



Developing a Chemical Safety Program from Lessons Learned

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Introduction

- I. UCLA and UChicago Incidents & Responses to Lessons Learned**
- II. Developing a Chemical Safety Program**
 - I. Inspections**
 - II. Chemical Administration Forms**
 - III. Compliance Tools**
 - IV. Training**
- III. Future of UChicago's Chemical Safety**





UCLA Timeline

- **December 2008- UCLA t-butyl lithium**
- **December 2011- UC and Prof. Harran charged**
- **July 2012- UC Settlement Agreement**
- **June 2014- Prof. Harran reaches Settlement**





UCLA's Response to Lessons Learned

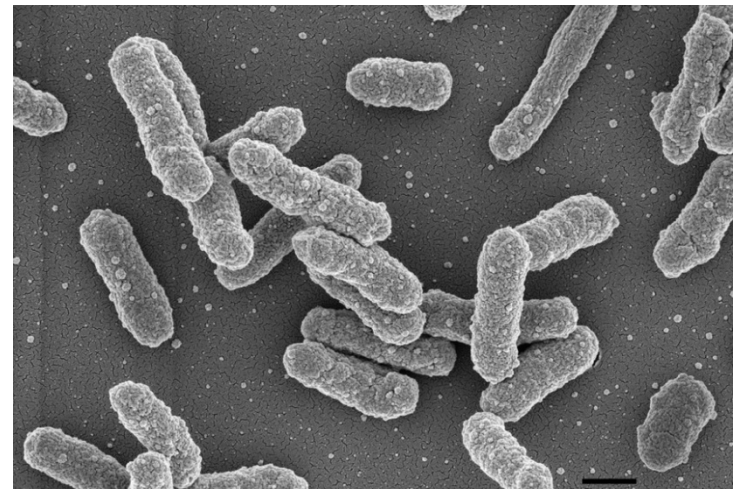
- **Dr. Gibson's 2011 ACS presentation**
 - **Inspections**
 - **Hazard Assessment Tool**
 - **Training**
 - **SOP Template Library**
- **Additional improvements**
 - **PPE distribution**
 - **Chemical Inventory**





UChicago Lab Acquired Infection

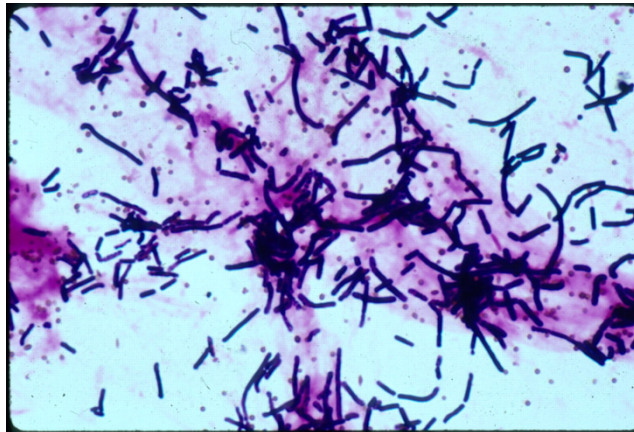
- **September 4, 2009- *Yersinia pestis***
- **OSHA: “Apparent violations warranting citations were not found during the inspection period.”**
- **External Review in 2011**
 - **Commissioned by Provost**
 - **Limited to Biosafety**





UChicago 2nd LAI

- **August 25, 2011- *Bacillus cereus***
- **Internal Review in 2013**
 - **Commissioned by UChicago President**
 - **All Safety programs at UChicago**





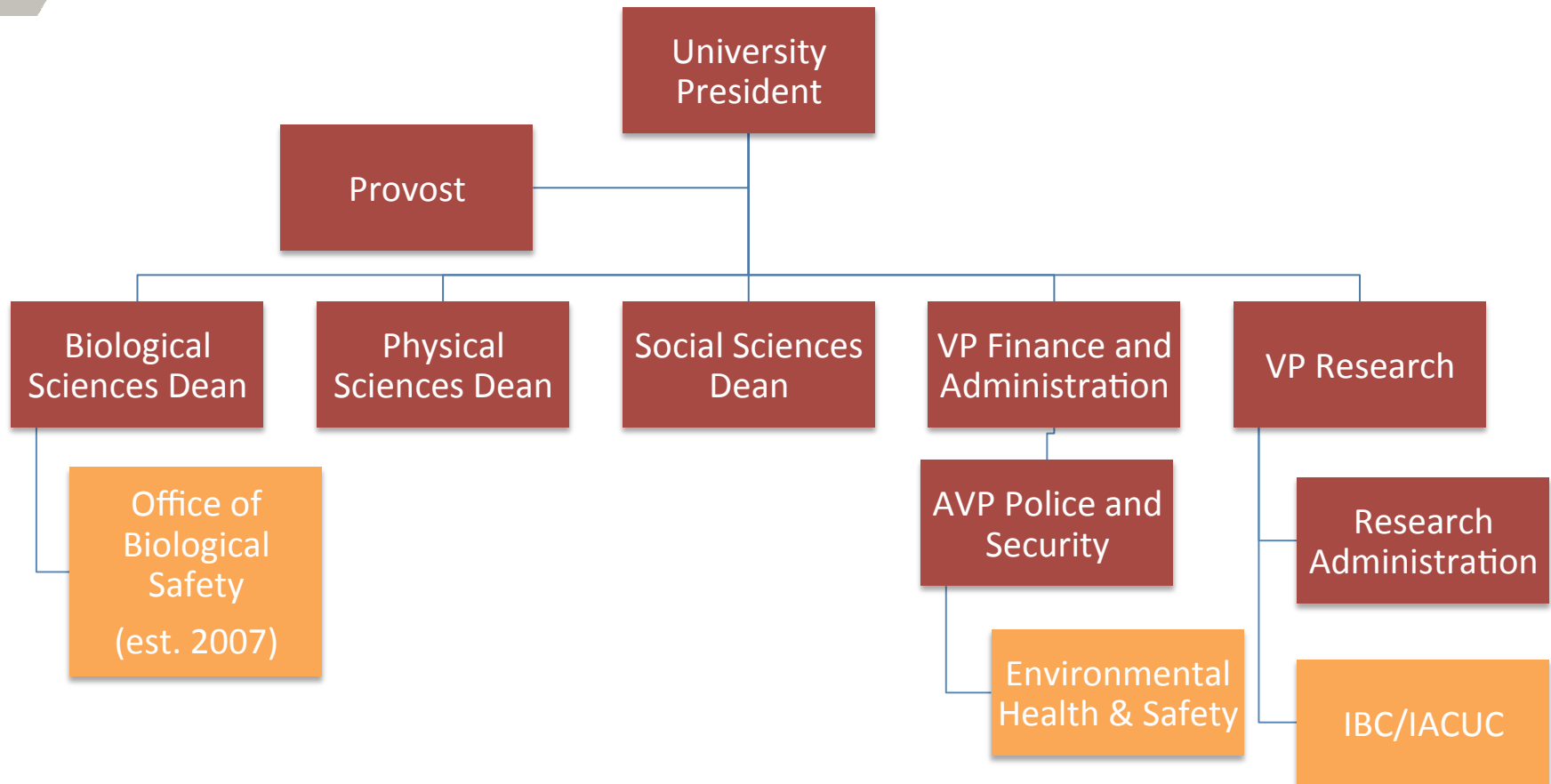
UChicago's Response to Lessons Learned

- **2011 Response from 2009 Lessons Learned**
Biosafety Office from 2 to 4 Full Time Employees
Personalized Biosafety Manual with Agent Profile Forms
Code of Conduct
Numerous training modules developed
- **2013 Response from 2011 Lessons Learned**
Office of Research Safety (ORS) established in 2014



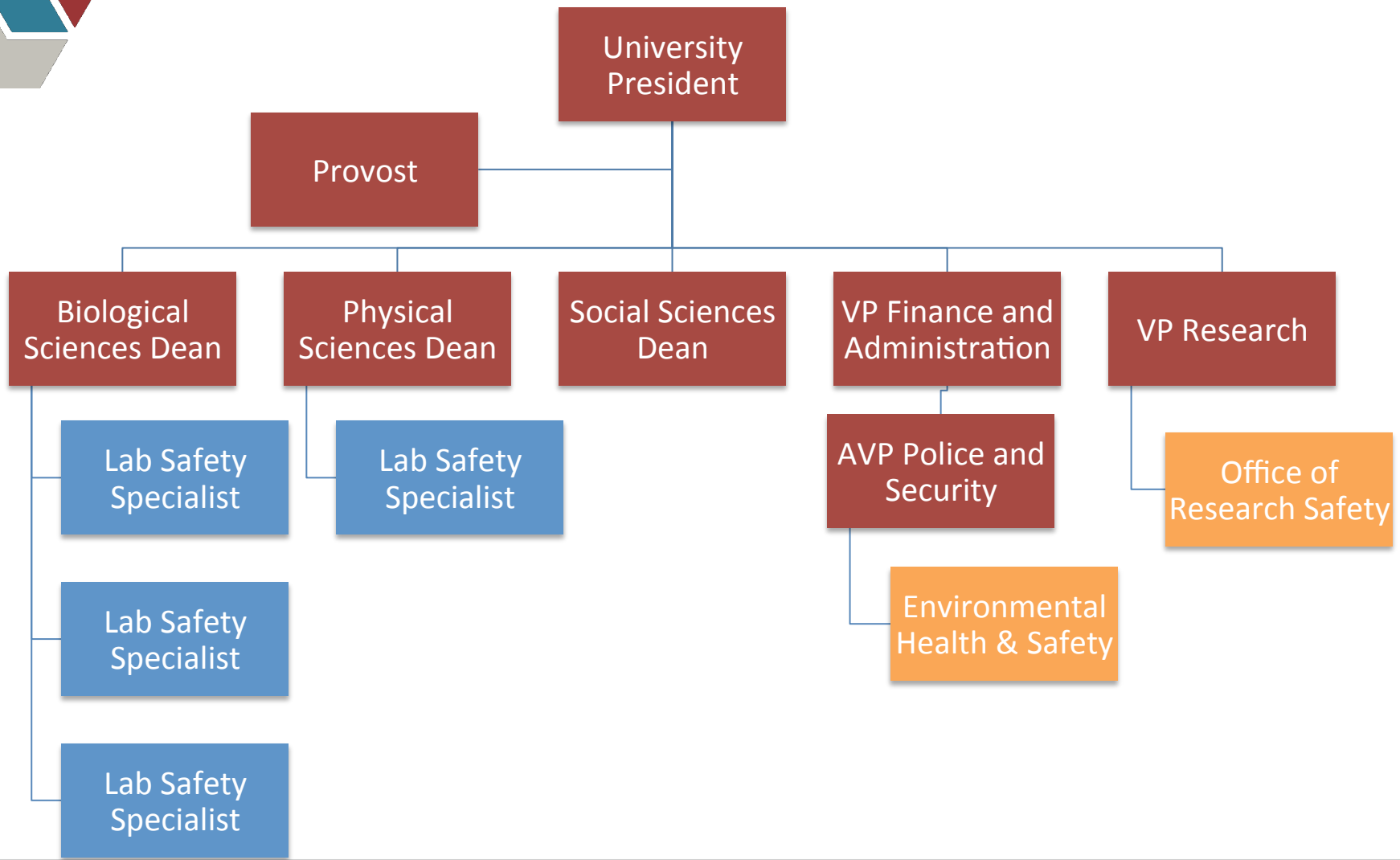


UChicago Safety Infrastructure (pre-2014)





UChicago Safety Infrastructure





UChicago Office of Research Safety

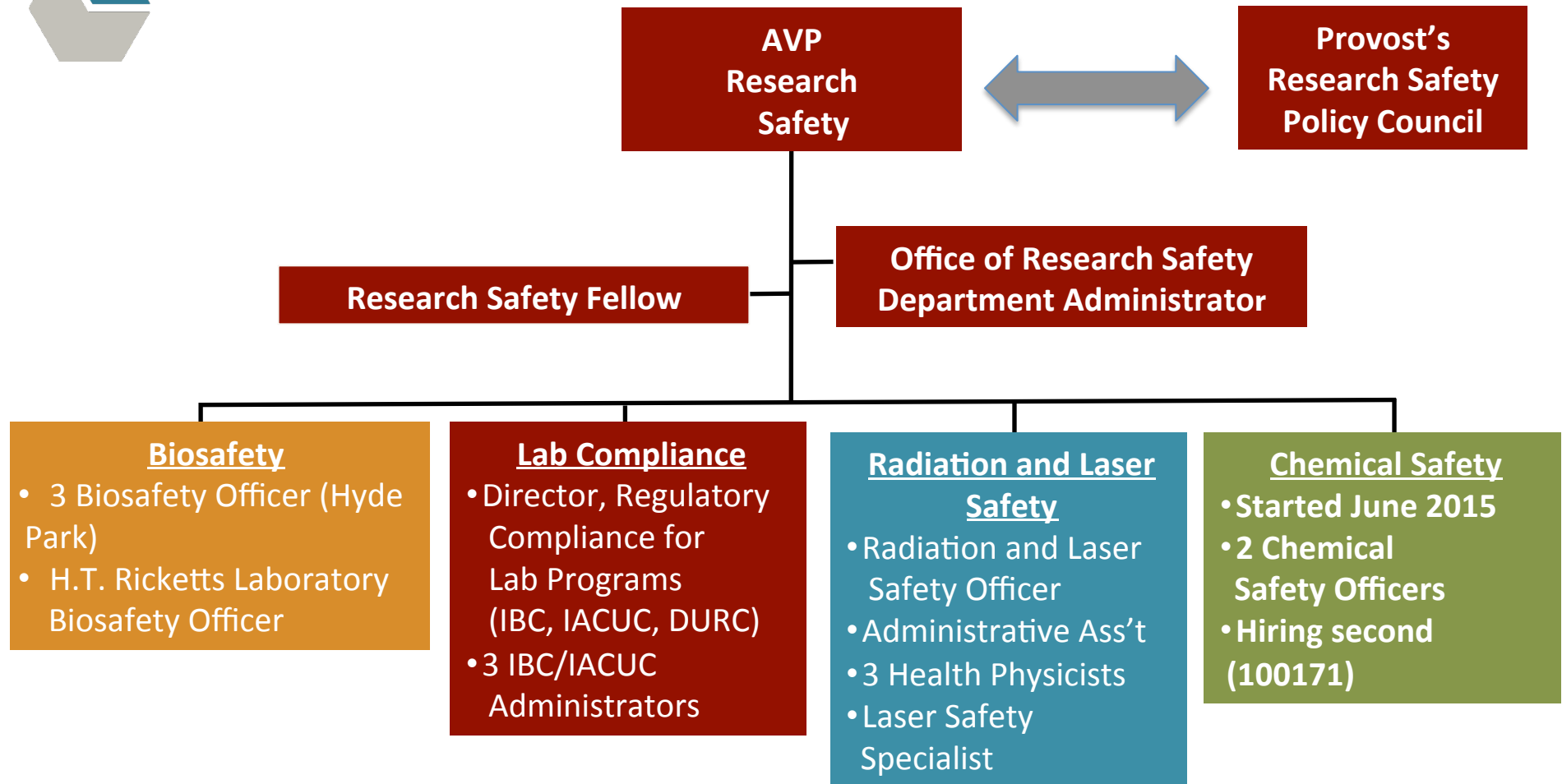
- **Replaces EHS for:**
 - **Inspections**
 - **Training**

- **Collaborates with EHS:**
 - **In spill response**
 - **Hazardous waste disposal**
 - **Incident reporting/ investigation**





Office of Research Safety



AVP: Associate Vice-President



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Development of Chemical Safety Program

- **What are the expectations?**
- **What was being done previously?**
- **Who can I partner with?**
- **What improvements can/need to be made?**
- **After changes are implemented, what isn't working and/or how can this work better?**





Areas for Improvements

- **Inspections**
- **Chemical Administration Forms (CAF) for Animal Research**
- **Compliance Tools for Researchers**
- **Training**





Inspections

- **Expectations**
 - **Compliance/ Safety**
 - **Comprehensive**
 - **Efficient**
- **Partners**
 - **Leadership**
 - **PIs**
 - **Researchers**





Inspections

UCLA

- **Announced Inspections by PI**
- **Reports sent 48 hours**
- **Follow ups for all findings, varies by finding**
- **Escalation if not fixed**

UChicago

- **Unannounced Inspections by room**
- **Reports sent by the end of the month**
- **Follow ups on 25% within 90 days**
- **No escalation**





Inspections

- **Improvements**
 - **Announced inspections by PI**
 - **Reports sent out 48 hours later**
 - **Reports have photos**
 - **Follow ups on all inspections (30 days)**
 - **Escalation procedure**
- **Feedback**
 - **Send completed report with survey**





Chemical Administration Forms

- **Expectations**
 - **Animal welfare**
 - **Occupational health of researchers/support staff**
 - **Easy for PIs to communicate hazards**
- **Partners**
 - **Veterinarian Staff**
 - **IACUC**





Chemical Administration Forms

UCLA

- **Protocols submitted with all chemicals**
- **EH&S reviews chemicals**
- **Asks for SOPs and certain chemicals to be listed as High Hazard**

UChicago

- **Protocol and a CAF lists the chemicals used**
- **PIs check list, high chemicals have extra ?**
- **EH&S provides a risk assessment form**





Environmental Health and Safety Chemical List

Search for the chemical by entering the chemical name where it says "Find" and selecting "Find the next in PDF" from the drop-down. Additional chemicals will be added to this list, with their Risk classification, as EH&S reviews them.		
Agent	Risk List	Risk Category
[[4-chloro-6[(2,3-dimethylphenyl)amino]-2-pyrimidinyl]thio]acetic acid (Wy 14643 or Pirinixic Acid)	Low	
(-)-Nicotine Hydrogen Tartrate Salt	High	Toxic, Teratogen, Reproductive Hazard
1-(2,3,4-Trimethoxybenzyl)piperazine (Trimetazidine)	Low	Irritant
1,2-dioleoyl-sn-glycero-3-phosphate (DOPA) nanoparticles	High	Irritant
1-(3,4-dichlorophenyl)-3-((2-(dimethylamino)ethyl)thio)-4-(4-methoxyphenyl)-1H-pyrrole-2,5-dione	High	
1-(3,4-dichlorophenyl)-3-(4-methoxyphenyl)-4-morpholino-1H-pyrrole-2,5-dione (Mop-SB3)	High	
1,1-Dimethylbiguanide hydrochloride (Metformin)	Low	Irritant
1,3-Bis(2-chloroethyl)-1-nitrosourea (BCNU)	High	
1,4-Bis-[2-(3,5-dichloropyridyloxy)]benzene,3,3',5,5'-Tetrachloro-1,4-bis (pyridyloxy)benzene TCPOBOP	Low	None
10058 F4	Low	Sensitiser, Irritant
12-O-Tetradecanoyl phorbol-13-acetate (Phorbol 12-myristate 13-acetate)	Low	
13C-oxalate	High	Flammable, Irritant, Toxic
17-AAG	Low	Flammable, Toxic
17B-Estradiol	Low	Carcinogen, Teratogen, Reproductive Hazard
[1-(β-mercapto-β, β-cyclopentamethyleneproprionic acid), 2-(O-methyl)tyrosine] vasopressin	High	Acute toxicity
1-heptanol	Low	Flammable, Irritant
1(L)-Methyl Tryptophan	Low	
1-methyl-3-(morpholin-4-ylmethyl)benzimidazole-2-thione (Compound 3)	High	Irritant
1-Methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) HCL	High	Toxic
1-phenylethanol	Low	Flammable, Toxic, Irritant
2-(2-ethoxyethoxy) ethanol (Transcutol)	Low	Flammable, Irritant, Mutagen
2-[2-(2-hydroxy-3-methylphenyl)vinyl]-8-quinolinol	High	Mutagen
2,4,6-Trinitrobenzenesulfonic Acid (TNBS)	Low	Toxic, Sensitiser, Corrosive
2-4-dinitro-1-fluorobenzene (DNFB)	Low	
2-Aminoethyl diphenylborinate (2-ABP)	Low	None
2-deoxy-D-glucose	Low	None
2-Deoxy-2-fluoroglucose	Low	Irritant
2-fluoro-4aminopyridine	High	
2-mercaptoethane sulfonate (Mesna)	Low	Irritant
2-oxo-2-(5-phenyl-1,3,4-oxadiazol-2-ylamino 2-naphtho[2,1-b]furan-1-ylacetate	High	Toxic
2-pentanone	Low	Flammable, Carcinogen, Irritant, Toxic
2-Propylpentanoic Acid (Valproic Acid)	Low	Irritant
((2Z-2-[(E)-3-(3,3-dimethyl-1-octadecylindol-1-ium-2-yl)prop-2-enylidene]-3,3-dimethyl-1-octadecylindole; perchlorate) and derivatives	Low	Irritant
3-[(benzylamino)sulfonyl]-4-bromo-N-(4-bromophenyl)benzamide	Low	

05/12/2015



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Chemical Administration Forms

- **Improvements**
 - **Removed duplication of forms**
 - **Simplification of chemical list**
 - **CAFs for chemicals not on the list**
 - **Added information into the CHP**
- **Feedback**



IACUC subcommittee approved, waiting for implementation





Compliance Tools

- **Expectations**
 - SOPs
 - Chemical Hygiene Plan
- **Partners**
 - PIs
 - Researchers
 - Lab Safety Specialists
 - Leadership

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Standard Operating Procedure
Process or Chemical Reaction

SOP is not complete until it has been filled out, signed, and dated by the PI and relevant lab personnel.

Lab specific information

Department	Click here to enter text.
Principal Investigator	Click here to enter text.
Office Phone	Click here to enter text.
Laboratory Safety Contact	Click here to enter text.
Lab Phone	Click here to enter text.
Building	Click here to enter text.
Locations covered by this SOP	Click here to enter text.
Emergency Contact	Click here to enter text.
Date SOP was written	Click here to enter a date.
Date SOP was approved by PI	Click here to enter a date.

Scope of the SOP

Describe the process, frequency of the process, chemicals or chemical classes involved, reaction scheme, and special hazards associated with process.

Chemical or chemical class	Hazards associated	Relevant physical or chemical information	SOP
Click here to enter text.	Click here to enter text.	Click here to enter text.	<input type="checkbox"/>
Click here to enter text.	Click here to enter text.	Click here to enter text.	<input type="checkbox"/>
Click here to enter text.	Click here to enter text.	Click here to enter text.	<input type="checkbox"/>
Click here to enter text.	Click here to enter text.	Click here to enter text.	<input type="checkbox"/>
Click here to enter text.	Click here to enter text.	Click here to enter text.	<input type="checkbox"/>
Click here to enter text.	Click here to enter text.	Click here to enter text.	<input type="checkbox"/>

Engineering Controls

- Local exhaust
- Fume hood/ Lab location
- Glove box

Standard Operating Procedure Page 1





Compliance Tools

UCLA

- **Chemical Specific SOP Templates**
- **CHP supplemented with SOPs**
- **Fact Sheets**
- **Website**

UChicago

- **Used UCLA SOP Template**
- **Not clear what was the CHP**
- **Safety Talks**
- **Website**





Compliance Tools

- **Improvements**
 - **Standard Operating Procedure templates**
 - **Chemical Hygiene Plan template**
 - **Guidance Documents (compoundchem.com)**
 - **Easier to navigate webpage (???)**
- **Feedback**
 - **Researchers like the Guidance Documents**
 - **CHP being reviewed by VP of Research**





Trainings

- **Expectations**
 - **Comprehensive**
 - **Modular**
- **Partners**
 - **PIs**
 - **Researchers**
 - **Lab Safety Specialists**
 - **Leadership (Research Safety Policy Council)**





Trainings

UCLA

- **Lab Safety Fundamentals Concepts (In-class)**
- **PI Training (In-class)**
- **UC Training Policy**

UChicago

- **Chemical Hygiene Plan (online)**
- **Fire Safety and Evacuation (online)**
- **EHS policy**





Trainings

- **Improvements**
 - **Training modules based on hazards in lab**
 - **PI module**
 - **In person available and encouraged**
 - **Training Policy endorsed by RSPC**
- **Feedback**
 - **Trainings still being rolled out**





Future Improvements

- **PPE/ Laundry**
- **Chemical Inventory**
- **Hazard Assessment**
- **Additional Training modules**





Important Take-Aways

- **Strong safety community to learn from**
- **Coordinated team approach is critical**
- **Seek input from faculty and researchers**
- **Communicate expectations**
- **Help them meet expectations**
- **Use inspections to educate**





UChicago Facts



5674 undergrads

6984 graduate students

4 Divisions with research labs

- **Physical Sciences Division: 80 PIs**
- **Biological Sciences Division: 350-400 PIs**
- **Social Sciences Division: 5 PIs**
- **Institute for Molecular Engineering: 12PIs**

Collaboration with Marine Biology Laboratories in Massachusetts





Inventory

- **Expectations**
 - **Reporting**
- **What was being done**
- **Partners**
- **Improvements**
- **Feedback**





Inventory Cont.

- **Partners**
 - **Faculty and Students**
- **Improvements**
 - **Only require**
- **Feedback**

