



Lessons Learned & Success Stories – December 2016 to February 2017 Report

The NBACC 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 STORIES:

1. A Principal Investigator (PI) designed an experiment themselves to determine if cells that had been infected with a risk group 2 virus and inactivated by acetone-fixation were still infectious. Laboratory staff scraped infected cells from an acetone-fixed slide into fresh cell culture and incubated the cells to allow potential growth of the virus. The virus in question grew to significant titers, despite presumed inactivation by acetone fixation following an approved SOP. The experiment now casts doubt on the reliability that acetone fixation inactivates virus during slide preparations. The PI proposed a solution that, with other options, will be evaluated by Safety to protect staff from exposures to potentially infectious virus particles when using a microscope on the benchtop.
2. During a review of the certification records, a staff member discovered and then reported that a Class III BSC had passed its annual certification, however the procedure to establish a rate of pressure decay (an internal requirement) had not been conducted according to the NBACC SOP. The procedure in the SOP is under investigation for improvements and clarification.
3. A DHS contractor reported that the cover of an ice machine in a kitchen area had not been closed on several occasions. The FDA classifies ice as a food product, and any ice making machines must be kept to temperature and immaculately clean. A communication was sent to all staff reminding them of the importance and health benefits of keeping the ice lid closed.
4. A staff member reported that the tip weld on a 5mL serological pipet had failed, which created a leak in the pipet tip. The staff member had seen similar failures at other institutions with the same pipet manufacturer, and suggested an alternative product for use in the lab.

LESSONS LEARNED:

1. Standard Operating Procedures (SOPs) are meant to be a written set of instructions that document daily operations and procedures or repetitive activities followed by NBACC. Failure to comply with SOPs may contribute to potential safety hazards and experimental deviation and/or error. In some cases, failure to comply may have no result or cause nothing harmful. Careful review and update of SOPs is a critical role of every employee. If you encounter an SOP that has error or confusing information, take the opportunity to initiate the change for the better. When we follow SOP’s we are engaged in making the SOP the best it can be and it helps each of us to perform at a high level of quality and consistency

2. Risk Assessments and SOPs are tools that make it possible for us to do our jobs safely and to the highest standards of good science. It is mandatory that all staff working on a project take the time to read and understand the risk assessments and SOPs for each procedure that is being performed, not only to refresh all the details of each procedure and to keep themselves safe, but to ensure that all staff are following the specific details that are unique to working at NBACC. Work in high security, high containment labs is complex and requires great attention to detail. Take the time to make sure that all staff members involved are following every one of the procedures required.
3. There are times during the course of the day that you might help a co-worker perform a task outside of your normal responsibilities. Much of the time this is welcome and encouraged. However, when performing tasks outside of your normal responsibilities, it is imperative to be aware of tasks you are authorized to perform and those you are not. Even though you may have good intentions, performing an unfamiliar task can create additional problems if you are unaware of the proper procedure or are not authorized to perform that procedure. This can inadvertently cause serious problems or endanger staff members or yourself.
4. Signs are critical tools here at the NBACC, whether they are found in containment, mechanical or administrative areas. They inform about a range of situations from meetings in progress to the PPE requirements to enter specific areas. It is easy to become complacent about signs that are in areas we routinely enter, but it is important that we take notice of signage and follow those postings. Several near misses in the Lessons Learned this month could have been avoided with observance of signage, such as entry into an unauthorized area or removing jewelry before entering the containment laboratory. These are examples of being complacent to the signage that we routinely see. It is important to be aware of complacency and try to improve awareness of signage around the NBACC.

EVENT SUMMARIES:

1. **OSHA RECORDABLE INJURY SUMMARY:** 11/07/2016; A staff member scraped the knuckles of both hands while trying to pull apart two pieces of a Nalgene hard sided transport container that were stuck together. The CMA examined the wound, applied first aid, and restricted the staff member from BSL-3 containment for three (3) days.
2. **FIRST AID SUMMARY:** 11/17/2016; A staff member broke off one of their fingernails, causing a finger to bleed, while stacking laundry in the Vivarium. The CMA examined the wound and applied first aid. No work restrictions resulted from the event.
3. **FIRST AID SUMMARY:** 12/07/2016; A staff member cut their hand on the sharp edge of a metal autoclave cart in the BSL-4 buffer corridor. The CMA examined the wound, applied first aid, and the staff member returned to work without restriction.
4. **FIRST AID SUMMARY:** 12/08/2016; A staff member sustained bruising injuries when a change room door closed on their hand. The CMA examined the injuries, applied first aid, and the staff member returned to work without restriction.
5. **FIRST AID SUMMARY:** 01/09/2017; A staff member bumped their arm and abraded their skin on a Class III BSC valve. The CMA determined that there was no open wound, and the staff member returned to work without restriction.
6. **FIRST AID SUMMARY:** 01/31/2017; A staff member pinched their finger in a compressed gas storage cage while wearing appropriate gloves. No work restrictions resulted from the injury

NEAR MISS SUMMARIES:

1. **LAB PROCESS FAILURE SUMMARY:** 11/1/2016; A staff member carried vials of sterile buffer in an unsealed zip-top bag through a laboratory hallway and the bag tipped, and several vials dropped in the hallway due to a small opening in the Ziploc secondary container. The staff member picked up multiple fallen vials and continued with work. The following day, a different staff member stepped on an unlabeled vial in the hallway, breaking the vial, and reported a spill of unknown material. An investigation by Safety determined that the unlabeled vial broken in the hallway originated from the bag of sterile buffer vials spilled the day before. The staff member who dropped the vials was retrained on the necessity of labeling and transporting vials in a closed secondary container regardless of whether the material is infectious or not. The lab workers have the option of using a sealed hard-sided transport container (as opposed to the Ziploc bag) for the transport of vials.
2. **LAB PROCESS FAILURE SUMMARY:** 11/3/2016; A staff member broke a sealed microscope slide (fresh wet mount) containing a 2 μ l drop of risk group 3 agent under oil immersion. The staff member mistakenly drove the objective lens down into the cover slip and the slide and both cracked. The CMA ruled negligible risk of exposure and negligible risk of disease. Per CDC guidance, the staff member was put on a 21 day fever watch, but did not develop symptoms of disease.
3. **LAB PROCESS FAILURE SUMMARY:** 11/10/2016; A staff member discovered that the respiratory protection requirements outlined in Risk Assessment (RA) were not being followed. A CAPA was established to address several corrective actions:
 - A representative from Health and Safety will attend meetings prior to the start of the project where the risk assessment(s) is discussed to ensure that controls are effectively in place and that project staff members are familiar with the PPE requirements and other safety controls for all project phases.
 - A schedule of post-approval monitoring will be established by the BSO for all project risk assessments.
 - The Principal Investigators will propose an improved risk assessment format for consideration that will highlight the engineering and administrative controls that are used in the RA.
4. **EQUIPMENT FAILURE SUMMARY:** 11/14/2016; A staff member reported that a BSL-3 autoclave failed its sterilization cycle due to a load probe failure. The cycle was run again and the material was successfully sterilized. The following corrective actions were taken:
 - The load probe was replaced, tested and put back into service.
 - A new cycle was programmed into the autoclave that will allow the autoclave technician to bypass the load probe and create an identical or longer cycle times for future failures.
 - The new cycle is password protected by the autoclave technician.
 - All failed autoclave cycles must be inspected by a member of Health and Safety, and the follow-up action approved before the non-containment autoclave door is opened.
5. **EQUIPMENT FAILURE SUMMARY:** 11/22/2016; A staff member reported that a reheat supply was leaking clean water in an interstitial space. The water was mopped up, and the union on the reheat unit was tightened.
6. **EQUIPMENT FAILURE SUMMARY:** 11/29/2016; During inventory a staff member found several cryovials containing toxins that had cracked caps. The vials were from a subcontractor and stored in sealed secondary containment conical tubes. The contents of the cryovials were transferred into new cryovials, placed back into new secondary conical tubes, and returned to storage.

7. **LAB PROCESS FAILURE SUMMARY:** 12/01/2016; A staff member reported that an autoclave failed its cycle due to a load probe failure (probe not in water). The cycle was run again with an extended heat up time and kill time in order to ensure adequate sterilization. A Health and Safety staff member confirmed that the cycle was successful, and the load was removed. The lab staff were retrained on autoclave use.
8. **EQUIPMENT FAILURE SUMMARY:** 12/02/2016; A staff member upset a thermometer and its bottle housing in a laboratory refrigerator. A small amount of propylene glycol spilled on the staff member, and onto the floor of the lab. The spill was reported to the CMA and the staff member washed the material off themselves and cleaned up the material on the floor, following proper spill procedures.
9. **LAB PROCESS FAILURE SUMMARY:** 12/06/2016; A staff member reported that an autoclave failed its cycle due to a load probe failure (probe not in water). The cycle was run again with an extended heat up time and kill time in order to ensure adequate sterilization. A Health and Safety staff member confirmed that the cycle was successful, and the load was removed. The lab staff were retrained on autoclave use.
10. **LAB PROCESS FAILURE SUMMARY:** 12/09/2016; An unauthorized staff member removed a HEPA filter from a Class III BSC without respiratory protection (although a successful VHP decontamination had been performed on the HEPA filters, RPE is still required to remove them). The staff member was retrained to contact FMO for the replacement of HEPA filters. The CMA ruled that this was not a potential exposure.
11. **LAB PROCESS FAILURE SUMMARY:** 12/14/2016; During routine surface sampling taken inside an NBACC BSL-3 laboratory, one out of 23 samples tested positive at very low levels for *Bacillus anthracis* contamination. As a result of the positive sample an additional 23 samples were taken inside the BSL-3 laboratory yielding four additional positive samples. No contamination was found near the BSL-3 exits, showers, door handles, or outside of BSL-3 containment. The CDC was notified, extensive surface decontamination was performed, and staff identified as having entered the area received medical evaluation resulting in a determination of a very low risk of exposure. All involved staff had been vaccinated against *Bacillus anthracis*, however, out of an abundance of caution, staff are performing self-monitoring for 10 days. Laboratory protocols are being reviewed to identify any process improvements and minimize the possibility of recurrence.
Update: After the 10 day fever watch, the staff members did not develop signs or symptoms of disease
12. **EQUIPMENT FAILURE SUMMARY:** 12/14/2016; A staff member reported a spill of acid wash in the animal support area. The spill was reported to the Chemical Hygiene Officer and the material was cleaned up. The cause of the spill was a failed peristaltic pump switch which was replaced.
13. **LAB PROCESS FAILURE SUMMARY:** 12/20/2016; A staff member mistakenly entered BSL-3 containment while wearing jewelry. The jewelry was surface decontaminated and removed from containment.
14. **LAB PROCESS FAILURE SUMMARY:** 12/21/2016; A staff member mistakenly walked across the line of containment into the dirty side of a BSL-3 change room without authorized access, and then walked back to the clean side without taking a personal shower. The employee was retrained on

proper entry and exit procedures for BSL-3. The employee took a shower and the floor of the clean side change room was mopped with bleach.

15. **EQUIPMENT FAILURE SUMMARY**; 12/21/2016; An autoclave failed its cycle due to a load probe failure. The cycle was run again with an extended heat up time and kill time in order to ensure adequate sterilization. A Health and Safety staff member confirmed that the cycle was successful, and the load was removed. The load probe was replaced.
16. **LAB PROCESS FAILURE SUMMARY**; 12/27/2016; A staff member mistakenly entered BSL-3 containment while wearing jewelry. The jewelry was surface decontaminated and removed from containment.
17. **LAB PROCESS FAILURE SUMMARY**; 12/28/2016; A UPS device was removed from a BSL-3 room (into another BSL-3 area) without proper VHP decontamination documentation. The UPS device was scheduled to be decontaminated again.
18. **EQUIPMENT FAILURE SUMMARY**; 12/29/2016; A staff member reported that a 1 L Nalgene bleach bucket leaked a small amount (1 mL) of bleach solution into a BSC. The solution was cleaned up and the bucket was replaced.
19. **LAB PROCESS FAILURE SUMMARY**; 01/09/2017; A staff member reported that they mistakenly wore jewelry into the BSL-3; they noticed the mistake immediately upon entering in the containment side change room. The jewelry was surface decontaminated and removed from the suite.
20. **LAB PROCESS FAILURE SUMMARY**; 01/11/2017; A staff member dropped a glass microscope slide (fixed material) in BSL-3 containing a risk group (RG) 2 agent which resulted in a corner of the slide breaking off. Although the "subject area" of the slide was not affected by the break, the CMA was notified and agreed that a potential exposure determination was unnecessary. The glass was cleaned up with forceps.
21. **LAB PROCESS FAILURE SUMMARY**; 01/12/2017; A staff member broke a commercially prepared (fixed) microscope slide in half under the high power objective; the microscope slide contained RG 2 agents. A refresher training program on microscope procedures was established through the microscopy PI for all NBFAC technicians.
22. **LAB PROCESS FAILURE SUMMARY**; 01/24/2017; A towel was found to be draped over the curtain rod over the boundary of containment in a BSL-3 change room. The LSM was notified of the issue and the towel was autoclaved out of the suite.
23. **PPE FAILURE SUMMARY**; 01/24/2017; A staff member noticed that an inner nitrile glove tore during a BSC cleaning (no infectious material present) in a BSL-3 laboratory. It is unclear if the inner glove tore during infectious operations or during the BSC final wipe down with IPA, when only one pair of gloves were worn. The CMA ruled no potential exposure.