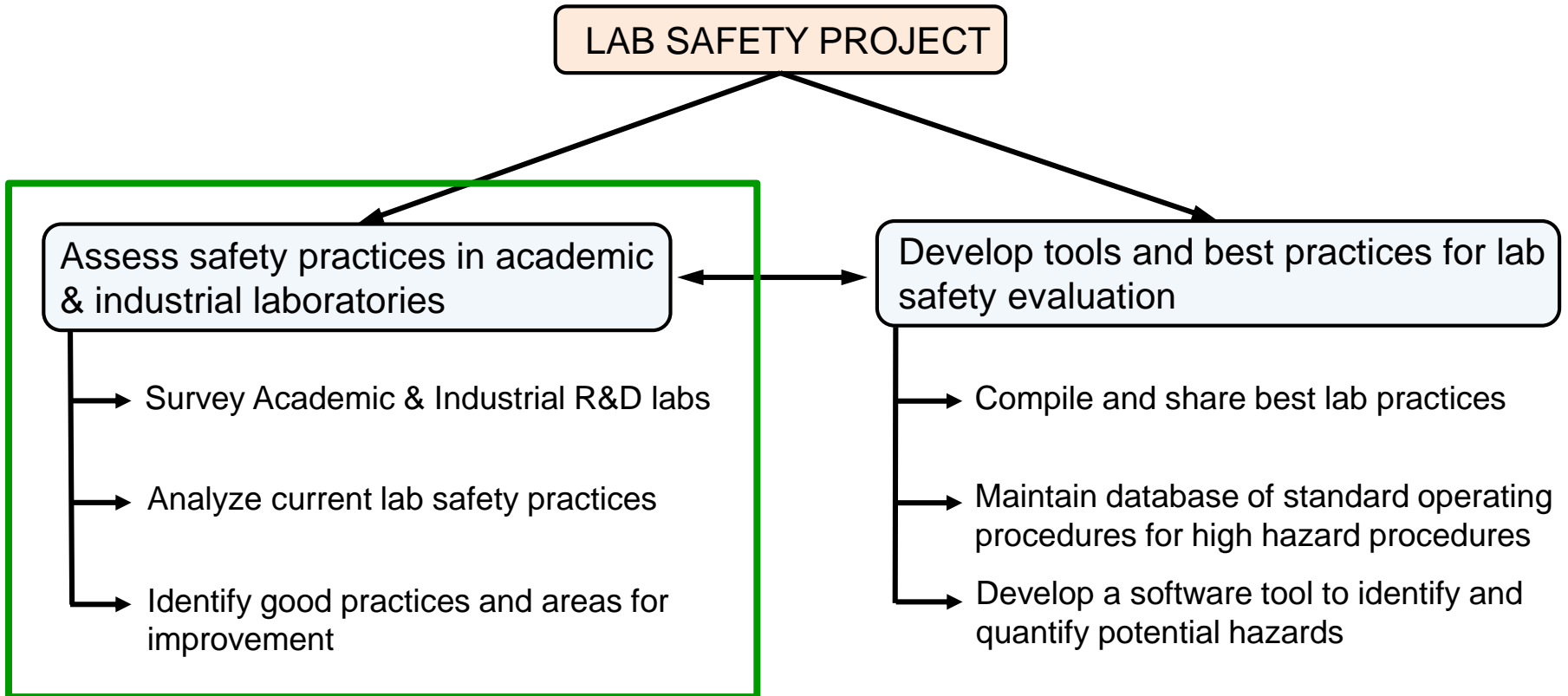
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# Survey of current practices in academic laboratories

Aimed to :

- Understand the safety practices in academic labs
- Identify gaps in current lab practices
- Leverage good practices

Qualtrics questionnaire

- Responses can be anonymous or non-anonymous
- Time commitment ~15-20 mins
- Directed to individual research labs
- First round to be sent to CISTAR partner universities
- Next round to other universities
- Compiled results analyzed and shared

# Survey of current practices in academic laboratories

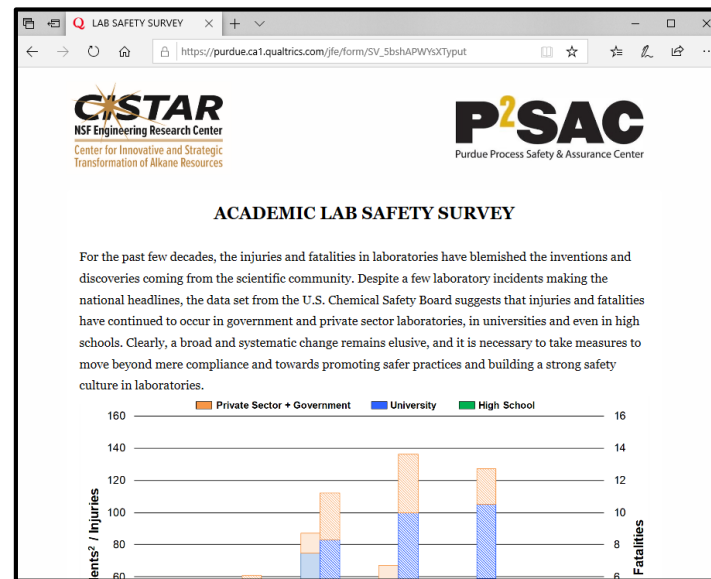
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Screenshot of survey



## Sample questions:

*Is there a review process for new experimental setup, chemical reaction setup and/or modification to an existing apparatus/equipment (e.g. Management of Change (MOC) procedure)?*

*Are there any special initiative(s) within your school for promoting safety awareness and incubating a good safety culture?*



# Survey of current practices in industrial R&D laboratories

Aimed to :

- Assess the safety practices in industrial R&D labs/pilot plants
- Understand their hazard evaluation process and develop best practices
- Obtain feedback for our proposed online hazard evaluation tool

Survey offered in both online (Qualtrics) and paper forms

- Responses can be anonymous or non-anonymous
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## **Sample questions:**

*What databases do you use to collect relevant data and complete the hazard evaluation process?*

*Can you list any recent/long-term initiative that helped to reinforce/improve the safety culture in your industrial labs or small-scale pilot plants?*

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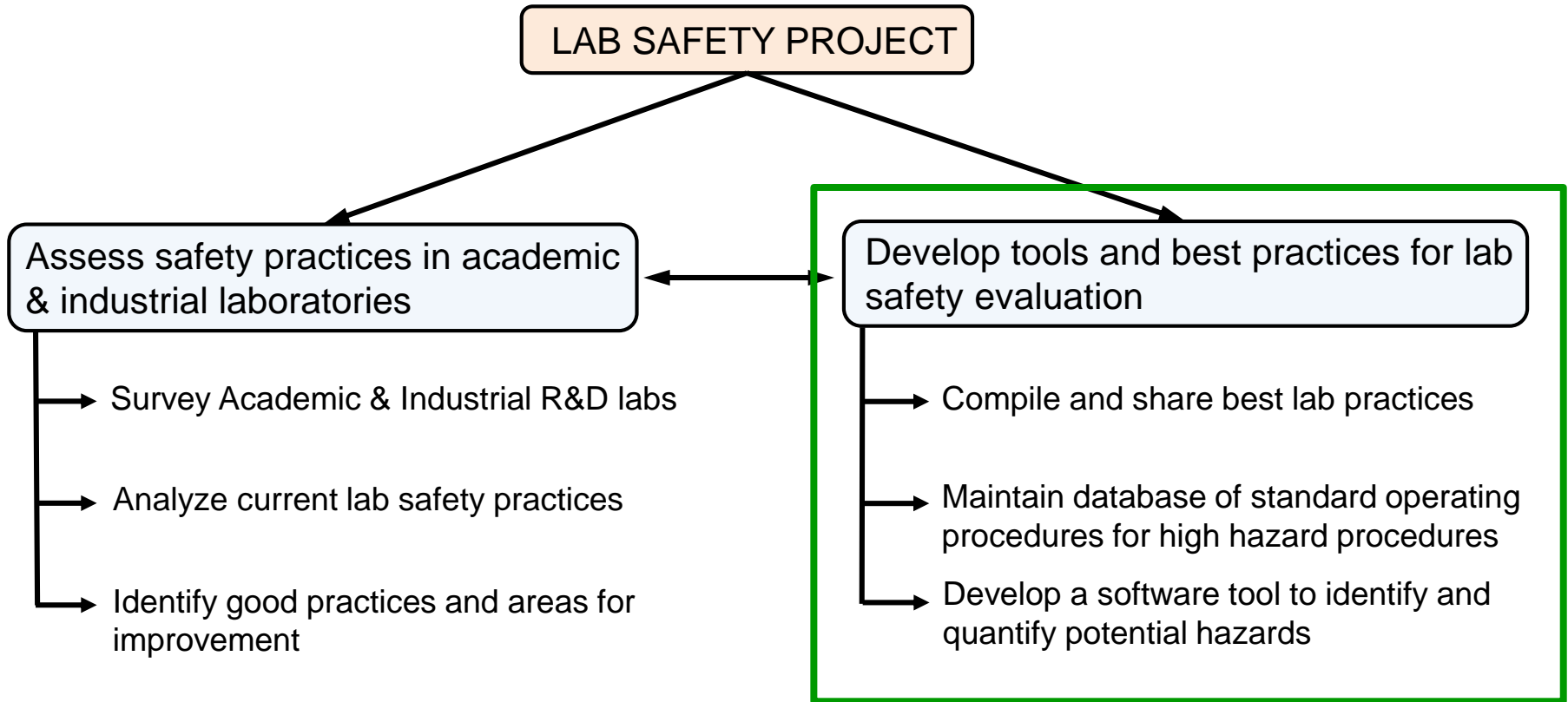
*What databases do you use to collect relevant data and complete the hazard evaluation process?*

*Can you list any recent/long-term initiative that helped to reinforce/improve the safety culture in your industrial labs or small-scale pilot plants?*

*Please fill out the paper surveys available at the end of this presentation.*

***If your organization is willing to share your best practices, procedures, training materials (especially visuals) to be hosted on this webtool, please reach out to Prof. Ray Mentzer***

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# Development of web-based tool for safety hazard evaluation

Need for a convenient tool that can

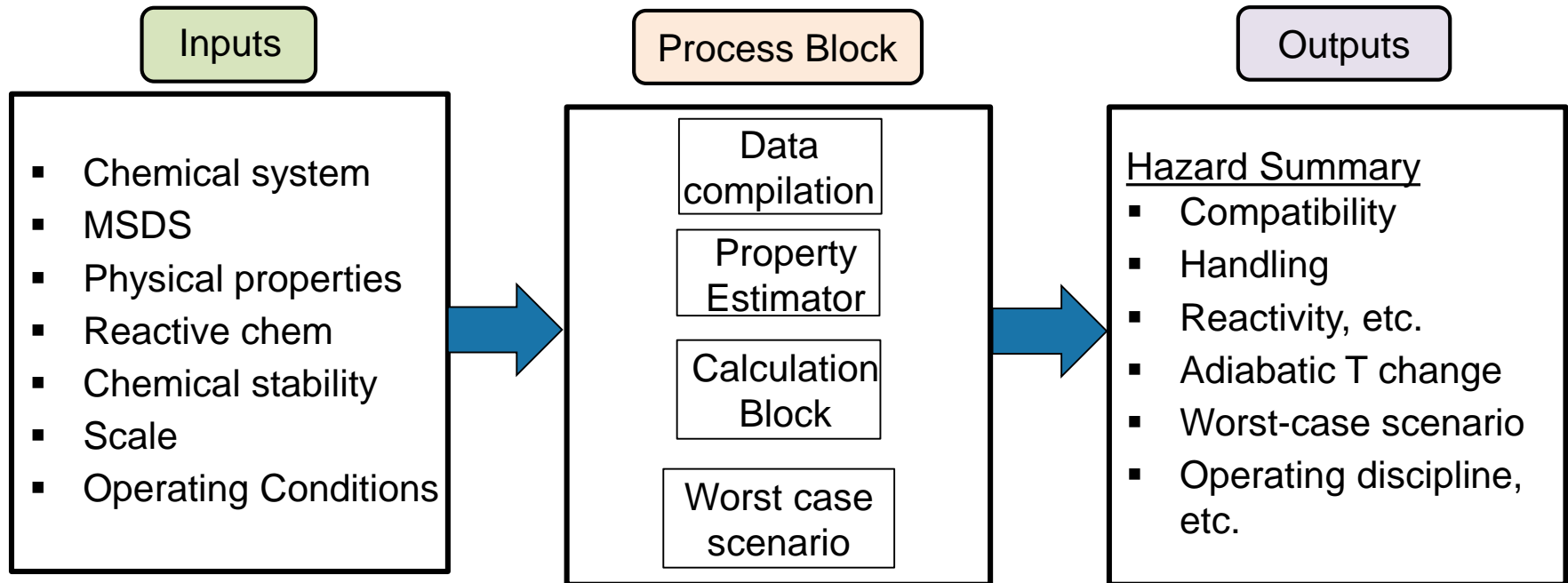
- Collect critical information about a planned experimental setup
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## Overview of **H.E.A.L.** : **H**azard **E**valuation and **A**nalysis for **L**aboratories

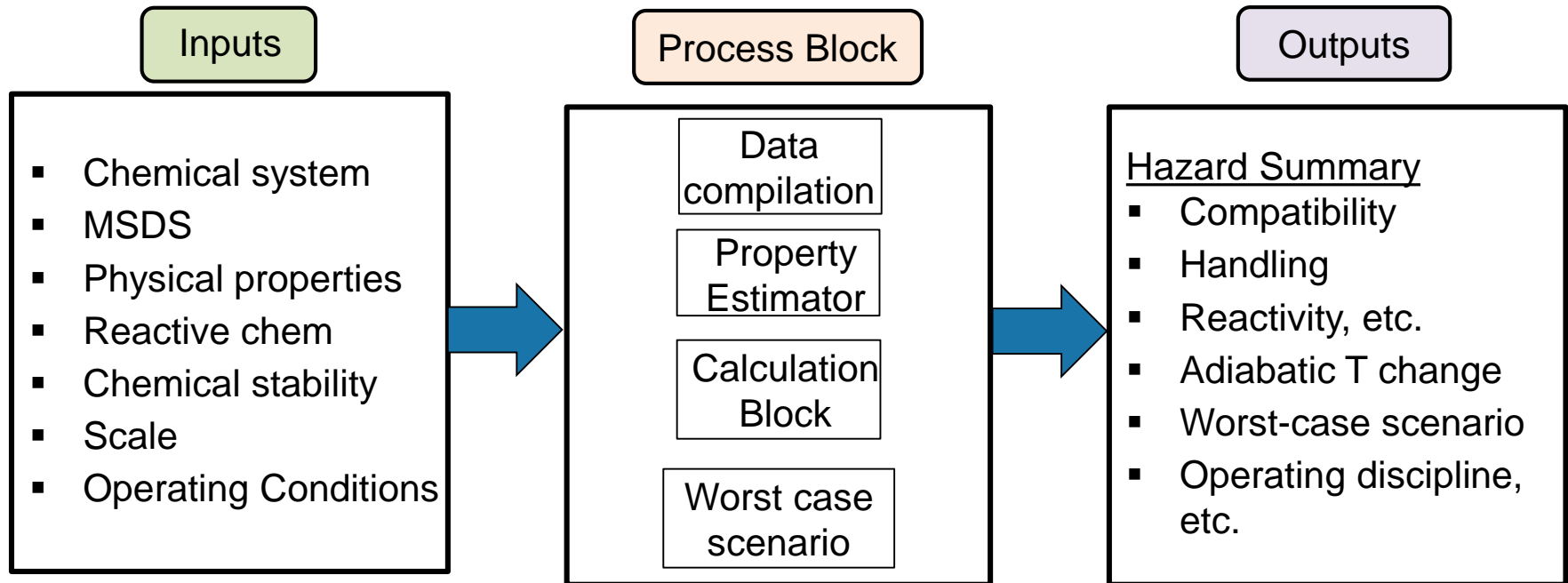


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*With the required inputs, process block will generate the desired outputs*

# Current status and near-term plans

## Surveys

- Survey questions compiled and integrated into online and paper forms
- IRB approval obtained, per university requirements
- Distribution of surveys to follow very soon
- Analyze data to understand trends and current practices
- Follow-up with non-anonymous responses regarding best practices



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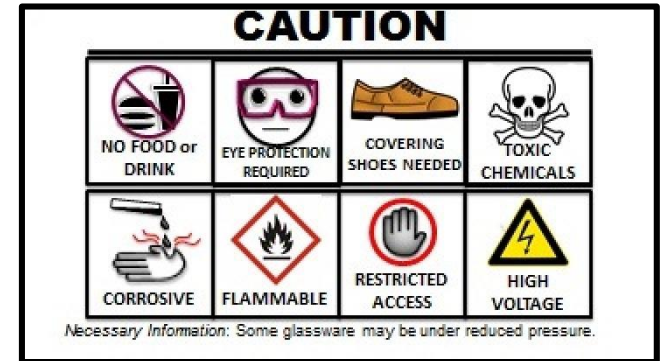
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## Hazard evaluation tool (H.E.A.L.)

- Drafted a logic diagram for how the tool will work
- Hired a computer program expert to assist team in developing H.E.A.L.
- Ongoing discussion with software vendors and commercial databases such as CRW, CHETAH etc.

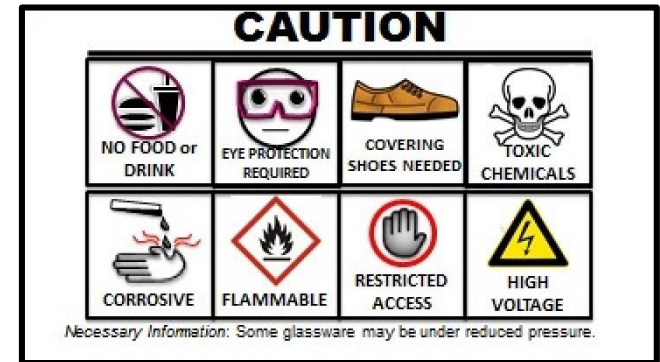
# Summary

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  - Highlight areas for improvement
  - Take steps to improve safety practices



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- Lab safety project aims to
  - Assess safety practices in academic & industrial research labs
  - Highlight areas for improvement
  - Take steps to improve safety practices
- Will be achieved through
  - Obtaining feedback from surveys
  - Compiling best practices
  - Developing software tool for hazard evaluation
  - Maintaining SOP database of high hazard processes
- **Survey feedback from academic and industrial partners is important for this project's success**



# Acknowledgements

- Dr. Jay Devaraj, *Corteva Agriscience, Agriculture Division of DowDuPont*
- Prof. Ray Mentzer
- Prof. Fabio Ribeiro



Industrial Survey: [tinyurl.com/industry-lab-survey](http://tinyurl.com/industry-lab-survey)



**Questions?**