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Project: Penn Nursing - A Real Look into Recycling in the Simulated Healthcare Environment
Stakeholders: Penn Nursing Students at all levels

Abstract

Penn Student Eco-Reps partnered with staff from the Penn School of Nursing over the past academic year to evaluate recycling practices in the simulation lab of the nursing school. The Helene Fuld Pavilion for Innovative Learning and Simulation (which will be referred to as the sim lab henceforth) is a space that provides nursing students with hands-on clinical experience. The project began with Eco-Reps consulting sustainability reports online regarding the practices of peer institutions. The team then worked on observing Penn Nursing’s sim lab and the current recycling practices that are in place. The next steps involved students contacting peer institutions and local healthcare partners regarding their current sim lab recycling practices. After reviewing and compiling data from the various nursing schools and hospitals, student Eco-Reps used the information to write a Green Fund application. Penn’s Green Fund Grant aims to promote sustainability on campus through projects initiated by students and faculty. Eco-Reps hope to use the Green Fund to bring in a sustainability consultant to support the burgeoning greening of the sim lab.

Introduction

In accordance with the University’s movements towards zero waste and its sustainability initiatives, the Penn Nursing School has made efforts to monitor and audit its waste production. The sim labs, in particular, have been identified as a major source of plastic consumption, as well as an area where recycling and reuse is most opportune. These plastic materials largely come in the form of test kits and other single-use medical equipment that aim to give nursing students the most replicable and accurate working conditions as compared to hospitals. Examples include syringes, IVs, and chest tubes. In an attempt to reduce this plastic waste, it is necessary to understand sustainable alternatives to this equipment, methods of reusing, and lastly more efficient and effective diversion of recyclables to and from general waste.

Project Overview

The overall goal of this project is to write a Green Fund application that will allow Penn Nursing to bring in a sustainability consultant who will conduct a waste audit in the sim lab. The consultant will then advise the student Eco-Reps and Penn Nursing staff involved of ways the school can better reduce, reuse, and recycle.
To write the Green Fund application, the Eco-Reps first conducted observations of recycling practices in the sim lab at Penn Nursing. The project partners have indicated that current practices within the nursing school rely on faculty instruction to determine whether kits used in the lab will be saved for reuse. The approach that was used involved contacting peer institutions regarding their individual recycling practices in their nursing schools. Students received information by researching these peer institutions’ websites, directly emailing sim lab managers, and engaging in video calls. After contacting other nursing schools, Eco-Reps then reached out to various hospitals in the Philadelphia region. Although Eco-Reps were able to gain a sense of what needed to be accomplished in order to reach a more sustainable sim lab in the nursing school, it was also important to receive advice from a consultant. The main goal this past year was for Eco-Reps to write a Green Fund application in order to bring in a consultant to observe and evaluate the sim lab. The report from the consultant will then be delivered within two weeks of audit/observation completion. The audit/observation will be scheduled on a date to be determined by the Eco-Rep team and the sim lab operations manager. With the help of this consultant, the ultimate goal of this project is to develop a waste reduction strategy for Penn Nursing’s sim lab.

Research Findings

Research was primarily divided into three categories, all of which will be discussed in this report.

1. Online Report Consultation
The first step towards understanding the problem was through a brief consulting of online literature regarding the issue. Consulting sustainability reports published online has proven to be particularly helpful. In specific, Emory University student Lauren Balotin’s report titled Sustainable Healthcare at Emory University was one such report that contributed pertinent figures that could help gauge the potential benefits and effects of more sustainable nursing practices. Specifically, Balotin’s report noted a sustainability “task force” divided into the sub-committees of Food, Energy/Emissions, Recycling/Waste, Purchasing, Building Design, and Transportation. Of these subcommittees, the Recycling/Waste committee provided specific figures that were most applicable to this project. It seemed to be the consensus that in addition to more efficient internal recycling customs, partnering with external programs and institutions were most beneficial. Partnering with the Centers for Disease Control and Prevention and their non-hazardous lab material recycling program and other initiatives led to a decrease in regulated medical waste to roughly 5,000 pounds a year by 2010, and by 2012, 40,000 pounds and $7,000 per month.

Much like Emory University, the University of Pennsylvania has partnered with Stericycle in its diversion of medical equipment. Stericycle is the current provider of infectious waste removal
services that is responsible for overseeing waste management and recycling in the nursing school. Although the Emory report has noted its efficiencies and cost-reductions in using Stericycle’s services, the Green Fund that will be applied for will analyze exact cost-benefits, as well as whether efforts should be moved toward more reuse techniques due to the nature of Pennsylvania’s recycling schemes.

II. Simulation Lab Observations

The second stage in collecting data was through real-time sim lab observations where nursing students engaged in practicals. Many of the test kits were single-use, and equipment such as syringes, chest tubes, and other sharps were quickly discarded. In particular, at one observation, the students were testing incisions and use of equipment on pigs. The health and sanitary concerns that the used equipment pose are also another factor that needs to be considered when looking at equipment reuse options. A problem with the current recycling culture in the nursing school is that during practicals and examinations, health, safety, and success in practicals have a much higher priority to students than recycling and sustainability practices. It may be that in addition to more streamlined recycling and reuse practices, discourse regarding sustainability should be improved, and more clear labellings involving sim lab specific equipment such as catheter kits should be placed near bins to reduce the risks of cross contamination between trash and recycling bins.

III. Contact with Peer Institutions

Additionally, in order to gain a better understanding of healthcare sustainability, peer institutions were contacted to open up discourse regarding reuse and recycling strategies. The peer institutions contacted were as follows: Thomas Jefferson, Duke, Columbia, NYU, Johns Hopkins, UCLA, Emory, Temple, UMD, Yale, and Penn State. Specifically, Yale School of Nursing provided us with video resources explaining specific reuse techniques they used in their sim labs, as did Penn State (while also providing example promotional material raising recycling literacy on campus). Yale SON’s sustainable practices included repackaging IV bags, and reusing IV tubes and medication bottles. Yale is able to repackage IV bags by refilling the bag with water using a syringe, and then sealing the bag with Parafilm. Moreover, primary IV tubes can be reused by being properly drained and hung for a couple days to dry. Lastly, a technique mentioned to reuse medication bottles included filling the bottle with Kool Aid mix and utilizing a crimper to place the cap on. The outcome results in an inexpensive supply of powdered vials that can be used for reconstitution, which is the process of adding a diluent to a dry ingredient in order to make a liquid.

Nevertheless, some challenges to reusing materials were brought up by schools, such as Thomas Jefferson and NYU. These schools have demonstrated concern for microbial growth when
storing supplies while they are wet. However, NYU also stated that in order to decrease microbial growth, they strive to use compressed air when clearing out the fluids of IV tubes.

**Results and Evaluation**

When contacting peer institutions, it was evident that many sim lab operation managers were responsive to the initial email they received regarding their own sustainability practices. Some schools even demonstrated further interest by arranging video calls to properly show their recycling habits in the sim lab. Specifically, nursing schools indicated that in order to promote sustainability, they either reuse or recycle lab materials. Upon contacting them, institutions that indicated equipment reuse includes Thomas Jefferson, NYU, UCLA, and Emory. On the other hand, schools that indicated that they recycle equipment include Yale, Emory, and Penn State. Penn State has demonstrated that they are able to recycle their nursing equipment through a recycling program that was implemented with the use of a grant from their school’s Sustainability Institute. With the grant, the sim lab at Penn State’s College of Nursing is now able to compost organic materials and incorporate two different kinds of plastic separation. This allows them to have the opportunity to recycle plastics from items, such as IV tubes and otoscopes. Similarly, the Perioperative Sustainability Team at Yale initiated a clinical recycling program, while Emory established a partnership with the Centers for Disease Control and Prevention to start a recycling program for non-hazardous lab materials. This program allowed Emory to decrease its regulated medical waste to roughly 5,000 pounds a year by 2010.

![Materials Commonly Used in the Sim Labs.](image-url)
It seemed as though more schools had a tendency to reuse their current nursing supplies in the sim lab rather than initiating recycling programs. The reason may be due to expensive costs and lack of proper knowledge in how to proceed regarding recycling practices in the sim lab. As a result, with the information collected from sim lab observations and these peer institutions, the Eco-Rep team worked to draft a Green Fund application that will help bring in a sustainability consultant. Specifically, the sustainability consultancy iSpring focuses on three practice areas: metrics and reporting, operational sustainability, and education and outreach. In the past, iSpring has completed energy efficiency, carbon footprint, waste and recycling, water conservation, program evaluation, and education projects for various organizations and universities, such as Penn. After contacting the lead waste consultant from iSpring, it was discovered that it will cost a total of $1,480.00 for them to complete a waste audit. The following budget estimates the cost of the consultant phase of this project (as shown in Fig 2).

<table>
<thead>
<tr>
<th>Audit/observation preparation</th>
<th>$370.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2 hours @ $185/hour</td>
<td></td>
</tr>
<tr>
<td>Simulation lab audit/observation</td>
<td>$740.00</td>
</tr>
<tr>
<td>-4 hours @ $185/hour</td>
<td></td>
</tr>
<tr>
<td>Post-audit/observation report preparation</td>
<td>$370.00</td>
</tr>
<tr>
<td>-2 hours @ $185/hour</td>
<td></td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td><strong>$1,480.00</strong></td>
</tr>
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We expect the consultant to provide ways for students to better reuse nursing materials. We hope to receive advice regarding the potential implementation of a recycling program in the sim lab. It is expected that the reporting from this Green Fund will inform a new Green Fund application for actions based on this consultant report.

**Conclusion**

Through this project, we were able to explore sustainability practices in the nursing environment. Our overall goal was to submit a Green Fund application that will allow us to bring in a sustainability consultant into Penn’s nursing school. We accomplished our goal by first reading online reports from various schools. Emory University published an online report on sustainable healthcare, which included the potential benefits and effects of sustainable nursing practices. Nevertheless, it seemed as though there were not many schools that provided online reports. Additionally, it was discovered that some institutions implemented recycling programs within their nursing schools. Next, we observed Penn’s simulation lab by watching practicals and recycling practices in real time. We were then able to contact other nursing schools in order to
ask for strategies in regards to recycling materials used in the lab. Finally, this allowed us to contact consultants to obtain information about budgeting and estimated costs. After choosing the consultant company iSpring, we were able to incorporate all of our data into the application. The Green Fund application was then submitted for review, and then accepted.

Future projects can build from this by applying the knowledge received from the consultant into a new Green Fund application. In order to further promote sustainability within the nursing school, Penn Nursing faculty may need to begin incorporating similar reusability techniques to peer institutions, such as Yale and Emory. Moreover, with the help of a new grant, students working on future projects related to this topic may potentially be able to implement a recycling program within Penn Nursing.

Appendices

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Green Fund Application