UAB The University of Alabama at Birmingham

A Partnership with EH&S, School of Medicine, to improve Safety and Sustainability for Autoclaves

Emily Colpack

Learning Objectives

Learn how to involve multiple stakeholders on high impact projects.

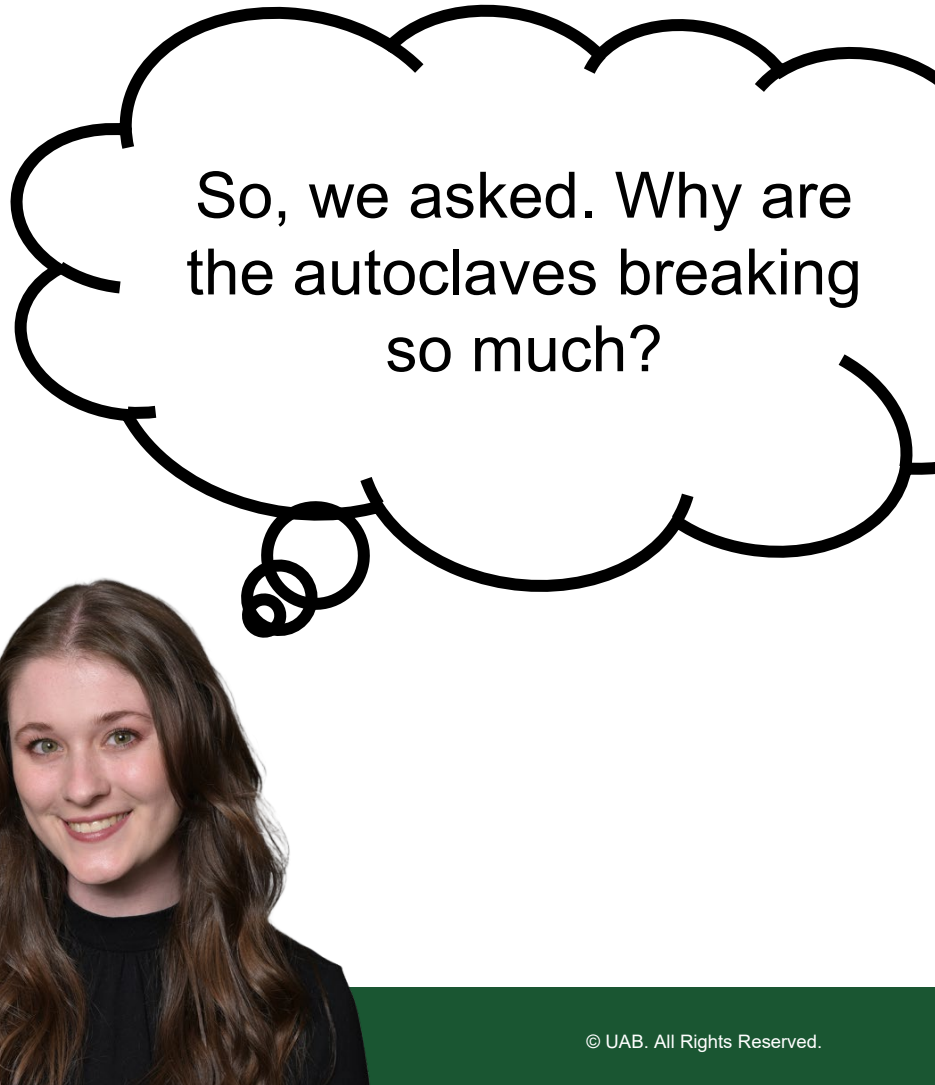
Learn how to communicate with other stakeholders to ensure proper collaboration.

Learn about proper usage of autoclaves.

Learn how to communicate to researchers about important items.

How did we identify this problem?

- In Green Lab presentations we would give sustainable recommendations about autoclaves.
- A few labs would say…
- ***“If we could use the autoclaves”.***
- We knew the autoclave repairs sometimes take a long time for a variety of valid reasons.



Who is responsible for the autoclaves working?

- Heersink School of Medicine is in charge of the autoclave repairs and making sure they're working.
- We talked to School of Medicine and mentioned we knew there was a big issue with the autoclaves breaking and being down.

<u>Our first response was why are they breaking and how can we help?</u>

- The researchers are improperly using the autoclaves and breaking them.

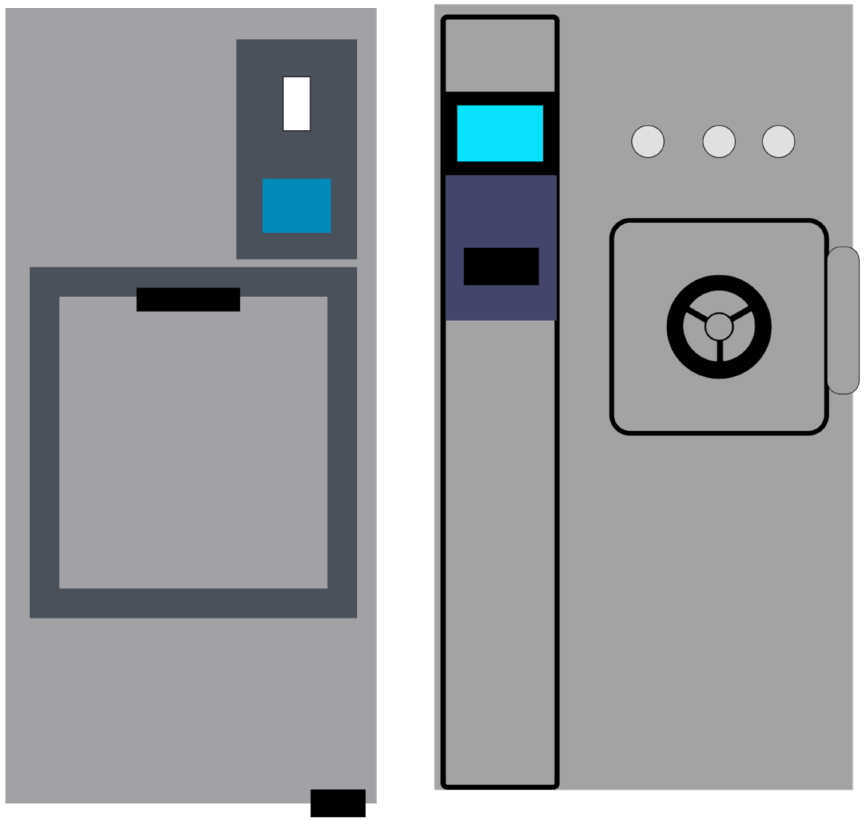
- These are old autoclaves, and it is not unusual they break down.

UAB The University of Alabama at Birmingham

How did these autoclaves break by user error? *It's just buttons to press right?*

Now how did these autoclaves break by user error? It's just buttons to press right?

- We have doors that move up and down to a foot press. Researchers were forcibly pushing the door down to get to their items.
- We also have the submarine type autoclaves.
- Non autoclavable items in the autoclave cause melting and clog the rain.
- Preventative Maintenace? Who does that?



Maybe we need EH&S...

- The researchers are placing non autoclavable items in the autoclave, and are trying to break the doors.
- We might need to do more communication on how to use the autoclaves safely.
- If the researchers can't use the autoclave safely, they likely don’t know how to use the autoclaves.
- Maybe it is mainly undergrads doing the autoclaving. There is high turnover with students.

High Impact Problem that Combines Multiple Stakeholders

Example: Autoclaves

- Autoclaves can use 84 kWh/day. This is about **2.8 homes worth of energy a day**!
- Autoclaves are dangerous if not used properly.
- Repairs can be expensive and take weeks to months depending on the model.

Who is the stakeholder?

- Sustainability (Green Labs) wants to reduce unnecessary cycles to reduce electricity usage.
- Environmental Health & Safety want to ensure people are being safe and autoclave their waste properly.
- Schools in charge of the repair and upkeep of autoclaves want researchers to use the autoclaves properly to prevent user error repairs that are expensive.

What are the main problems?

Green Labs

Wants labs to autoclave full loads

Autoclave correctly the first time to limit number of cycles

School of Medicine

Limit number of repairs needed for the autoclave

Limit items melting in the autoclave

Wants the researchers to correctly contact the correct email to report needed repairs

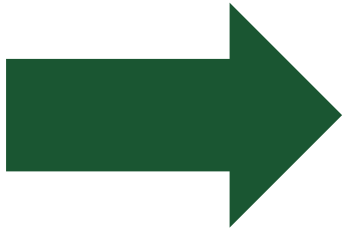
EH&S

Wants to ensure researchers are safe

Wants to communicate up to date safety procedures to labs

How do we distribute these communications?

- EH&S can be scary and has to be very serious.
  - No lab is going to want to admit they don’t know the proper protocols for autoclaves.
- SOM sends out a lot of email alerts and needs to prioritize alerts to ensure people actually read those emails.
- Green Labs thrives off education and knows how to communicate and engage labs.



- Green Labs has the time to create colorful flyers to get EH&S and SOM's messages across.
- All stakeholders agreed to do monthly training sessions in a different building each month so researchers could ask specific questions to EH&S, sustainability, and the autoclave repair experts.
- Green Labs will talk to labs more about autoclaves during presentations to reach more people.

Signage Fatigue

New and LESS Signage

EHS direct recommendations

Sustainability tips!

Request from School of Medicine

AUTOCLAVE OPERATIONS GUIDE

Autoclave Instructions

1. Log into the autoclave and select from favorites or use the appropriate settings.
2. Never place containers directly on the rack or autoclave floor. **Always use secondary containers** to capture spills. Allow sufficient space between items to allow steam penetration. Make sure autoclave is full but do not overload.
3. Run autoclave cycle, and after cycle is finished turn off jacket to help save energy and water.
4. Make sure that jacket pressure gauge is reading 0 PSI before opening the door.

Safety Requirements

Waste Requirements: Autoclaved waste should be discarded as per institutional guidelines. All Category A waste must be autoclaved before it is offered to Stericycle as "medical waste." Contact biosafety@uab.edu for guidance.
PPE: Wear appropriate personal protection equipment (PPE) such as heat resistant gloves, lab coat, safety glasses.
Compatibility: Check plastic materials to ensure that they are compatible with the autoclave. Instruments and surgical tools should be autoclaved in appropriate pouches, not biohazard bags.

Scan this QR code to see HSOM current equipment status log, trainings, sustainability tips, and full repair procedure.*

*Blazer ID Authentication needed

Autoclave Broken?

Report the issue to HSOMFacilities@uab.edu

Include a description of the issue, building, room number, and a department contact for updates.

Emergency?

Contact UAB Maintenance at 934-WORK

In the event of an **emergency repair ONLY** (e.g. active water leak, steam filling the room).

Contact HSOM Facilities (HSOMFacilities@uab.edu) or Green Labs (greenlabs@uab.edu) for questions!

Autoclave Cycle Options

- Environmental Health and Safety provided expertise on correct words for safety guidelines
- Green Labs noticed each floor had wildly different cycle times and saved favorites.
  - We created recommended settings
  - We also edited each floor to have standardized favorite cycles to promote proper use.

Gravity

The most basic sterilization cycle. Steam displaces air in the chamber by gravity (i.e. without mechanical assistance) through a drain port.

Load Type

Glassware, unwrapped goods, waste, utensils, red bags

Requirement

Never place containers directly on the rack or autoclave floor. Always use secondary containers.

Recommended Settings

Local regulations require waste to be sterilized for 30 minutes at 15lbs pressure at minimum 250°F (121°C).

Each sterilizer used for treating waste must be validated after 40hrs of combined operation.

Liquids

A gravity cycle with a slower exhaust rate to minimize boil-over.

Load Type

Media, LB broth, water, etc.

Requirement

Do not overfill the bottle with more than 2/3rd of liquid. Always loosen the caps before loading to avoid shattering.

Recommended Settings

Temperature Setting	Liquid Quantity	Time
250°F(121°C)	75 ml	25 minutes
250°F(121°C)	250 ml	30 minutes
250°F(121°C)	500 ml	40 minutes
250°F(121°C)	1000 ml	45 minutes
250°F(121°C)	1500 ml	50 minutes
250°F(121°C)	2000 ml	55 minutes

This sign was placed on doors leading to Satellite Waste Accumulation Areas.

WARNING

If the door will not open, your cycle is not finished.
This is dangerous to yourself and others. It can also break the door trapping your items inside.

DO NOT FORCE THE DOOR OPEN.

DOOR AND CHAMBER MAY BE HOT!

Pressure in chamber must fully evacuate
before the door can be opened.

Autoclave Trainings

- Once a month in different research autoclave rooms each month.
- Might become a requirement to get autoclave password.
- All stakeholders working on adding more training to existing online biosafety and waste packing trainings.

- The trainings have let researchers ask questions they would not have over email.
- Allows for open dialogue during the training between autoclave experts and our safety experts.

Questions?

email eac16t@uab.edu

UAB The University of Alabama at Birmingham