

Q2 Lab Safety Culture Award Submission

Theme: What's on Your Mind? Understanding Headspace and its Impact on Safety

Working in a BSL-1 laboratory with live *E. coli* cells and advanced fluorescence microscopy presents a unique challenge: our experiments often run continuously for several days, and unlike many workflows, they cannot simply be paused. Because the cells continue to grow and change, timing is critical but so is the mental state of the researcher managing them.

One of the biggest headspace risks we identified was fatigue and reduced focus during off-hours work. When experiments extend into late evenings, it becomes harder to maintain attention to detail, increasing the likelihood of small errors such as incorrect sample handling, missed steps in imaging protocols, or lapses in contamination control. These risks are subtle but significant, especially in work requiring precision and consistency.

Recognizing this, we made intentional changes to how we plan and conduct experiments. We began structuring schedules so that high-focus, high-risk tasks are performed during daytime hours, when researchers are more alert. Off-hours work is limited to no-risk activities at all times. This shift acknowledges that our headspace directly affects safety and data quality.

We also strengthened our team-based safety practices. New students are closely supervised and paired with experienced lab members until they are confident and competent, reducing the risk associated with inexperience and uncertainty. Additionally, we implemented a “work buddy” system, ensuring that no one is working alone during critical procedures, which helps catch mistakes early and provides immediate support if something goes wrong.

Another key improvement was introducing checklists for routine tasks, even for experienced researchers. Repetition can lead to overconfidence, and having a structured checklist helps maintain consistency and prevents steps from being skipped when attention drifts.

Finally, we actively encourage a culture of speaking up when mistakes or near-misses occur. Acknowledging errors without fear of judgment allows the team to learn and adapt, reinforcing a shared responsibility for safety.

By recognizing how fatigue, inexperience, and complacency influence our headspace, we were able to implement practical changes that improve both safety and reliability. This experience reinforced that safety is not just about protocols, it is about being aware of the mental state we bring into the lab and designing systems that support us when our focus is not at its best.