Implementation of New Technology to Reduce and or Eliminate Human Papillomavirus to Improve Probe Disinfection

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Abstract

The project detailed in this report defines the implementation of a new technology at the Christ Hospital Network that would cause for the removal of the current Glutaraldehyde User Station's (GUS) soaking station to be replaced with the Trophon systems. By implementing the new technology, this would improve probe disinfection and reduce the risk of patient *Human papillomavirus* (HVP) from probe related hospital acquired infections.

The problem was that the Christ Hospital Network used GUS disinfection soak stations (G10VP) to perform high level disinfection on intracavity probes in the Emergency Department, General Ultrasound, and Outpatient Obstetrician and Gynecology areas. This product is not approved to kill the *human papillomavirus (HPV)*. Studies have proven HPV can be passed from one person to another via intracavity or surface ultrasound probes, if probes are not adequately disinfected before use (Nanosonics, 2015). Common disinfection methods, even high level disinfection (HLD) methods, do not kill the cancer-causing HPV on ultrasound probes. The HPV virus can survive and remain infectious on surfaces, including medical equipment, for days or weeks, when treated with common disinfectants (Nanosonics, 2015). Results show that Trophon Environmental Probe Reprocessor (EPR) was the only disinfectant to completely inactivate HPV (Nanosonics, 2015).

This project required removal of all existing GUS soak stations (G10VP) from the aforementioned departments, and replaced with new Trophon probe high level disinfection systems. Staff reeducation was performed, and changes were made to hospital policy and process. The final part of this project was the Biomed training, so that the Healthcare

Technology Management department was ready to take over and handle any service related problem through the duration of ownership by the hospital.

Preface

This project was design to fulfill my graduation requirements for my Bachelors of Science at IUPUI. As part of the requirements, I completed the project planning and design course, HETM-49000. As a part of the course, I had to compose a written proposal and present it to my place of employment for approval. I proposed the implementation of a new technology at the Christ Hospital Network called Trophon systems. Implementation of the new technology would improve probe disinfection and reduce the risk of patient *Human papillomavirus* (HVP) infection from probe related hospital acquired infections. The final step of my undergraduate degree was to complete the senior capstone project course HETM 49200. This course required that I manage the work, set the pace, and meet the posted deadline. This imposed a great deal of stress on me, because I knew my graduation was dependent on me successfully completing this course. My project idea became an interest to me after Penn State released the findings of a study they conducted proving that Human papillomavirus (HVP) is not being killed by our current probe disinfection system.

I would like to acknowledge and thank first my family for being supportive of my dreams and goals. I would like to thank Dr. Barbara Christe, for always offer encouragement when it was needed. Being a student at IUPUI has helped me grow and develop academically, professionally and personally. I learned my strengths are things I leverage on, and things I use to push myself further when I wanted to give up. On the other hand I was able to recognize my weakness that I will continue to develop and build upon. Lastly I would like to offer a heartfelt

thank you to the amazing staff at The Christs Hospital Network for embracing change and wanting to continuing to do what is necessary to stay a leader in the healthcare industry.

Introduction

The Christ Hospital Network, pride themselves on being a national leader in clinical excellence and patient experiences. Their mission is to improve the health of our community and create patient value by providing exceptional outcomes and the finest experiences. The Christ Hospital has been named the Most Preferred Hospital by the Greater Cincinnati community for twenty one consecutive years (The Christ Hospital Network, 2018). There was a risk identified that could put patients at risk of being expose to a hospital acquired infection, specifically human papillomavirus (HPV), due to their current disinfection process using GUS disinfection soak stations (G10VP) to perform high level disinfection on intracavity probes.

HTM has experienced higher probe cost because the probes are being left to soak in cidex for time periods not in accordance with the OEM recommendations causing the probe to discolor and break down resulting in costly repairs. HTM is constantly being challenged to lower and maintain budgets, more efficiently and effectively due to the changes in Medicare and Medicaid reimbursements.

Inefficient use of clinical staff time is important. Reducing the time it takes to complete probe disinfection will allow clinical staff more quality time with their patients. This is of importance because reimbursements are tied into patient satisfaction, and this could directly affect hospital survey scores.

In addition, implementation of the new technology will address both patient, and staff safety issues by removing all manual processes of soaking and rinsing the probes and automating the process. Those processes would become easier and faster because it will not have any of the risk associated with the use of cidex. The Christ Hospital would continue to support their mission, core values, and vision with the implementation of the Trophon systems.

A. **The Problem**

1. Current disinfection process not effective at killing HPV. Christ Hospital Network is currently using GUS disinfection soak stations (G10VP) to perform high level disinfection on intracavity probes in the Pelvic Center, Emergency, General Ultrasound, and Outpatient Obstetrician and Gynecology departments. The current high level disinfection process is putting The Christ Hospital Network's patients at an increased risk of the hospital- acquired infection specifically from *human papillomavirus (HPV).*

2. Higher probe repair cost. There is an increased need for the healthcare technology management (HTM) probe repair due to overexposure to disinfectants during the current high-level disinfection process.

3. Inefficient use of clinical staff time. There is an inefficient use of clinical staff time, specifically for ultrasound sonographers and equipment technicians, through increased processing times, due to the current disinfection process being twice as long as than the Trophon disinfection system.

4. User error resulting in patient safety issues. With the GUS disinfection soak stations (G10VP), clinical staff must use a digital timer to track the high-level disinfection process. This process leaves it up to the clinical staff to remember to check this timer. In many cases the clinical staff will get distracted and forget get to check the timer resulting in the probe being left to soak for longer than the original equipment manufacturers (OEM) recommendations.

5. The rinse portion is a manual process and allows room for error. There were multiple disinfection processes in use, making it difficult and time consuming for the Infection Control Department to keep the policies and procedures updated.

A. Solutions

1. This project focused on the purchase and implement of the Trophon EPR, a high level disinfection system that has been tested and proven to kill the *human papillomavirus*. This will help the Christ Hospital Network reduce and eliminate the risk of patients contracting hospital-acquired infections.
2. This project comprehensively trained ultrasound sonographers and end users through the original equipment manufacturer (OEM), to ensure proper use and to satisfy competency requirements for governing regulatory agencies.
3. This project examined all current disinfection processes and policies, while updating them to fulfill hospital regulations.
4. This project trained the in house biomed(s), which was a critical objective. The OEM charges $1265 per system for yearly maintenance. This project required the installation of twenty-four systems throughout the Christ Hospital Network totaling $30,360 to maintain

them. The initial $14,300 for biomed training will be saved in the first year of maintenance.

B. Pros & Cons

1. Cost. The expense associated with purchasing and maintaining the Trophon system can be of some concern. Installation of the Trophon system in all the identified departments requiring them would cost the hospital approximately $342,672, before any discounts are applied. The Biomed(s) which have to be trained by Nanosonic so they could maintence and service the units after warranty period expired, which cost $14, 300 for up to five people.
2. Benefits.
    a. One of the greatest benefits would be the changes in the cleaning protocol that reduce patient risk, improve probe disinfection and reduce the risk of patient *Human papillomavirus* (HVP) infection from probe related hospital acquired infections.
    b. The redesign of the disinfection process will improve safety for clinical staff such as ultrasound sonographers, equipment technicians, and sterile processing staff, because they no longer will need to be exposed to hazardous chemicals, such as Cidex OPA.
    c. Clinical staff will become more efficient with their work flow process, this will be largely due to the decreased processing times. The new disinfection process takes less than half the time the old disinfection process took to complete.
    d. The Trophon disinfection system is an automated system so the clinical staff can focus all their attention on their patients without the worry of being distracted.

Staff no longer need to worry about forgetting to check the timer and manual rinsing that was required with the old disinfection process, resulting in probes being left to soak for longer than the original equipment manufacturers (OEM) recommendations.

e. Using the Trophon system alleviated the need to use multiple disinfection processes; making it less difficult and time consuming for the Infection Control Department to keep the policies and procedures updated. This project included comprehensively training ultrasound sonographers and end users through the original equipment manufacturer (OEM), to ensure proper use and to satisfy competency requirements for governing regulatory agencies.

f. Lastly HTM will see a decrease in probe repairs because of the elimination of longer than-needed soak time in the cidex.

C. Implementation Process

1. Implantation of Trophon systems.
    a. Purchased all new Trophon systems.
    b. Instructed and verified that all end users had completed online competency training before their Trophon could be installed.
    c. Removal of all GUS soak stations. The GUS soak stations were placed in storage until arrangements can be made for them to be liquidated.
    d. Trophon systems were received, inventoried and installed.
        i. The installation of some of the units required that they be mounted on the wall with the bracket provided by Nanosonics. According to hospital polices HTM

staff is not permitted to drill into the walls to install mounting brackets, this must be done by the hospital's maintenance department, and coordinated with the appropriate maintenance providers to have brackets mounted

ii. The configuration of the system was completed and all necessary supplies left at the department.

e. Work with department staff and infectious control to make sure that all policies and procedures had been updated to reflect the new disinfection process.
f. Assure that new supplies and consumables are in the hospital ordering system (Lawson), and that the correct staff is in-serviced and informed on necessary part numbers and ordering procedures.
g. Frequent checks by both HTM and the Infectious Control Department for the first thirty days to offer support to clinical users and to make the transition smooth.
h. Assisted Nanosonic with the site audits to confirm that departments and staff were compliant with The Joint Commission (JCS) and OSHA standards that require that health care facilities protect workers and patients from known risks. .
i. Completed Biomed Maintenance Training for the five in-house biomed(s).

Conclusion

The focus of the Christ Hospital Network is to support a culture that will allow staff to treat patients with compassion, driven by excellence. As healthcare needs change, this opened up the doors for the implementation of new technology that will help align patient care with the hospital's vision and mission. The purpose of this project was to improve probe disinfection of the intracavity probe, by implantation of a new technology that has be proven to reduce the risk of patient *Human papillomavirus* (HVP) transmission from probe related hospital acquired infections. To achieve this twenty-four Trophon systems were purchased and installed in all departments that were currently using endocavitary probes to treat and diagnose patients. The implantation of this technology also aided staff in working more efficiently, increase staff and patient safety and lower replacement probe cost. Simplifying the current probe disinfection process will reduce the paperwork burden and reduce the risk of errors related to utilizing a complex manual process. Through the implementation of new technologies and updating infection control policies, CHN can better achieve their mission of providing compassionate care, while also improving staff safety and reducing costs.

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