



Lessons Learned & Success Stories – March to May 2020

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. Comparative Medicine implemented a process improvement to prevent inadvertent door closures. In an October 2019 incident, the elevator currently in use by Comp Med was easily overridden when the 1st floor button was pressed allowing it to open on the non-vivarium side. The Comp Med staff did not have time to remove their personal protective equipment (PPE) and get on the elevator before the door closed. To prevent the elevator from being called to other floors while in use by Comp Med, a key to lock the elevator was obtained by coordinating with facilities, and will be placed in a lock box for future use.
2. Over the last few months, there have been a number of spills involving plates and microscopes. To address this issue, staff members have designed and fabricated a stage tray for microscopes. In addition to 96-well plates, the stage tray will accommodate roller bottles. The raised sides of the tray allow the researcher to manipulate their plate or roller bottle without accidentally pushing them off of the microscope stage and causing a spill.
3. A staff member suggested replacing the fabric locker key leashes with plastic ones so that they can be cleaned. Upon receiving this suggestion, plastic key chains were ordered and have begun to replace the fabric ones. This improvement will help to reduce the spread of COVID-19 and is another example of how BNBI staff continue to take steps to keep each other and out communities safe from this virus.

LESSONS LEARNED

1. In order to help preserve personal, family and your co-workers' health, you should be especially mindful of your surroundings during these particularly difficult times. Take an extra moment in your day to wipe down door knobs, coffee pot handles, and other surface areas which others may come in contact with. Another example of being proactive is when you've placed a helpdesk ticket and are awaiting a personalized response - Clorox your keyboard and telephone keypad **before** their arrival, to avoid potential cross contamination of surfaces. Remember, action today can prevent a crisis tomorrow. ~ *Steve Shallenberger*
2. Many of the NBACC functional groups are operating on altered work schedules and frequently working from home these days. It can be difficult to know who to contact and when a particular staff member will be onsite. Email is the best form of communication. Remember that staff on-site are

often spending significant amounts of time in the lab or dealing with other issues. They may not be immediately accessible or respond quickly as their attention is dedicated to other tasks. For the at home worker, communication and patience is critical. Plan ahead and allow for extra time if additional support or assistance is required to complete an assignment.

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.

- 02/28/2020 - A staff member cut their thumb on the serrated edge of a packing tape dispenser.
- 02/11/2020 - A staff member that was leaving a Biosafety Level-2 (BSL-2) laboratory to discard cardboard slipped and fell on the floor of a recently mopped hallway.
- 03/10/2020 - A staff member that was working in a BSL-3 suite noticed a cut on the knuckle of their right hand. The staff member believes the injury occurred when they retrieved a paper towel from a Wypall box after washing their hands.
- 03/18/2020 - A staff member working in an interstitial space struck their hand with a hammer when making a gasket; a process that involves holding the gasket maker in place and striking it with a hammer to cut out the gasket.
- 04/20/2020 - A staff member was loosening a locking ring on a HEPA filter casing of a glovebox when they scraped their left hand on the retaining clip.

NEAR MISS SUMMARIES

1. **SPILL SUMMARY:** 02/04/2020 - A staff member working in a BSL-3 laboratory noticed a small amount of dried blood on the tie-string of their outer lab coat. Upon closer inspection, the staff member also noticed a small drop of dried blood inside the Biosafety Cabinet (BSC) near the front of the unit. The employee's work included serial diluting and plating blood, serum and tissue samples that had been exposed to a Risk Group (RG) 3 agent. The staff member disposed of their outer lab coat and called Health and Safety from the laboratory. Three other employees were present in the room at the time of the incident. The staff were instructed to leave the room and wait the required 30 minutes before reentering the room. After the 30 minutes, the staff member that reported the spill was permitted to enter the room in an Assigned Protection Factor (APF) 1000 Powered Air-Purifying Respirator (PAPR) to clean up the BSC. During their discussion with the Health and Safety member, the employees admitted that they did not recognize the event as a spill because the blood was dried. The staff members also believe that the spill was due to a small amount of blood in the cap of one of the sample tubes that was expelled when the tube was uncapped in the BSC. Based on the fact that the BSC was working properly and there was no breach in the PPE of the staff members in the room, the CMA ruled no potential exposure. Staff later confirmed with Health and Safety that the samples all tested negative for agent.
2. **SPILL AND PPE FAILURE SUMMARY:** 02/11/2020 - A staff member working in the BSC of a BSL-2 laboratory was scoring a small glass ampule of a RG1 agent when the top portion of the ampule shattered, causing a tear in their outer glove. A small amount of material from the vial spilled onto the paper towel and absorbent bench pad that the staff member used to shield their fingers while they held the ampule. Once the ampule broke, the staff member immediately stopped their work, inspected their gloves for tears and noticed a small tear in the middle finger of their right outer glove. The employee removed their outer gloves, withdrew from the BSC and performed a leak test on their inner gloves. After speaking to a member of Health and Safety and confirming that their inner gloves

had remained intact, the staff member was permitted to clean up the BSC and continue their work. The CMA ruled no potential exposure.

3. **PROCEDURAL FAILURE SUMMARY:** 02/11/2020 - A staff member informed a member of Health and Safety that an autoclave run they had initiated the day before was run incorrectly. A single bag of BSL-3 waste containing unknown samples from a proficiency test, with less than 6mL of liquid, was autoclaved. The waste was run on a liquid cycle, but the autoclave's load probe was not inserted into water prior to initiating the cycle. As a result, the autoclave began the kill portion of the cycle earlier than it would have if the load probe had been sensing the temperature of water inside of the autoclave. Typically, the heat-up time for a properly set-up liquid cycle is around 30-45 minutes, followed by a 120 minute kill time. In this run, the heat-up time was less than 1 minute, followed by the normal 120 minute kill time. The autoclave recognized the cycle as "completed" since the kill time had been achieved. The waste was removed from the autoclave on the same morning that the staff member reported their error and was transferred to a waste storage container outside of the loading dock, to await pick-up and transportation to the incinerator. Once Health and Safety became aware of the issue, the waste was transported back to the autoclave and run on a correctly set-up liquid cycle. Due to the small amount of liquid present in the bag and the fact that the autoclave achieved proper temperature and pressure for a full 120 minutes, the CMA ruled no potential exposure.
4. **PPE FAILURE SUMMARY:** 02/12/2020 - A staff member that had been working in the BSL-4 laboratory was exiting through the chemical shower when their leg became wet with MicroChem Plus during the decon cycle. Upon further inspection, the staff member noticed that their zipper had snagged on the zipper flap of the suit in a way that prevented the suit from sealing entirely. The staff member had been performing a check of animals that had been exposed to a RG4 agent, but none of the animals were removed from their primary containment caging during the staff member's time in the suite. The staff member experienced no other problems with their suit, and there were no spills of agent or agent outside of containment during their time in the suite. A reminder was sent to BSL-4 users to always ensure that their suit is fully sealed prior to entering the BSL-4. The CMA ruled no potential exposure.
5. **PPE FAILURE SUMMARY:** 02/21/2020 - A staff member working in the BSL-4 was exiting through the chemical shower when they noticed that their right elbow was wet. Upon exiting the shower and examining the suit, the staff member could not find an apparent defect in the suit (Dover #254) but placed it out of service to be evaluated and repaired. The staff member had been doing animal checks and noted that there were no spills or issues with their suit during their time in the suite. After further testing of the suit by another staff member, a pinhole was discovered, and the suit was retired. The CMA ruled no potential exposure.
6. **PROCEDURAL FAILURE SUMMARY:** 02/25/2020 - A staff member that had been working in the BSL-4 laboratory was exiting the chemical shower and taking off their suit when they noticed that they had not been wearing a pair of inner gloves during their time in containment. The staff member had entered the suite to join two additional staff members and, during their rush, failed to don their inner gloves before putting on their suit. The staff member reported the oversight to the control room operator once they entered the suit room. After speaking with a member of Health and Safety, the staff member reported that their work involved reading plates that contained agent, but that they had not worked in the BSC with any agent. The staff member also confirmed that there were no glove tears or other issues with their PPE during their time in the suit. The staff member exited the suit room without testing the outer gloves of the suit, so Health and Safety requested another staff member to check the integrity of the gloves. That staff member confirmed that there were no leaks

or issues with the outer gloves on the suit. The staff member, their supervisor and Health and Safety met to discuss the incident and ways to reduce the likelihood of a reoccurrence. The CMA ruled no potential exposure.

7. **SPILL SUMMARY:** 03/02/2020 - A staff member working in a BSL-3 laboratory was organizing chemicals, when they picked up a bagged bottle and rested it on their knee. The staff member immediately felt their knee become wet and noticed that there was liquid leaking from the bag. The staff member immediately placed the bagged bottle back into the container and called the Command Center to request Health and Safety. The bottle inside the bag contained methanol, MicroChem Plus and an inactivated RG2 agent. The staff member was instructed to flush the area of their scrubs with water for 5 minutes and then don a new pair of scrubs in the change room. While the staff member changed their scrubs, Health and Safety requested the waste generator return to the suite to clean the spill and transfer the contents of the bottle to a new, intact container. Upon transferring the contents, the staff member noted that the compromised bottle had a large physical crack. The CMA ruled no potential exposure.
8. **SPILL SUMMARY:** 03/03/2020 - A staff member working in the BSC of a BSL-4 laboratory was removing the supernatant from a tube that contained blood infected with a RG4 agent, when they stuck their serological pipette too far down in the tube which pushed the contents of the tube out. Approximately 1mL of supernatant spilled onto the absorbent pad in the BSC. The staff member cleaned the spill and reported the incident to the control room operator, who contacted Health and Safety. The CMA ruled no potential exposure.
9. **SPILL SUMMARY:** 03/13/2020 - A staff member working in the BSC of a BSL-3 laboratory was decontaminating a stack of 96-well plates, when they jostled the plates and liquid spilled outside of the BSC and onto their lab coat. The plates contained bleach and a RG3 agent, however the full contact time had not been reached at the time of the spill. The staff member removed their lab coat and in the process saturated their scrubs with the liquid. The employee exited the room, changed their scrubs and re-entered the room. There was another staff member that was present during the spill, but they did not exit the room. Once the first employee re-entered the lab, they contacted the Command Center and requested to speak to Health and Safety. The Health and Safety member instructed both staff members to exit the laboratory and wait 30 minutes before re-entering the room. As a result of this incident, the Biosafety Officer (BSO) met with the group and their supervisor to reiterate expectations involving spill response and near-miss reporting. The CMA ruled no potential exposure.
10. **PPE FAILURE SUMMARY:** 03/16/2020 - A staff member reported that while working in a BSL-3 laboratory, their waterproof bandage partially came off when they removed their gloves prior to exiting the lab. The staff member had no issues with their gloves (or the bandage) during their work in the laboratory, which included decontamination waste and handling plates of RG2 and 3 agents, respectively. The staff member washed their hands, left the suite and reported to the CMAs. They also stated that on their way out of the suite, they kept the bandage on their finger until they entered the dirty side of the change room and showered out. The CMA ruled no potential exposure.
11. **PPE FAILURE SUMMARY:** 03/27/2020 - A staff member reported that while working in a BSL-3 laboratory, their waterproof bandage came off when they removed their gloves prior to exiting the lab. The staff member had no issues with their gloves (or the bandage) during their work in the laboratory, which included work with a RG3 agent. The CMAs would like to remind staff that their skin should be free from oils and lotions for bandages to adhere properly. Additionally, if the bandage is

located on a joint, it should wrap around your finger so that the edges of the bandage adhere to itself. The CMA ruled no potential exposure.

12. **SPILL SUMMARY:** 03/28/2020 - A staff member working in a BSL-3 laboratory reported that they were aliquoting a tube of a RG3 agent when they jostled the tube, and less than 100µl of liquid exited the tube and landed on the BSC and on their lab coat. Unaware that liquid had landed on their lab coat, the staff member immediately began to clean the BSC with MicroChem Plus. After a few seconds, the staff member noticed the wet spot on their lab coat. They immediately sprayed it with MicroChem Plus, discarded the lab coat, and informed the other staff member in the room of the spill. They then noticed a small wet spot on their scrubs. Unsure of whether the spot was from the MicroChem Plus that they had sprayed on their lab coat or agent that soaked through the lab coat, the staff member sprayed their scrubs with bleach and both lab members exited the lab. The staff member immediately headed to the dirty side change room, where they cut their scrubs off, and discarded them into the biohazard waste container. While the staff member was removing their scrubs in the change room, the other staff member placarded the room and documented the time of permitted reentry. The bag of biohazard waste containing the soiled scrubs was taped and pulled into the suite to be autoclaved. They called the Command Center from the change room and spoke to Health and Safety. After showering out, the staff member was permitted to don fresh scrubs and re-enter containment. Both staff members were allowed to return to the room to continue their work after the required 30 minute wait time had elapsed. The CMA ruled no potential exposure.
13. **PROCEDURAL FAILURE SUMMARY:** 03/30/2020 - A staff member working in a BSL-3 laboratory was reading 96-well plates on a microscope. When they picked up the next plate in their stack, the bottom of that plate stuck to the lid of the plate underneath it and lifted the lid off of the plate. The plates contained a RG3 agent. The staff member immediately noticed the missing lid, held their breath and sat the lid back down on the plate. The staff member then doffed their lab coat and gloves and washed their hands before exiting the lab. Once outside of the lab, they called the Command Center and requested to speak to Health and Safety. The staff member was permitted to return to the laboratory and finish their work. The CMA ruled no potential exposure.
14. **SPILL SUMMARY:** 04/20/2020 - A staff member was working in a BSL-3 suite when they noticed water leaking from an autoclave chamber. The autoclave had accumulated water as it sat idle from its last successful run earlier in the week. When the staff member opened the chamber, a significant amount of water leaked onto the floor. Roughly 1 liter of water ran through the containment wall and into a storage room and mechanical space. The employee contacted a member of Health and Safety who cleared the buffer corridor of staff members and cleaned the spill and decontaminated the area with 10% bleach for 30 minutes. Despite the chamber and the water being clean at the time of the spill, the Health and Safety member donned a Tyvek suit and PAPR before beginning the clean-up process. The CMA ruled no potential exposure. While the cause of the autoclave leak is still being investigated, staff are reminded not to leave successfully autoclaved waste sitting in the autoclave chamber for more than a day.
15. **SPILL SUMMARY:** 04/30/2020 - A staff member working in the BSC of a BSL-3 laboratory was decontaminating plates containing a RG3 agent when they mishandled one of the plates and caused roughly 0.5-1mL of liquid to spill onto the surface of the BSC. The entire spill remained inside the BSC. The staff member contacted the Command Center and, after speaking to a member of Health and Safety, cleaned the spill and resumed their work. The CMA ruled no potential exposure.

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.

This work was funded under Agreement No. HSHQDC-15-C-00064 awarded to Battelle National Biodefense Institute by the Department of Homeland Security (DHS) Science and Technology (S&T) Directorate for the management and operation of the National Biodefense Analysis and Countermeasures Center, a Federally Funded Research and Development Center. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of DHS or the U.S. Government. The DHS does not endorse any products or commercial services mentioned in this presentation. In no event shall the DHS, BNBI or NBACC have any responsibility or liability for any use, misuse, inability to use, or reliance upon the information contained herein. In addition, no warranty of fitness for a particular purpose, merchantability, accuracy or adequacy is provided regarding the contents of this document.