

Biological Waste Management Program – A Better Way

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(Abstract)

The biological waste management program at The University of Texas at San Antonio has experienced great success due to overwhelming support from faculty and staff. This program was created to relieve the burden on Principle Investigators of autoclaving and disposing biological safety level 1 & 2 waste, and free up valuable autoclave space and run time for front end research sterilization purposes. Biological waste consists of Petri dishes, pipettes, culture plates, contaminated gloves, media, research animal carcasses, sharp containers, blood and tissue samples, and cell lines. The lab staff now collects all biological waste generated in the labs in biohazard bags or sharps containers and places in closeable, biohazard labeled containers meeting US Department of Transportation and state of Texas regulations for transport of regulated medical waste. Once the container is ready for disposal, the Safety Technician in the Environmental Health, Safety and Risk Management (EHS&RM) office inspects and collects each container for transport to an on-campus cold storage unit. The Safety Technician marks and labels each container for transport and disposal by a contracted company permitted in the state of Texas and with the EPA for this purpose. EHS&RM provides all supplies needed for biological waste collection such as biohazard bags, biological waste boxes, and sharp containers free of charge to the research staff. EHS&RM provides training and consultation on waste disposal procedures.

(Introduce and describe why UTSA benefited by the Best Practice)

The University of Texas at San Antonio is a public research and teaching university with a population of over 28,000 students. There are 58 biological and biochemical laboratories that Environmental Health, Safety & Risk Management (EHS&RM) personnel support on a daily basis. Each of these laboratories can have as many as six to eight people who perform research year round. EHS&RM personnel pick up on average as many as fifteen biological waste boxes per day from university facilities. The biological waste program has allowed the research personnel to focus on their research, and not spend valuable manpower, energy and time processing waste in an autoclave. Costs are decreased since research dollars are no longer paying for the labor and higher energy consumption that comes with autoclaving low hazard biological waste. With this procedural change, only the few researchers who generate highly infectious waste are required to autoclave that waste prior to pick up by the EHS&RM safety technician.

(Statement of the Problem/Initiative)

The University of Texas at San Antonio (UTSA) had a historical challenge with providing sufficient autoclave units and steam capacity for faculty and staff to perform biological waste sterilization in addition to sterilizing media and equipment for their procedures. Most challenging was the cost associated with providing additional autoclave units where limited facility space existed and no funding was identified to purchase these units. This problem was only getting worse as 60 new research laboratories, many operating at a Biosafety Level 2 of containment, were recently added. The time required to autoclave each biological waste bag by laboratory personnel was up to one and one half hours. This caused a back-up every day of people waiting to use available units causing high levels of frustration. Valuable research hours were lost every day as lab personnel had to stay with their biological waste until it was properly autoclaved for disposal and placed into our non-hazardous municipal waste trash bins or dumpsters. Researchers had to wait to sterilize their media and equipment slowing down their research.

The Chair of Institutional Biosafety Committee proposed to the Director of Environmental Health, Safety and Risk Management (EHS&RM) that it commit to alleviate this problem by disposing of all biological waste in a more expedient manner. A cost benefit analysis was completed by the

EHS&RM office that compared costs associated with processing the biological waste through the autoclave vs. utilizing the biological waste boxes. Discussion with research faculty, staff and students was solicited that included what type of biological waste was generated daily in each lab, quantity per day, storage capacity, and time required to autoclave biological waste. The Research/Facilities meeting team was also asked for their input on autoclave needs and requirements. Based on the results of this analysis, recommendations were made to the Vice President of Business Affairs and the Provost that indicated one full time employee would be sufficient to provide biological waste pick up from the laboratories. Funding for this position became a top priority which the Institutional Biosafety Committee recommended to the Provost to fund. A full time Safety Technician position, with a starting salary of \$18,024, was then authorized out of indirect funds (F&A) via the Provost's office and the Vice President of Business Affairs. With this new authorization, EHS&RM created a job description to manage all biological waste from each laboratory.

EHS&RM provided the Safety Technician with a golf cart, personal computer for tracking waste and personal protective equipment. In-house training was provided by our Laboratory Safety Officer on biological waste management. An existing walk-in cooler is used to store

all biological waste prior to pick up and disposal by a contracted waste disposal company.

Input on what duties the Safety Technician would be required to carry out to make the Principal Investigator's job easier was solicited from each Principal Investigator. Based on this input, this new position is required to provide training on what biological waste lab personnel are authorized to place in biological waste containers, how to properly label the contents of the box and electronically submit their request for pick up. Lab personnel are required to attend the mandatory training provided by EHS&RM.

(Implementation)

The time required to fill this position was approximately 3 months. EHS&RM initiated the job description, solicited input from the Provost's Office and the Office of the Vice President for Business Affairs, as well as the Institutional Biosafety Committee. Once the Safety Technician position was filled and basic training completed, the next challenge was to implement the program. EHS&RM requires the technician to visit each lab requesting waste pick up within 24 hours of their request and input this information into our tracking database. This database contains the name of the Principle Investigator, date of the pick up, number of boxes, weight, disposal date, and cost. Implementation of this program to full capacity was phased in over a period of approximately 3 months after hiring the Safety Technician. Currently we have found no downside to this program.

(Benefits)

Currently UTSA generates an estimated 104,104 pounds of biological waste each year. The University is growing at a rapid pace with increasing laboratory space. The amount of biological waste generated is expected to increase substantially in the near future.

The cost for lab staff to autoclave and dispose of waste includes: cost of autoclave bags, cost of black garbage bags, cost to run the autoclave,

and cost for Waste Management dumpster disposal. The cost per pound using an autoclave run by a steam generator is \$0.60 with a yearly cost of \$62,462 at current waste amounts. The cost per pound using an autoclave run by house steam is \$0.506 with a yearly cost of \$52,677.

The cost for a safety technician to collect waste and have it incinerated by a contracted company includes: salary of the technician, cost of running a cold box for storage, cost of boxes, liners and labels, and cost of contractor transport and disposal. The cost per pound is \$0.346 with a yearly cost of \$36,020.

Utilizing the safety technician saves the university between \$16,657 and \$26,442 per year. This disposal method allows up to 19 autoclave loads per day to be used for sterilization of lab equipment or media for research or teaching lab purposes. It allows one FTE lab technical assistant position to be reassigned to other duties or to be eliminated from the budget. Additionally, and estimated 1735 cubic yards of dumpster space per year is now available for other non-hazardous trash. UTSA was also able to eliminate the need for one or more additional autoclaves, yielding a substantial cost savings of at least \$380,000.

The biological waste collection method as outlined above is financially sound and advantageous for the University. It also builds a good will

relationship with the research staff by providing an institutionally funded service that decreases their non-research work. Faculty and staff are highly satisfied and relay their satisfaction through the Laboratory Safety Officer to the Director of EHS&RM.

(Retrospect)

Hiring an individual from the original posted job description that was commensurate with the pay and qualifications from the committee's recommendations posed a challenging task to EHS&RM management staff. The education and experience listed had to be revised a couple times to attract the desired qualified individual and not exclude so many candidates. In retrospect, more work should have been done up front with Human Resources to ensure the wording in the job description fit the desired qualifications to perform the biological waste management tasks required.