



Biosafety Officers, Behavioral Compliance Strategies, and Their Effects on Laboratory Practices

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Introduction

What is the role of a biosafety officer? In our opinion, the role of a biosafety officer is to ensure containment of laboratories and minimize the likelihood of biological exposure to laboratory workers, those working in the laboratory building, their families, and the community-at-large. This role comes with underestimated complexities.

Good laboratory practices are a basic tenet of biosafety programs and, as such, biosafety officers may need to become behavioral specialists who motivate the wide range of personalities working in the laboratory to follow and adhere to safe laboratory practice recommendations. This can be a frustrating, possibly career ending problem for many biosafety officers today.

Standard Operating Procedures and Good Laboratory Behavior

How do we motivate people to do what they know they are supposed to do? Biosafety officers need to ensure that the behaviors being requested can actually be carried out. Based on our experience, a majority of standard operating procedures (SOPs) have been adapted, but are impossible for laboratory staff to successfully demonstrate. The desired behaviors should be detailed by providing a list of behaviors that laboratory staff will be asked to follow. Typically, a SOP will direct laboratory staff to follow a procedure, which can be interpreted differently when another laboratory staff reads the same SOP. For example, during a spill, the SOP may require laboratory staff to call someone; if that person has not been identified, the organization does not have a standard for reporting a spill. SOPs ensure that multiple laboratory staff with different backgrounds can demonstrate the same behavior with little or no variation.

Adherence to SOPs over a period of time is a sustained behavior, which requires many factors to be successful (Figure 1). For example, a SOP for sharps disposal in sharps containers (readers can substitute any behavior for this example). Several things are needed for this behavior to occur. Individuals need to understand the risks associated with not following the SOP (needle sticks, pos-

sible exposure to infectious agents), and the benefits of following the SOP (personnel protection). Writing an SOP and asking laboratory staff to follow it is an incomplete strategy for increasing and sustaining safe laboratory behaviors. Individuals must understand why they are being asked to participate in specific behaviors. Biosafety officers should consider facilitating a risk/benefit session for the most important SOPs, and providing information and involving staff in the development and delivery of the final SOP.

After understanding the risks of not following the SOP, and the benefits of following the SOP, biosafety officers should ensure that laboratory staff has the resources needed to practice the SOP. For example, if a SOP calls for sharps to be disposed of in sharps containers, and there are no sharp containers around, sharps will be disposed of improperly. Laboratory staff must have access to what is needed to follow SOPs. If laboratory staff doesn't have the necessary equipment to follow the SOP, and are expected to complete a task, they will complete the task without following the SOP. Biosafety officers should frequently ask laboratory staff about resources available to them and what items they need to increase the likelihood of SOP adherence. If these resources can be acquired by the biosafety officer and made available to laboratory staff, bridges will be built that will enhance cooperation and SOP compliance. Unfortunately, just knowing the risks and benefits, and having adequate resources is not enough to sustain good laboratory behavior and SOP adherence.

Skill-based training must be also provided to laboratory staff. Using the same example, if someone is asked to dispose of sharps properly with only a written SOP for guidance, individual skills are not being evaluated, or developed and bad habits may begin to develop. Ensuring proper waste disposal by asking individuals to demonstrate appropriate behavior in ideal and less than ideal (meaning laboratory staff are placed in a situation where sharps containers are not present) situations is an important aspect of behavioral capability. Laboratory staff must be effectively trained, and asked to demonstrate the skills needed, and practice critical thinking skills, to ensure an increased likelihood of safe laboratory behavior. Even

Figure 1

Standard Operating Procedures (SOPs) are behaviors which must be sustained throughout all laboratory practices. For sustained behavior to occur, individuals must:

- 1) Understand risk associated with not following the SOP.**
- 2) Understand benefit associated with following the SOP.**
- 3) Have the skills to adhere to the SOP.**
- 4) Have the resources needed to adhere to the SOP.**
- 5) Have the belief in personal ability to adhere to the SOP.**

Poor laboratory practices will occur even when SOPs are in place if all five factors have not been provided. Furthermore, if individuals are expected to follow SOPs and are not provided with the factors listed above—work anxiety and frustration with safety professionals begins to occur.

more importantly, laboratory staff must feel supported by leadership, be successful in behavioral demonstration, and be reinforced in these behaviors, or the final ingredient needed to sustain good laboratory behavior is missing. Laboratory staff must believe they can successfully participate in good laboratory behavior without failing, or being judged inappropriately. Biosafety officers can offer training beyond lectures and move toward providing training. This provides laboratory staff with a sense of accomplishment and ensures the demonstration of the behavior needed to successfully participate in the SOP.

Again, the biosafety officer serves to increase the likelihood that laboratory staff moves from knowing what they are supposed to be doing to actually doing it. The implications of how biosafety officers address behavioral compliance within the laboratory are significant and can determine the success or failure for a biosafety officer.

Involving Biosafety Officers and Behavioral Compliance

Biosafety officers should consider making themselves accessible and seen by laboratory staff on a frequent basis and with no other purpose than offering assistance and checking in. If a biosafety officer is viewed in an adversarial light, a psychological association between the biosafety officer and laboratory staff begins to develop, and a conditioned response of anxiety and dread begins to occur. For example, if a biosafety officer is only available when there is a problem, laboratory staff may experience feelings of anxiety and concern caused by the problem. After repeated problems, these feelings become paired with the biosafety officer. Once this happens, the presence of the biosafety officer begins to elicit feelings of anxiety and concern, causing a mental “noise” and making it extremely difficult for biosafety officers to operate outside of responding to a problem. Unfortunately, many biosafety officers only appear when there is a problem, and the association becomes very strong, resulting in greater difficulty when carrying out the multiple roles and re-

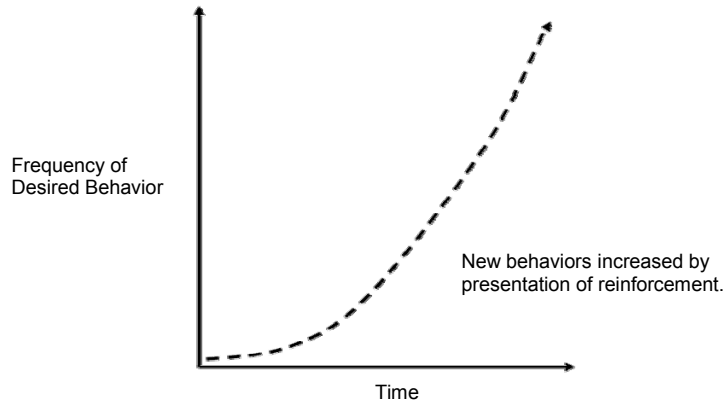
sponsibilities of the biosafety officer. Therefore, biosafety officers should not be accessible only when something goes wrong. They should consider frequently walking the halls and interacting with laboratory staff. This will break the association between the biosafety officer and negative circumstances, and allow the biosafety officer to be more than someone who just mitigates problems.

Many biosafety officers utilize punishment as a means of consequence for failure to adhere to SOPs. A closer look at punishment produces the following conclusions. Punishment decreases the frequency of behavior over time (Figure 2). If a biosafety officer chooses to use punishment, it is only effective when the negative stimulus (biosafety officer in this case) is present, but does little to change behavioral practices when the biosafety officer is not present. For example, speeding (behavior) on the freeway is reduced when a police officer (negative stimulus) enters the freeway. Once the officer leaves the freeway, the behavior returns to where it was prior to the negative stimulus being presented. In short, punishment suppresses behavior, but does not teach new behavior. Additionally, for successful punishment to occur, the negative stimulus must be presented consistently, immediately, and clearly, following the behavior. Biosafety officers typically don't have the time and resources to manage behavior using this principle. Therefore, punishment for failure to comply with good laboratory practices only suppresses the behavior when the biosafety officer is around. They should consider utilizing reinforcement strategies to increase the likelihood of behavioral compliance.

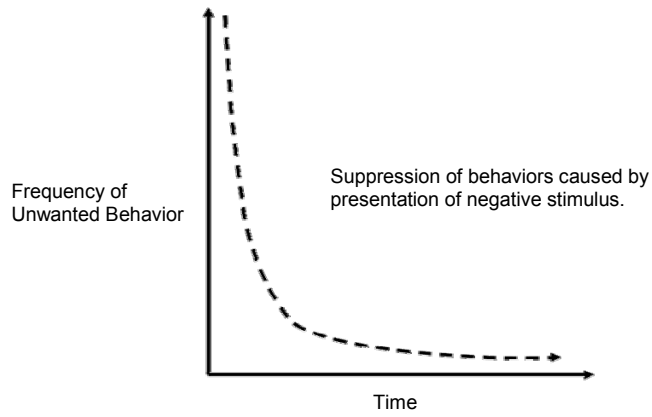
Laboratory staff has a choice to make when facing an issue. They can decide whether or not to involve the biosafety officer in the issue. If the biosafety officer is an enforcer who has become associated with negative stimuli, when the laboratory staff encounters an issue, exposure, or problem; they will be more likely to avoid the biosafety officer. To do so is unacceptable (as this is when the biosafety officer is most needed); however, this is under-

Figure 2

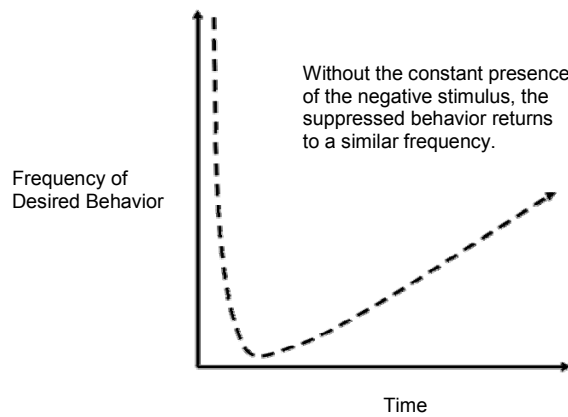
Reinforcement of Good Laboratory Practices



Punishment of Bad Laboratory Practices



Punishment without Presence of Negative Stimulus



standable if the biosafety officer has provided nothing but headaches for all of the staff involved. Instead of presenting a negative stimulus (punishment), biosafety officers should consider presenting an opportunity (reinforcement). When a problem occurs, new solutions are required to respond and prevent the problem from reoccurring. The biosafety officer should work with laboratory staff to review what has happened and develop practical solutions to address the problem that will minimize the likelihood of the problem behavior happening again. This reinforces new behavior and forges a partnership of service between scientists and biosafety professionals.

Inevitably, positive association and reinforcement increases the likelihood that a biosafety officer will be utilized at the most critical point (accident, exposure, development of new SOP). Biosafety officers who utilize positive association and reinforcement provide little reasoning for exclusion when a laboratory issue occurs. Not only will laboratory staff be more likely to involve biosafety officers, they also may decide to adhere to SOPs as a common practice.

Laboratory Staff Attitudes

Behavior and choices can be addressed generally. However, dealing with laboratory staff attitudes is more personal and needs to be addressed individually. Laboratory staff members have different motivations, communicate differently, come from different backgrounds, and behave differently based on the attitudes they have developed as a result of their experiences. Simply stated, attitudes influence choices and behaviors. Attitudes cannot be generalized. This requires biosafety officers to deal with laboratory leaders on an individual basis. Biosafety officers must be prepared to assess the motivating forces of the individual scientists; failure to do so could lead to the biosafety officer unintentionally serving as a barrier to the scientist's motivation; thereby causing a negative attitude towards the biosafety officer and biosafety as a profession. Generally speaking, most scientists are independent, self-contained, and objective. They are problem-solvers and would much rather focus work than discuss it. Scientists tend to be resourceful and adaptable, are very logical, and may have difficulty dealing with interpersonal conflicts that require emotional sensitivity. They are realistic and practical and like to work alongside capable individuals. Scientists typically don't like to control people and prefer to be left alone to carry out their work. Understanding these individual characteristics will assist biosafety officers when communicating and interacting with scientists.

Biosafety officers can influence the attitude of scientists by how they communicate. Biosafety officers should ensure that the recommendations being put forward are realistic, practical, and workable. Scientists like

action more than discussion so biosafety officers should limit discussions that produce little or no action. Biosafety officers should not focus on enforcing the rules, but rather supporting scientists and developing practical solutions for ensuring safe laboratory practices. Biosafety officers must be clear about the expectations being asked of scientists. They should attempt to stay away from emotional appeals, vague generalizations, and instead, base their appeals on logic, and provide detailed examples of the issues being discussed. Biosafety officers can begin to shape attitude by asking scientists for help in problem solving and integrating a logical basis for SOP development, while still allowing them to focus on their work.

Conclusion

One of the many roles of a biosafety officer is to ensure containment of laboratories and minimize the likelihood of biological exposure to laboratory workers, those working in the laboratory building, their families and the community-at-large. The solution is filled with complexity, but can be broken into three parts; individual attitude, sustained behavior, and personal choice. All three of these parts have a synergy, which has a direct impact on the biosafety officer's role. Attitudes improve when people are treated the way they wish to be treated. Sustained behavior occurs when people are given information on risk and benefits, and are provided with the adequate resources and skill-based training opportunities. Good personal choices are influenced when people begin to associate safe behaviors with positive experiences. Focusing on the ABCs (attitudes, behaviors, and choices) of laboratory staff can lead to increased involvement of biosafety officers, greater SOP compliance among laboratory staff, and more acceptance and positive feelings about safe laboratory behavior recommendations.

Albert Einstein once said, "Insanity is doing the same thing and expecting different results." If a biosafety officer is frequently encountering problems with scientists, a change may be needed. If a biosafety officer's resistance to change is stronger than a desire to grow, it can cause significant problems with attitude, behavior, and the biosafety choices made in the laboratory environment. Biosafety officers must consider that outcomes can be achieved through a variety of processes. Providing options in the process (without sacrificing safety) empowers laboratory staff, while achieving the expected outcome (safe laboratory practices). A troubling disconnect remains between what laboratory staff members know they are supposed to do and what they are actually doing. Filling that vacuum requires an understanding that can only be achieved if a biosafety officer is where they belong—on the frontlines—working to push science safely forward while forging strong partnerships with scientists.