

Lessons Learned & Success Stories – January to March 2021



The NBACC Mishaps, Lessons Learned and Success Stories Summary serves to reinforce a strong culture of safety and accountability by promoting consistent reporting of mishaps, establishing strong lines of communication with the safety department, supporting a learning environment by allowing others to learn from reported events, and tangibly demonstrating NBACC Leadership's commitment to safety, accident prevention, and continuous improvement.

SUCCESS STORY

1. While moving supplies to an airlock, two staff members noticed the timer in the airlock appeared to be broken. The individuals dropped off supplies in the airlock and went to get another load. When they returned 30 minutes later, they found that the timer had not moved. They waited a few minutes to see if someone had picked up another load and reset the timer. When they noticed it wasn't working, they transported their supplies to the other airlock and notified a member of Health and Safety. They explained what they saw, got a new timer, and called a different staff member in the lab to replace the timer that wasn't working. By paying attention and taking the extra few minutes to confirm that the timer wasn't working, the staff members avoided a near miss. As a result of good communication between staff both inside and outside of the lab, the timer was able to be replaced without anyone accidentally enter the airlock from the cold side.
2. While pipetting, a technician noticed that the pipette appeared not to be picking up the correct volume of liquid. They compared the aspirated volume with another pipette and noticed a significant difference. They notified the Principal Investigator (PI), and it was verified the first pipette wasn't functioning properly. The study continued with a new pipette. This person noticed a potential problem, stopped work, and verified the equipment they were using was working properly before proceeding. If the study had continued with the wrong volume, the study data would have been compromised.
3. A PI proactively read the updates to the 6th Edition of the Centers for Disease Control and Prevention's (CDC) Biosafety in Microbiological and Biomedical Laboratories (BMBL) and recognized a new guidance that would apply to their already approved studies. An amendment was submitted to the Institutional Animal Care and Use Committee (IACUC) for their consideration of these changes as a potential safety improvement. After a thorough review by the IACUC and engaged discussion regarding risk/benefit analysis, it was determined to not proceed with the proposed changes as the risk mitigation measures that were already in place would be safer than proceeding with the new guidance from the BMBL. The IACUC was appreciative of the proactive measures taken by the PI in considering the updated regulations. It is a success when staff take initiative to be aware of changes in standard operating procedures (SOP), regulations, or processes and apply them directly to their work, in addition to attempting to make the workplace safer.

LESSONS LEARNED

1. Whether it is using a new piece of equipment or mentoring a new staff member in a procedure that they are not familiar with, using a surrogate when available is always best practice. As seen in this month's occurrences, a staff member did a mock run of a newly acquired instrument using buffer only. The run did not go as plan and since it was only buffer a near miss was prevented.

2. Though there are always lessons to be learned from the near-misses and incidences described in this document, one of the events this month presented an opportunity to reinforce the pillars of NBACC safety culture and the responsibilities of all NBACC staff. When reading this month's event summaries, remember that the strength of our safety culture comes from the individual decisions we make each day.
3. Deadlines are a part of life here at NBACC. But working safely is the first priority, even if it means finishing the job later. We all often feel constant pressure to complete tasks as quickly as possible so that we can move onto the next task, but we all know that if a task is supposed to take an hour, sometimes priorities shift and it might take two hours, so plan accordingly. Make deliberate movements and don't rush, especially while working in a Biological Safety Cabinet (BSC) or around any equipment that might have sharp corners or edges.

EVENT SUMMARIES

FIRST AID SUMMARIES: In all the following incidents, personnel reported to the Competent Medical Authority (CMA), first aid was applied as necessary, and laboratory restrictions were placed, if needed:

- 12/09/2020 - A staff member was loosening a bolt when their hand slipped and they scraped their right knuckle on the wall
- 12/10/2020 - A staff member was placing an item in a drawer when they sustained a paper cut from a cardboard box that was also inside the drawer
- 12/23/2020 - A staff member leaving a laboratory noticed that one of their left fingers was bleeding despite not actively injuring it. The staff member had been handling papers in the laboratory, and the injury was consistent with a paper cut
- 12/29/20 - A staff member was putting on their clothes in the change room when their hands slipped and they scraped their right wrist
- 01/19/2021 - A staff member was reaching into the back of a laboratory drawer when their finger became caught in between the drawer and the cabinet and they sustained a cut
- 02/02/2021 - A staff member cut their finger on a cardboard box while working in a Biosafety Level-3 (BSL-3) laboratory
- 02/25/2021 - A staff member scraped their hand through their work gloves while removing a gasket from a motor in an industrial support area
- 02/25/2021 - A staff member working in a BSL-2 lab was retrieving a pair of gloves and cut their finger on the box.

NEAR MISS SUMMARIES

1. **PROCESS FAILURE SUMMARY:** 12/21/2020 - The doors to two primary containment cages were left open overnight in an Animal Biosafety Level-3 (ABSL-3) room. The doors were closed in the morning, and the Biosafety Officer (BSO) and the Responsible Official (RO) were notified. The animals in question were not symptomatic but had been challenged. All staff were in proper personal protective equipment (PPE). The CMA ruled no potential exposure. This incident has many facets and layers worthy of analyzing. For the purpose of this document, the discussion will only surround operational/procedural/safety concerns for learning purposes and will not include personnel involvement:
 - **Understand the purpose of your safety controls.** Although primary containment caging is not a requirement per BMBL, it is one of our engineering controls at NBACC, and it plays an important role in safety. By circumventing an engineering control and the intended operation of equipment, the level of protection provided by the engineering control and equipment is compromised.

Engineering controls (as well as administrative controls and personal protective equipment) are carefully selected for the work required. While no animals or personnel were harmed in this instance, circumventing controls, for any reason, has the potential to put personnel and animal health at risk

- **Understand hazard recognition.** It should be recognized that any situation where equipment is noted to be in an abnormal state (e.g., caging left open, lab door unlocked, sash found raised too high in the BSC, etc.) is a reason to stop and report the situation before proceeding. If you notice a hazardous situation or are informed of the same, personnel should not proceed to the room, a stop work should be called, and staff should contact the BSO
- **Notify the correct people promptly of hazardous situations.** In this particular situation, there was a missed opportunity to recognize an abnormal situation, in addition to a delay in notifying the BSO. Staff should be reminded that if you are advised of a hazardous situation and a stop work has yet to be called, the responsibility falls to you. By calling a stop work you are preventing others from proceeding into a potentially hazardous situation via entry into the room or suite. Staff should realize that once a hazardous or abnormal situation is recognized, safety of all staff involved becomes a priority. Staff should not perform their own risk assessments of situations. Staff should remove themselves from the unsafe situation, prevent additional individuals from encountering the hazard, and make notifications promptly to Health and Safety as appropriate. Biosecurity and regulatory concerns should be assessed after the health and safety of everyone involved is secured
- **Good mentorship is vital to an organization's safety culture.** This incident prompts a hard look at the effectiveness of our Mentorship program and the distinction between mentoring and training. Mentorship not only means teaching technical skills, it also means instilling a robust sense of safety culture in mentees, including a sense of accountability and the desire to actively look for problems and better (and safer!) ways to get the job done.

2. **PPE FAILURE SUMMARY:** 01/14/2021 - A staff member was moving a new refrigerator into a BSL-4 laboratory when they tore their right glove. The staff member immediately followed the glove tear procedure, notified the control room operator and exited the suite. Once in the suit room, the staff member performed an inner glove leak test and confirmed with a member of Health and Safety that their inner gloves had remained intact. The CMA ruled no potential exposure.
3. **SPILL SUMMARY:** 01/20/2021 - A staff member working in a BSL-3 laboratory was moving 96-well plates inoculated with a Risk Group (RG) 3 agent from an incubator into a zip-top bag, when the bottom plate in the stack was jostled and landed upside-down on top of the bag causing the material to spill onto the bag and the employee's gloves. The staff member immediately held their breath, removed their contaminated PPE, washed their hands and left the room. After speaking to a member of Health and Safety and waiting 30 minutes, the staff member was permitted to don an assigned protection factor (APF) 1000 powered air purifying respirator (PAPR) and re-enter the room to clean up the spill. The CMA ruled no potential exposure.
4. **SPILL SUMMARY:** 01/26/2021 - A staff member working in the BSC of a BSL-3 laboratory was completing their work when a closed 2 mL tube containing a RG 3 agent got caught on their lab coat and fell out of the BSC and onto the floor. The tube remained intact and no liquid escaped the tube upon impact. The employee reported that there had been no spills in the BSC during their work, but it had not yet been surface decontaminated prior to the tube falling out. All employees immediately held their breath, exited the room, and contacted Health and Safety in accordance with proper spill

procedure. After waiting 30 minutes, the employee re-entered the room and deconned the floor where the tube had fallen. The CMA ruled no potential exposure.

5. **PPE FAILURE SUMMARY:** 02/02/2021 - A staff member working in the BSC of a BSL-3 laboratory had just decontaminated the BSC when their hand brushed against a piece of equipment and caused a small tear in their outer glove. Though the staff member had completed their work with a RG 3 agent in the BSC, the full disinfectant contact time had not elapsed. Upon noticing the tear, the staff member removed their outer gloves and performed a leak test of their inner gloves. The staff member confirmed with a member of Health and Safety that their inner gloves remained intact. The CMA ruled no potential exposure.
6. **SPILL SUMMARY:** 02/09/2021 - A staff member working in a BSL-3 suite was transferring a bag containing stacks of agar plates from one laboratory to another when, as they were leaving a room, the handle of the door hit their arm and caused them to drop the bag. Upon impact, the bag opened and the tape failed, allowing two plates to lose their lids and roll out onto the floor of the hallway. The staff member put the lids back on the plates and then entered an adjacent laboratory to call Health and Safety instead of calling from the dirty side change room. Upon speaking to a member of Health and Safety, the staff member was instructed to leave the laboratory, collect the other staff members in the suite and enter the dirty side change room. A sign was posted on the door of the other change room preventing staff members from entering the suite. After allowing for a 30 minute air wash, the staff members were permitted to don APF 1000 PAPR hoods and enter the suite to clean the spill. After the incident, Health and Safety met with the staff member to reiterate the appropriate spill procedures and exit routes. The CMA ruled no potential exposure.
7. **PROCESS FAILURE SUMMARY:** 02/10/2021 - A staff member updated their Occupational Health Risk Assessment (OHRA) form to indicate work with a Class 3B laser. However, the update was missed by the CMA, and the staff member was not enrolled in the Laser Safety Medical Surveillance program until their next OHRA update four months later. Though the staff member had not directly worked with lasers during the interim, they did enter a laboratory space while wearing proper PPE 1-2 times while lasers were operational.

OTHER OCCURENCES:

REPORTED EVENTS: In all the following, personnel reported the events to Health and Safety, and the events were tracked for trending purposes:

- A staff member working in a BSL-3 laboratory reported an outer glove tear. The staff member was deconning a BSC after completing their work with agent when, due to their gloves being wet with Bleach, their hand slipped as they were unplugging a piece of equipment resulting in the tear. They immediately performed a leak test of their inner gloves and confirmed that they were intact. There was no agent present at the time of the tear, and no spills of agent occurred during their work
- A staff member's PAPR shut off as they were entering a laboratory. Both the battery and motor were evaluated and found to be functional
- A staff member was following a manufacturer's instructions and doing a mock run on a new emulsifying instrument when the metal beads they were using caused the sample tube to crack, spilling 500 µl of buffer. The staff member contacted the manufacturer, and as a result the speed and interval of the emulsifier will be lowered when using metal beads instead of glass beads

- A staff member placed a used pipette tip in a waste container within the BSC without first decontaminating it. A small amount of disinfectant was added to the container to saturate the tip
- A staff member was tasked with disposing of a large volume of paraffin-embedded, non-infectious samples that were no longer needed. After reaching out to the Regulatory Compliance Specialist, they were informed that the samples could be autoclaved. The autoclave that the staff member typically used for waste was out-of-service for maintenance so they used the autoclave in another room, which they were not familiar with and which is typically used to sterilize surgical instruments; not waste. The employee unpacked the samples from the boxes that they were stored in and placed them in a 'hat box'- style waste container that was lined with a bag. Due to the size of the load, a secondary container would not fit into the autoclave so it was not used. Additionally, the staff member was unaware that the autoclave had an appropriate liquid cycle so they ran the waste on a dry cycle. The staff member then left for the day and asked another technician to empty the autoclave's contents upon completion. The autoclave cycle completed with no errors. When the second staff member opened the autoclave they discovered the hat box had a tear in the side, and a substantial amount of paraffin wax had leaked into the chamber of the autoclave. They cleaned as much as they could and left. When they arrived the next day and attempted to run an empty dry cycle, the autoclave went into alarm. The staff member then called a member of Facilities Management Operations (FMO), and the FMO member reported the incident to Health and Safety. The autoclave was placed 'out-of-service' until the wax could be completely removed
- A staff member was using pop-up style toaster that was widely known to be broken by the employees that use it. Instead of the toast automatically popping up, the user must manually pop up the toast to stop the cycle. The staff member was called away from the toaster for a few minutes, and the toast began to burn and cause significant smoke. The toaster was discarded and replaced
- A staff member reported smelling a very bad odor seeping into their office space. Upon further inspection, a staff member had failed to turn the burner off of a coffee maker, and a coffee pot had been scorched in the kitchenette area on the floor beneath their office
- A staff member working in the BSC of a BSL-2 laboratory had completed their work and was bleaching down items in the BSC when they removed their outer gloves and noticed a small tear in their left inner glove. They performed a leak test of their outer gloves using disinfectant and confirmed that they remained intact
- A staff member reported that, in preparation for a vaporous hydrogen peroxide (VHP) decon, a rack was moved across the line of containment in a BSL-3 airlock without the buffer corridor airlock door being locked and marked, as per the SOP. There was no entry into the airlock from the corridor side while the door was unlocked
- A staff member, implementing a new testing procedure, briefly entered the irradiator room without wearing their dosimeter
- A staff member, attempting to retrieve their items from an airlock reported that the airlock timer was not functional. The timer was replaced by Environmental Operations (EO)
- A staff member reported after-hours that a Class II BSC in a BSL-3 laboratory was in alarm. Due to fluctuations in air handling, ducted BSCs within the building occasionally go into alarm. After speaking with a member of Health and Safety, the staff member was permitted to enter the lab and clear the alarm
- A subcontractor reported that a computer workstation began smoking in the Command Center. Upon further investigation, the smoking was due to an excessive amount of dust in the processor.

The computer was removed and replaced, and routine cleanings were recommended for all computers inside the Command Center

- A staff member working in a BSL-3 suite was preparing to load an autoclave when they noticed a puddle of liquid in front of the unit. The staff member contacted Health and Safety. After involving a member of FMO, it was determined that the liquid was sterile condensate that had accumulated in the autoclave chamber. The condensate had spilled on to the floor when the autoclave tray was pulled out
- A staff member working in the vivarium was cleaning and spraying down the room as described in the SOP. They removed the hose-end sprayer nozzle that is usually attached to the hose and put it on the floor roughly one foot from the drain. The staff member removed the nozzle to increase the water pressure and flow so that they could flush the floor drain. The staff member put the hose partially down the floor drain and ran water for a few minutes to flush the drain without incident. When the staff member was done flushing the drain, and began putting the hose away, it bumped the nozzle nearby causing the nozzle to roll into the drain. The staff member could not visibly see the nozzle in the dark drain so they put the filter basket and drain cover back onto the drain, finished their duties and put in a work request to have the nozzle retrieved by FMO. The staff member met with a member of Health and Safety and they agreed that in the future, if the user prefers not to use the nozzle to flush the drain, it should be placed in an area where it cannot be easily pushed into the floor drain
- A staff member was wiping down a BSC in BSL-2 laboratory after finishing their work when they noticed a tear in their right inner glove. The staff member was still wearing their outer gloves but due to the contrasting glove colors was able to notice the breach. The staff member tested the integrity of the outer gloves using disinfectant and confirmed that they remained intact
- A staff member failed to request two visitors check their temperatures and answer the COVID-19 Health Questionnaire prior to entering NBACC. Upon realizing the mistake, a member of Health and Safety confirmed with the visitors that they had checked their temperatures prior to their visit
- Staff members working inside a Class III BSC containing a RG 3 agent experienced unexpected back-pressure in a line which allowed approximately 2.5 mL to spill. The spill was entirely contained within the BSC. The spill and BSC surface were decontaminated with Bleach-Rite. There were no issues with the BSC or staff PPE during the spill. Staff will replace the check-valves on the line to ensure they are opening correctly to release pressure
- A staff member was working in a BSC of a BSL-3 laboratory when the ducted BSC in the room started to go into alarm. After speaking with a member of Health and Safety, it was determined to be a false alarm, and the staff member was permitted to enter the lab and clear the alarm. There was no work taking place in the ducted BSC at the time of the alarm.

Note: *It should be assumed that staff are wearing a PAPR (minimum APF 25) in events taking place in the BSL-3 laboratories unless otherwise stated.*

Document Definitions:

Event Summaries – Any OSHA recordable mishap or first aid injury or illness.

Near Miss Summaries – Any mishap that requires a potential exposure ruling from the Competent Medical Authority (CMA) or represented a CDC Form 3 submission.

Other Occurrences – Mishaps that do not fit into the other two categories.

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