



## Lessons Learned & Success Stories – October to December 2022

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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.

### **LESSONS LEARNED:**

1. When escorting visitors or other authorized personnel into laboratories, please be sure to refresh yourself on NBACC's escorting rules. As a reminder, Escorted Laboratorian Form (ELF) cards must be checked by the escort before entry every time, including checking the date on the card. In all instances, ensure that the process and rules are explained prior to entering the change room (refer to Entry and Exit of BSL-2, BSL-3, and BSL-4 Cabinet Lab Areas and/or BSL-4 Entry and Exit). Allow enough time for the escorted person to ask questions. If escorting someone of a different gender, this may include entering the change room and physically pointing out the line of containment and instructing the person to not cross until given verbal permission following a visual inspection by the escort from the containment side. If any issues arise during escorting, please contact Health and Safety for a risk-based analysis and their resulting guidance. As a reminder, it is always the correct choice to contact Health and Safety during any laboratory incident to receive their instruction following a detailed communication of the situation and possible risks.
2. Complacency and attention issues often arise while performing tasks that feel second-nature to us. Many of this month's reported incidents are attributed to complacency while operating autoclaves. Loading and running autoclaves is a task that many NBACC staff members perform regularly – it is such a habitual process that can easily lead to inattentiveness. However, there is a lot that can go wrong throughout the operation of autoclaves, such as taping bags too loosely, taping bags too tightly, forgetting to press 'start' on a cycle run, or tearing gloves/cutting hands on autoclave carts while loading and unloading. Staff are encouraged to remain vigilant while performing habitual tasks and maintain a healthy respect for what can go wrong.
3. Attention to detail is a critical part to all our jobs; just being aware and noticing has the potential to significantly impact the outcome of an event. It could be noticing something major, like water leaking under a door to something small and more minute, such as a glove tear or a misplaced pipette tip. Take a few moments when you enter your lab, office, cubicle or work area to pay attention to everything around you—is it in order, is anything out of place? By training ourselves to be attentive and fully focused, we are more prepared for when something does go wrong.

## SUCCESS STORIES

1. In preparation for an upcoming project, the Comparative Medicine (Comp Med) and Facilities Management Operations (FMO) groups worked on a way to make it easier to move caging into the suite over the lip of the APR door. In the past, ramps were used to move the caging. However, the ramps were heavy, bulky, and not very efficient. FMO gave Comp Med a Johnson bar to use instead. The Johnson bar works like a huge crowbar on wheels that helps lift the 600lb caging up and over the edge of the door. Using the bar is more ergonomic and provides a safer method for moving the caging. Through this collaborative troubleshooting between Comp Med and FMO, staff were able to move the caging into the space without issue or injury.
2. IT staff noticed that when they attempted to badge through a door from one interstitial space to another, they were forced to pause at the door and present their badge in a way that often made them vulnerable to being struck by the door when it was opened from the other side. The solid door is at the end of a short hallway that has a liquid nitrogen manifold system near it. Because of the manifold's location, the location of the badge reader, and the lack of door window, the area created a blind spot. Recognizing the hazardous situation, IT reached out to Health and Safety and a ticket was put in to have a window installed in the door. During the installation of the window, the FMO group recognized that the door had been assigned a fire rating per a National Fire Protection Code. To ensure they weren't creating a new hazard, FMO confirmed that the window had a compatible rating before installing it into the door. In both instances, staff members recognized potential hazards and worked to have them mitigated before they caused harm.
3. While performing observations in the cold-side ABSL-4, one of the containment cages was noticed to have a small leak. Upon opening the door, a small amount of urine would leak out onto the floor. Once these animals were infected, it would have been a potential spill if traces of the agent were found in the urine or feces. Senior members of Comp Med discussed potential fixes and decided to try an absorbent pad under the catch pan to absorb any urine that may have escaped out of the pan. It has proven to be successful.
4. When planning for an upcoming study in the ABSL-4, senior members of the Comp Med staff experimented with multiple procedures for drawing up BSAT safely and while in BSL-4 containment suits. The current method involving pushing air through the oral gavage tube in order to ensure the entire amount of BSAT was deposited would require staff to draw up BSAT, inject the BSAT, twist off the syringe, draw air, twist back on, inject air into the tube, and finally dispose in the sharps container. Due to the high-risk nature of this process, the staff members figured out the amount of liquid that was being held in the hub of the tube. From there, it was realized that if you draw up the liquid using the syringe and tube that you will be dosing with, the syringe will automatically draw up the air from the tube prior to the liquid entering. This theory was tested multiple times and it proved to always come out the same. This modification meant that Comp Med staff were able to go straight out of the BSAT container to the animal to the sharps container, reducing a 7-step process to a 3-step process.
5. During a post-approval monitoring (PAM) of an ongoing ABSL-4 study, a member of Health and Safety questioned the necessity and safety of using transport boxes in small spaces. It was noted that additional hazards – small space, BSL-4 containment suits, wetting the containment box with disinfectant and creating a slip hazard among others – prompted a reevaluation. The Health and Safety member, the PI, and members of Comp Med, in consultation with the Responsible Official,

determined utilizing the transport box for this study may add risk to the procedures. After verifying the documents associated with the project did not require an amendment to effect this change, an email was sent to Comp Med project staff confirming the discontinuation of the transport box.

#### **EVENT SUMMARIES:**

1. **FIRST AID SUMMARY (CUTS):** 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.
  - 09/07/2022; A staff member sustained a papercut while opening a box of Q-Tips.
  - 09/14/2022; A staff member was removing and replacing hydrophobic filters when they were moving around a shut-off valve and scraped their head on the handle. Respiratory protection was required during the removal and replacement of those filters; the staff member was wearing a PAPR, but the area also requires the use of a hard hat, which the staff member was unable to wear with a PAPR. At the time of the incident NBACC did not have a hard hat attachment available for PAPR units, but multiple attachments have since been ordered.
  - 10/05/2022; A staff member sustained a papercut on their right thumb while opening a box of gloves.
  - 10/17/2022; A staff member tested positive for COVID-19 after being in close contact with a staff member that later tested positive.
  - 10/18/22; A staff member was changing the bearings on a piece of equipment when their glove got caught and their hand was pulled between a sheave and a belt, smashing their left ring finger.
  - 10/28/2022; A staff member was loading an autoclave when they cut their right middle finger on the side of the metal autoclave cart.
  - 11/16/2022; A staff member scraped their wrist on the bolt of a door while working in an interstitial space.
  - 11/28/2022; A staff member scraped their hand on the bolt of a door while working in an interstitial space.
  - 11/30/2022; A staff member at an off-site welding training sustained a burn on their hand from welding slag. As the staff member was welding, a hot piece of slag fell into their glove and burned their palm.

#### **NEAR MISS SUMMARIES:**

1. **PROCEDURAL FAILURE SUMMARY:** 08/16/2022; A Health and Safety member was escorting CDC inspectors out of the building when one of the inspectors realized they had left their badges in a change room. The staff member left the remainder of the inspectors with another escort and walked the CDC inspector to the last change room they had entered. The escort opened the door to the change room and held it half open while the inspector entered; the inspector took two steps over the line of containment and grabbed the badges before they could be stopped. The escort fully entered the change room and told the inspector to “stop.” The Health and Safety member made a risk-based decision and placed paper towels on the floor, poured bleach on them and had the inspector step onto the paper towels. They then took the badges and wiped them down with bleach. The lanyard that the badges were on was soaked with bleach and discarded. Next, the staff member had the inspector wash their hands as they waited 10 minutes for the bleach contact time for the shoes and badges. The staff member went back and mopped the clean side of the change room once they had exited. When investigating how the inspector’s badges made it across the line

of containment and onto the dirty side of the change room, Health and Safety discovered that earlier in the day the inspector was being escorted by an individual of a different gender and therefore navigated the change room unsupervised. This situation represents a deviation from an established NBACC practice, which is that the inspector would have been instructed to remove all personal effects and clothing and leave them on the dirty side of containment prior to taking another personal shower. Health and Safety would have been contacted to determine the best way to decontaminate personal effects prior to them being returned.

2. **PROCEDURAL FAILURE SUMMARY:** 09/16/2022; A staff member entered BSL-3 suites multiple times with an expired ELF card. The staff member's card had been expired for roughly 18 days before they realized. In those 18 days the staff member was escorted into containment four times by different individuals. When the staff member realized that their card was expired, they immediately reported it and started the process to obtain a new card. The staff member did not enter a BSL-3 suite after noticing their expired card. Health and Safety confirmed with the CMA that no medical surveillance had lapsed during the card's expiration and the staff member was provided an updated ELF card. As a reminder to staff, the Escorted Laboratorian system relies solely on staff remembering to check someone's card before entering a laboratory. It is equally important for staff that hold ELF cards to ensure that their card is within date.
3. **EQUIPMENT FAILURE SUMMARY:** 09/29/2022; A staff member was working in the biosafety cabinet (BSC) when a box of delicate task wipes in an acrylic holder magnetically bound to the outside of the BSC fell and hit the staff member in the head. The staff member was uninjured from this impact. They completed their work in the BSC and then picked up the box from the ground. The glue adhering the magnet strips to the acrylic holder had failed. The holder will be repositioned.
4. **PROCEDURAL FAILURE SUMMARY:** 9/27/2022; A staff member reported that during a post-approval monitoring (PAM) of a protocol, a visitor was inadvertently escorted into a room during work with BSAT despite not being listed on the CDC Form 1. At the time of the PAM, the escorting staff member did not recognize that BSAT was involved. Moving forward, the committee conducting the PAM will update their paperwork to include flags for projects that involve the use of BSAT so that members are informed before conducting their observations.
5. **PROCEDURAL FAILURE SUMMARY:** 10/18/2022; A vendor was escorted into the vivarium without the appropriate training, medical clearance, and ELF card. Upon seeing the vendor, members of the Comp Med group questioned whether an ELF card had been issued for the space. The escort contacted a member of Health and Safety who explained the required training and documentation needed before access could be provided to the vivarium. The vendor was escorted out of the vivarium, the proper forms and training were completed, and the vendor was allowed back in to complete their work. Over the last few weeks, there has been an uptick in the number of lapses regarding escorting at NBACC. To help staff be more successful with escorting visitors and new NBACC members, NBACC Security and the ISC have formed a subcommittee to create a checklist to guide staff through the requirements and expectations associated with escorting. Additionally, the 'Control of Access to the NBACC Laboratory' SOP will be updated to inform staff of the process and approvals necessary to obtain access.
6. **FACILITY PROCESS FAILURE SUMMARY:** 11/01/2022; Staff members preparing to enter a BSL-2 laboratory reported that water was leaking out of a nearby laboratory and into the buffer corridor. When members of FMO and Health and Safety arrived, they discovered that the source of the water was a broken pre-filter housing for the reverse osmosis (RO) water filtration system. FMO isolated

the waterline, and the lab was cleaned and mopped. While the BSL-2 laboratory was being cleaned, staff members in a BSL-3 suite called to report standing water in one-half of the suite that appeared to be coming from a single laboratory. Members of FMO and Health and Safety entered the suite and were able to determine that the source of the leak was once again a cracked pre-filter housing of the laboratory's RO system. The water was cleaned by members of FMO and Health and Safety. During the investigation of the incident, it was noted that on the morning of the events, FMO was certifying hydrophobic filters, a process which involves manipulating the main water valves. It is believed that when the water valves were reopened the water pressure damaged the housings. After examining all of the pre-filter housings, FMO noted that many are showing signs of aging due to years of UV exposure, so the group has made plans to replace all the pre-filter housings for the RO units.

7. **FACILITY PROCESS FAILURE SUMMARY:** 11/09/2022; While testing a recently repaired elevator, a staff member entered the unit on 2i and selected the 3rd floor. As the elevator approached the 3rd floor, the unit overshot the floor by 2ft and hit the ring stop on the elevator shaft, causing the ceiling tiles of the elevator to fall to the ground. The elevator then immediately dropped back to 2i. When the doors opened, the staff member immediately exited the elevator. The unit is currently 'out-of-service' for repairs. Upon completion of the repairs and moving forward, the elevator contractor will spend more time riding the elevator to ensure all adjustments made are sufficient and that all elevator scenarios are exhausted.
8. **PPE FAILURE SUMMARY:** 11/15/2022; A staff member reported an inner glove tear when they were removing their outer gloves in a BSC after working with a Risk Group (RG) 2 agent. They were unable to leak test the outer gloves but noted that there was no spill of material and that their skin was intact. The CMA ruled no potential exposure.
9. **SPILL SUMMARY:** 11/22/2022; A staff member working in the BSC of a BSL-4 laboratory was holding two vials of an RG 4 agent when one of the vials slipped from their hands and fell onto their lap. Though the vial was closed at the time of the spill, the responding Health and Safety member had the staff member disinfect their lap area with a detergent/disinfectant as a precaution. The CMA ruled no potential exposure.
10. **SPILL SUMMARY:** 11/23/2022; A staff member working in a BSL-4 laboratory reported finding a pipette tip on the floor with pinkish liquid inside. The staff member was unable to confirm where the tip came from but noted that they were working with an RG 4 agent. Upon finding the tip, the individual remained hooked up to air, discarded the tip properly, and then cleaned the area where the tip was found. The staff member confirmed that their suit and gloves remained intact the entire time. The CMA ruled no potential exposure.

#### **OTHER OCCURENCES:**

1. **REPORTED EVENTS:** In all of the following, personnel reported the events to Health and Safety, and they were tracked for trending purposes.
  - A staff member working in a BSL-3 laboratory was unscrewing the lid of a tube when they tore their outer gloves. They immediately washed their hands and donned new gloves. They confirmed with Health and Safety that their inner gloves had remained intact.
  - A staff member was mopping a BSL-3 laboratory when they discovered a tube on the floor.

They immediately left the room and contacted Health and Safety. The Laboratory Space Manager (LSM) entered the room and confirmed that the tube was a closed and intact cryovial that contained a reagent. The LSM had been disposing of multiple tubes the day prior and did not realize one fell on the floor rather than in a waste container. The tube was disposed of properly.

- A staff member working in a BSL-3 laboratory dropped the cap of a cryovial out of a BSC onto the floor. The staff member immediately exited the room and called Health and Safety to report the spill. The staff member confirmed that the vial contained a blood sample from an unchallenged animal model. They were permitted to re-enter the room, pick up the cap, and disinfect the floor.
- A staff member that had been doing chores in the BSL-4 suite reported that, upon exiting the chemical shower, they noticed that the right shoulder of their scrubs was wet. The staff member stated that the suit as pressure tested before use. They also stated that they were only doing chores within the suite and did not access agent. The suit was marked "out of service" until it could be evaluated by the LSM. Once the suit was evaluated, it was patched and placed back in service.
- A staff member working in a BSL-3 laboratory noticed water on the floor that appeared to be coming from an incubator. The new incubator was empty at the time of the leak and was put into the space a few days prior as part of the equipment refresh. It was calibrated the day prior. The staff member left the room and contacted Health and Safety. The Health and Safety member advised them to clean the spill according to normal BSL-3 procedures. Absorbent mats were placed at the incubator to prevent additional spilling. The staff member also contacted Property Management to determine the cause of the leak. Upon further investigation it was determined that Property Management had placed a small piece of paper towel in the water jacket spout to keep any residual water from splashing out when moving the unit. When the incubator was jostled during the move, the paper towel wicked the remaining water and leaked it onto the floor. The paper towel was removed, and the unit is no longer leaking.
- A staff member was assisting with a VHP decon setup in the BSL-4 suite when their hose became detached from their suit. The staff member immediately headed to the chemical shower and showered out to the suit room. Once there, they called to report the incident to the control room operator who contacted Health and Safety. The staff member noted that they were at the corridor of the suite at the time of the incident and there was no agent present. They also noted that they had completed a pressure test prior to using the suit. The staff member believes that the hose simply unscrewed from the suit due to frequent bending and movement in the suite. The suit was marked "out of service" and will be evaluated by Health and Safety and FMO.
- A staff member was prepping sharps containers for transport to the incinerator in the non-containment BSL-4 buffer corridor when a sharps container was temporarily tipped onto its side and a small amount of liquid spilled out. The sharps container had already been successfully autoclaved out of the BSL-3 suite. The spill was cleaned with bleach and the staff member was advised to keep sharps containers upright while moving them to prevent spills.
- A staff member working in an ABSL-2 laboratory reported an outer glove tear. The staff member believes that the tear was likely the result of repeatedly flicking a syringe containing an agent in the BSC. They called Health and Safety, washed their hands, and donned a new set of gloves. The staff member confirmed that their inner gloves remained intact.
- A staff member reported that a Class II BSC in the next door BSL-3 laboratory was in alarm.

During the month of October, ducted BSC's were found to be in alarm three different times. The alarms are due to fluctuations in the building's air handling. In each instance, after speaking with a member of Health and Safety, the staff member was permitted to enter the lab and clear the alarm.

- A staff member working in a BSL-3 laboratory reported that a heat block sparked upon being connected to a power source. The staff member immediately unplugged the heat block from the source and contacted Health and Safety. The cause of the spark is unknown, but the power cord was not frayed or wet. The heat block was VHP decontaminated out of the suite and discarded.
- A staff member working in a BSL-3 laboratory reported an outer glove tear. The staff member was unsure of the cause of the tear but had been working in the BSC for an extended amount of time. They called Health and Safety, washed their hands, and donned a new set of gloves. The staff member confirmed that their inner gloves remained intact.
- A staff member working in the BSC of a BSL-3 laboratory reported a spill of 5mL of ethanol solution onto an absorbent pad. The staff member cleaned the spill and continued their work.
- A staff member working in a BSL-3 laboratory noticed a "goo-like" liquid leaking from one of two items sitting in the BSC: a decontamination jug or a Styrofoam ice bucket. Both items were in the BSC after being decontaminated a few days earlier. Upon investigation, the leak was determined to be coming from the ice bucket, which had degraded from multiple decontaminations with bleach. The spill was cleaned up and the ice bucket was replaced with a new one.
- A staff member working in the BSC of a BSL-3 laboratory reported that a 2ml tube of uninfected cells leaked into the plastic bag they were being stored in. The bag was already in the BSC when the leak was discovered. The spill was cleaned in the BSC, and the items discarded.
- A staff member reported that they bumped their hand on an autoclave cart while walking through the BSL-4 hallway. After bumping the cart, the staff member noticed a cut on the outer glove of their suit at the cuff. They exited the BSL-4 suite, spoke to Health and Safety, and were permitted to re-enter the suite after replacing the gloves and retesting their BSL-4 suit.
- A staff member reported that their scrubs became wet upon exiting through the BSL-4 chemical shower. Upon further investigation, the staff member discovered that their zipper had not been fully closed during their time in the BSL-4 suite. The staff member had only been accessioning tubes and no agent was out during their time in containment.
- A staff member preparing to empty an autoclave noted that a decontamination jug was outside of a biohazardous waste bag and had no autoclave tape on it. During the incident investigation, the staff members that prepared the waste confirmed that the decontamination jug had been placed inside of a waste bag prior to being autoclaved. They deduced that either the bag was taped/shut too tightly, causing the pressure to pop the tape and open the bag; or the bag was taped too loosely, and contents of the bag shifted during the autoclave cycle and the jug fell out.
- Following a successfully completed autoclave cycle, an Environmental Operations (EO) staff member opened the autoclave and discovered paper towels and biohazard stickers scattered across the autoclave chamber floor. Upon investigation it was determined that the bag was taped/shut too tightly, causing the pressure to pop the tape off the bag. The bag was still intact, but the top was open. The LSM spoke to the group that prepared the waste and reminded them to loosely tape the bags to allow for steam exchange. The EO and FMO groups cleaned the autoclave.

- A member of EO opened an autoclave from the containment side to autoclave out linens when they discovered a bag of waste that had not been autoclaved. Health and Safety spoke to the individual responsible for placing the waste in the autoclave and reminded them that waste must be autoclaved once placed in the unit. The cycle was started by the member of EO.
- A staff member working in a BSL-2 laboratory reported a spill of roughly 15 mL of buffer on the benchtop. They were pouring the buffer into a hard-sided container from a 50 mL conical tube when some of the liquid splashed over the side. Most of this spill was absorbed by a diaper pad and there was no agent present. At the time of the spill, the staff member held their breath, left the room, and called Health and Safety. They were permitted to re-enter the room to clean up the remainder of the spill using absorbent material. The absorbent material was then bagged, labeled, and placed into the satellite accumulation point (SAP).
- A DHS guard staff member called the on-call Health and Safety member after-hours to report an alarm in a BSL-2 laboratory. The Health and Safety member returned to the NBACC to investigate the source of the alarm and discovered that the sash of the chemical fume hood was raised too high. The staff member cleared the alarm, lowered the sash, and notified the LSM of the issue.
- Two staff members were traveling back from a business trip when they were involved in a vehicular collision with another vehicle. Neither staff member sustained any injuries.
- A staff member working in the BSC of a BSL-2 laboratory reported that the cap from a flask containing buffer and mammalian cells fell out of the BSC and onto the floor. The staff member was unscrewing the cap when it fell off the flask, onto the BSC working surface, and then rolled onto the floor of the room. They held their breath, exited the room, and called Health and Safety. The staff member noted that the flask only contained media and cells during the time of the spill but that they had worked with agent in the BSC earlier. Prior to opening the flask, the vial of agent had been capped and both the vial and the working surface of the BSC had been appropriately disinfected. After speaking to a member of Health and Safety, the staff member was permitted to re-enter the room, pick up the cap, and disinfect the floor.
- A staff member working in a BSL-2 laboratory noticed a tear in their inner gloves (nitrile) shortly after removing their hands from the BSC. The staff member had finished deconning the BSC, removed their outer gloves, and was writing down information when they noticed the tear. The staff member confirmed that when they removed their hands from the BSC their gloves were intact. They believe they may have snagged their gloves on a cardboard box. The staff member washed their hands and donned a new pair of gloves.
- A staff member working in the BSC of a BSL-4 laboratory reported that a pen fell out of the BSC while they were spraying the cabinet down. They had been working with samples that did not contain agent. After the spill, the staff member remained hooked up to air and deconned the pen and area on the floor with a disinfectant/detergent. When reporting the spill to a member of Health and Safety, the staff member noted that they had no issues with their suit and gloves.

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), represented a CDC Form 3 submission, or a potentially serious accident or incident that could have resulted in personal injury, illness, death, and damage to property or the environment, but did not occur due to one or more factors.

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

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All research was conducted in compliance with the Animal Welfare Act and other federal statutes and regulations relating to animals and experiments involving animals and adheres to principles stated in the Guide for the Care and Use of Laboratory Animals, and approved by both the NBACC Institutional Animal Care and Use Committee and, when applicable, the DHS Compliance and Assurance Program Office. The facility where this research was conducted is fully accredited by AAALAC International and maintains a Public Health Service (PHS) Humane Care and Use of Laboratory Animals (Policy) assurance.