A Strategy to Reduce Regulated Medical Waste in Hospitals

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The DNP student DYLAN REAGAN and the Scholarly Project A STRATEGY TO REDUCE REGULATED MEDICAL WASTE IN HOSPITALS meet all the requirements for the degree of Doctor of Nursing Practice at University of Saint Francis-Fort Wayne, IN.

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Executive Summary

Background

Hospitals produce substantial amounts of waste daily, which causes environmental and economic impacts. Operating rooms account for much of this production. As this waste is produced, it must be separated and placed into containers that are later removed for disposal and if necessary, undergo treatment. The different treatments are dependent on the types of waste and whether it is infectious or not. Identifying and selecting the correct containers is a crucial step in the disposal process. If items are placed into the incorrect container, there are likely to be increased costs for removal and treatment. More specifically, inappropriate material placement into regulated medical waste (RMW) containers significantly contributes to these costs.

Methodology

The waste disposal practices of anesthesia providers and operating room staff at a rural hospital in Indiana were examined over four weeks. During the implementation period, participants' waste practices were guided by waste disposal prompts that were placed on the RMW sharps container within the three ORs at Adams Memorial Hospital (AMH). Utilizing a digital scale provided by the facility, containers were weighed weekly and compared from the pre-implementation and implementation period.

Findings

Results from this project revealed a 68% reduction in RMW volume following the conclusion of the implementation period. This reduction in volume yielded a potential annual savings of $7,296 for AMH.

Conclusions/Implications

This project provided AMH with a simple, cost-saving measure for healthcare facilities. The future opportunity for these types of cost-saving initiatives is unlimited and could be implemented system-wide to further increase annual savings.

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Chapter 1: Introduction

Background

As a profession, both Anesthesiologists and Certified Registered Nurse Anesthetists (CRNA) can benefit healthcare institutions financially through modifications in their waste practices inside the operating room (OR). An estimated 80% of solid waste is created before the patient enters the room (Babu et al., 2019). While waste production is inevitable, current waste practices must be examined. Anesthesia providers' contributions to this begin in the preparation phase and continue throughout the operative period. The anesthetic materials required are determined by both the type of patient and the specific procedure being performed. From an anesthetic perspective, an individualized patient-centered plan is laid out and materials are gathered. Preparation is key to ensuring successful execution and maintenance of patient safety. While preparing for procedures, providers open a variety of packages during this preparation phase. If too many items are opened, this can translate into significant material waste if not utilized. These acts become increasingly important if the facility is a small rural hospital compared to an urban hospital. ORs' account for up to 70% of hospital waste (Denny et al., 2019; Kwakye et al., 2011). As types of waste from healthcare institutions are discussed, it is important to distinguish between medical waste and common household waste. The Occupational Safety and Health Administration (OSHA, 2015) defines regulated medical waste (RMW) as liquid/semi-liquid blood, items contaminated with blood, contaminated sharps, and other pathological waste. Further, the disposal of RMW is defined by regulations and laws that govern its proper disposal. RMW is an unavoidable part of healthcare. According to the World Health Organization (2021), 15% of all hospital-related waste is considered hazardous. The proper treatment and disposal of this infectious waste protect the public from disease. The Environmental Protection Agency (2021) states medical waste is primarily regulated by state environmental and health agencies. Indiana Code defines infectious waste and waste treatment

options for both infectious and non-infectious waste (Indiana General Assembly, 2021). The primary methods of disposal and types of waste are discussed later in this paper.

Problem Statement

Waste in the OR financially impacts the healthcare system while also having negative impacts on the environment. One-fourth of OR waste is attributable to anesthesia-related equipment (Denny et al., 2019). Improper waste segregation increases the amount of RMW because it must undergo special treatment before proper disposal. Anesthesia providers frequently place unbroken, empty medication vials into RMW sharps containers (B. Wisenbaker, personal communication, October 10, 2020; D. Shepherd, personal communication, March 15, 2021). With the improper placement of unbroken, empty medication vials into RMW containers, waste volume increases which directly translates to increases in disposal costs. According to the waste management policy, section C number 2, for Adams Health Network, the disposal of empty, unbroken medication vials is not required to be disposed of in the RMW sharps containers at Adams Memorial Hospital. Refer to Appendix A for referenced waste management policy.

Practice Knowledge Gap

The American Association of Nurse Anesthesiology lacks a position statement on environmental responsibility. However, the Association of Perioperative Registered Nurses (AORN) does have a position statement. AORN's position statement encompasses all healthcare professionals' through their ethical and professional responsibilities to protect the patients that they serve (AORN, 2020). Through this protection, providers can lessen their ecological footprint and practice responsibly. A common theme found in the literature is the improper segregation of waste into incorrect waste containers. Numerous studies found the improper placement of solid waste into RMW containers (Seidman & Parker, 1998; Amariglio & Depaoli, 2021; Hsu et al., 2020; Stonemetz et al., 2011; Shinn et al., 2017; Hubbard et al., 2017). Two studies examined their RMW sharps containers and found solid waste, which contributed to

additional weight and volume. This additional waste contributed to increased costs for waste treatment/removal (Seidman & Parker, 1998; Amariglio & Depaoli, 2021). Although waste segregation has proven to be environmentally beneficial and economically sound, it is not widely implemented by anesthesia providers.

Needs Assessment

RMW reduction is necessary because of the detriments that waste has on the environment and the increased economic impact it has on healthcare facilities. Through proper identification and separation of waste, less waste could be routed through treatment facilities. While the project manager was on a rotation at Adams Memorial Hospital (AMH), anesthesia providers and OR staff were observed improperly placing waste into the RMW sharps containers. The types of waste included empty, unbroken medication vials, plastic tubing, and unused portions of medications. Per OSHA (Disposal guidelines, 2021), IV syringes without needles can be placed into a regular trash container. Additionally, the placement of empty, unbroken medication vials into regular trash containers is an appropriate allocation (Medical Waste Disposal Guidelines, 2021). The placement of empty, unbroken medication vials into regular trash containers is consistent with AMH policy. See Appendix A for the institutional waste management policy. Separation of waste was dependent on the provider, and some providers were better than others at disposing of waste correctly (Personal communication, October 10. 2020).

Project Overview

RMW containers are placed throughout hospitals, specifically in inpatient rooms, nursing units, and operating room suites. The sharps container falls underneath the classification of RMW because it contains objects that are contaminated with blood or pathogens or carry the risk of puncture-related injuries. Disposal of the contents in the sharps containers is based on weight (Seidman & Parker, 1998; Amariglio & Depaoli, 2021). This Doctorate of Nursing Practice (DNP) project focused on the anesthesia provider and OR staff's waste disposal practices throughout the operative period. With these waste

practices, RMW sharps containers were the focal point. Anesthesia providers and OR staff regularly place empty, unbroken vials into the RMW containers, further contributing to increased costs for the removal of RMW (D. Shepherd, personal communication, April 1, 2021). Through this DNP project, the project manager aimed to reduce the amount of waste in the sharps container and reduce waste removal fees for Adams Memorial Hospital. The project manager intended to accomplish this aim with the creation of prompts that were placed on the RMW sharps containers. These prompts served as a guide for the participant's waste disposal practices during the intervention period. RMW sharps containers are considered hazardous and therefore must undergo specific treatment before disposal. Waste in the OR not only impacts the financial well-being of facilities but also places burdens on the environment and the global population. Depending on the facility and their waste removal policies, this improper placement leads to increased weight and subsequent increased costs. These increased costs have an impact on facilities of all sizes but can impact smaller facilities in the rural setting. The smaller hospitals have less funding and tighter budgets in addition to paying for third-party waste removal. Currently, 46% of rural hospitals in the US operate in the loss (Siegel, 2019). As these institutions operate in the red, day-to-day functions could become compromised from insufficient funding. Depending on the anesthesia providers' waste practices, larger hospitals can be impacted as well.

Scope of Project

With the focus of the project on RMW, the project manager examined the RMW sharps containers located within the three ORs at AMH. For the aims of this project, AMH provided the RMW sharps containers and the digital scale. Each OR had separate RMW sharps containers, these containers were numbered (1-9), allowing them to be tracked and examined throughout the project. The RMW sharps containers weights were recorded weekly during both the pre-implementation and implementation periods. Recyclables, large hazardous red waste receptacles, and solid waste containers

were excluded from this project. Additionally, the contents within the solid waste containers were neither weighed nor examined. The DNP project proposal initial approval form is in Appendix L.

Stakeholders

Primary stakeholders for this DNP project include the project manager; project advisor, Dr. Mueller; and site champion, Dr. Shepherd, CRNA. Refer to Appendix D for AMH's letter of support for this DNP project.

Budget and Resources

There were no incurred costs to the facility for this project's implementation. The project manager purchased and created the waste disposal prompts. As mentioned earlier, these prompts were placed on the RMW sharps containers and served as a guide for the participants' waste disposal practices during the implementation period. The total cost was approximately USD 75. The resources required for this project included a digital scale, educational material that defined RMW ($25) and prompts for the RMW containers to guide waste disposal practices ($50). Refer to Appendix I for the estimated project budget and Appendix K for the waste prompts. RMW sharps containers that were already in the operating room were utilized to meet the aims of this project. See Appendix B for the on-site digital scale that was utilized for this project. The Clinical Engineering and Biomedical Engineering Department at AMH provide maintenance for the digital scale.

PICOT Question

For Certified Registered Nurse Anesthetists and OR staff (P), how does a waste container designated for empty, unbroken medication vials (I) compared to no designated container (C) influence the cost of regulated waste removal (O) over four weeks (T)?

Risk Analysis

There was no risk to the participants in this DNP project. All participants in this project were instructed that if empty, unbroken medication vials were placed into the RMW sharps container instead of the regular waste container, they must not remove them. See Appendix C for Informed Consent for the project's participants.

Chapter 2: Synthesis of Supporting Literature and Project Framework

Theories/Frameworks: Lean Methodology

Lean methodology allows teams to map processes and eliminate unnecessary waste (White et al., 2021). The process examined in this project was the waste stream at AMH. RMW sharps container were the primary waste stream highlighted in this project, in addition to the third party waste management company. As AMH is a 25 bed critical access hospital, it's size is much smaller than typical hospitals. Due to this size constraint, it is no surprise that AMH utilizes a third party for disposal of RMW. The lean method gained much of its notoriety in the automobile industry, with Toyota motors (White et al., 2021). While this revolutionized that specific industry, this method has been applied to virtually all other business models, including the healthcare system.

Within the Lean method, there are fundamental aspects to consider, and these include: eight types of waste, two concepts and five core principles. Millard (2018) defines the eight types of waste as: motion, inventory, waiting, defects, overproduction, transportation, over-processing, and human potential. Motion deals with personnel, supplies and equipment and excessive movement beyond what is necessary. Inventory focuses on the abundance of items, the cost to store, maintain and the subsequent devaluation of the goods. Waiting is a delay in the normal routine, for instance if interruptions in a process occur. Defects is the quality of the products produced. Overproduction leads to increases in inventory, motion, and transportation. Transportation of materials from one location to another with no clear benefits to the customer. Over-processing reflects putting more resources into products than the customer values. Human potential is the underutilization of personnel attributes and skills.

Out of these eight types of waste, overproduction and over processing are be reflected in this DNP project. The increases in volume of RMW within the sharps containers reflect overproduction. This over production translates to more waste needing treated prior to disposal which represents over-

processing. The actions of anesthesia providers placing empty, unbroken medication vials into the RMW sharps container encompasses both the production and processing aspects. The result from the providers actions is increases in both the quantity of containers, waste volume and cost of removal. Hypothetically, if the waste removal company charges per weight or per container, it is reasonable to consider the likelihood of increased costs for waste removal from the facility.

The two concepts pertinent to Lean methodology, are respect for people and continuous improvement. The respect for people focuses on the front line workers and the ideas generated from within them and continuous improvement takes the stance that facilities procedures have the potential to always be improved upon (Willard, 2018). Discussions regarding the importance and necessity of this project occurred with the anesthesia providers at the site. They are considered the front line workers. From these discussions, stemmed the idea to target RMW and to make attempts to decrease it at AMH.

(Lynn, 2021)

Millard (2018) emphasizes five core principles for lean methodology including: value, value stream, flow, pull, and perfection. Value is derived from the customer preference on the price of the good. Value stream is the sum of the products entire life cycle from inception of the idea to the customers use of the produce. Flow in the processes should sync with one another, with limited delays, or interruptions. Pull reflects customer demand and the production of goods should match the demand. Perfection involves the investigation of issues and wastes. As RMW sharps containers were examined, this allowed the project manager to investigate waste creation at the root cause within AMH. This examination represents the perfection core principle.

Literature Review

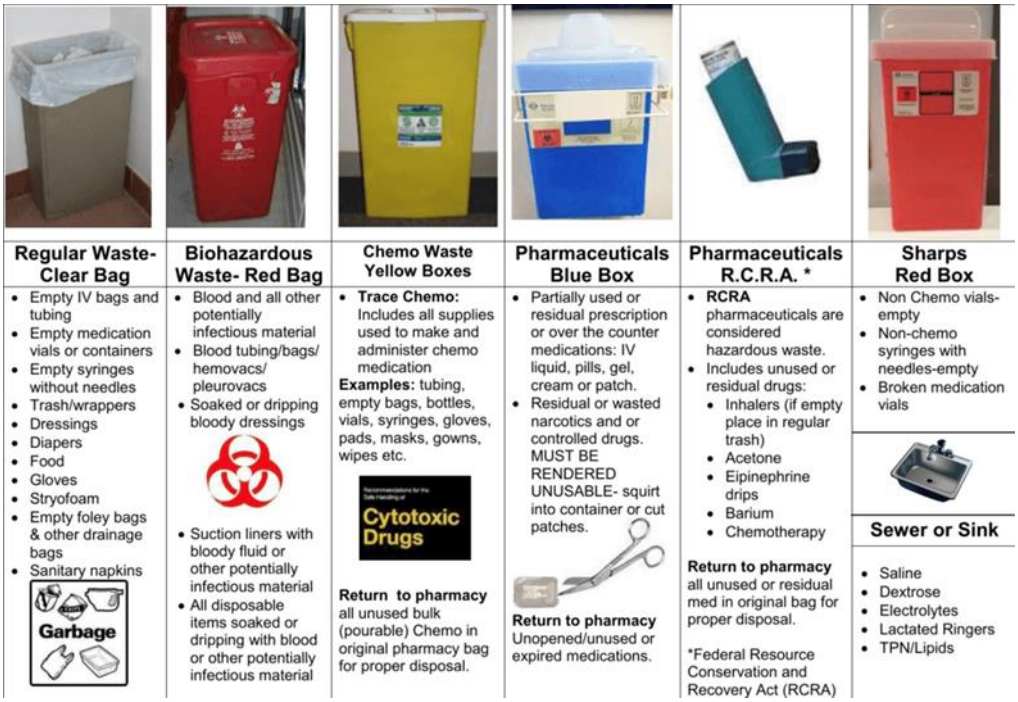
Since 1992, there has been a 15% annual increase in waste generated by healthcare systems (Denny, et al., 2019). With this figure in mind, waste production has increased 435% since 1992. An article published in 2018 stated that 4 billion tons of waste were created from hospitals annually (Guetter et al., 2018; Martin et al., 2017). More recently, hospital waste production has grown to approximately 6 billion pounds annually (Farifield et al., 2021). These figures show the magnitude of this problem in the United States and even nations abroad. Both developed and developing nations are affected at different levels. Njue et al., (2015) found 16.3% of both nurses and waste handlers properly adhering to waste disposal guidelines. Healthcare facilities face increased costs for RMW disposal (Wohlford et al., 2020; Garcia, 1999; Regulated medical waste, 1994). Compared to regular waste removal from healthcare facilities, cost of RMW removal is an important consideration as executives critique their budgets. The disposal costs for RMW are upwards of ten times as much as solid waste (Wyssusek et al., 2019; Wohlford et al., 2020). Improper waste segregation within healthcare facilities leads to increased costs. Upon the examination of waste contents in RMW containers, inappropriate waste was discovered (Shinn et al., 2017; Hubbard et al., 2017; Stonemetz et al., 2011; Hsu et al., 2020; Amariglio & Depaoli, 2021; Seidman & Parker, 1998; Pereira et al., 2013; Shinn et al., 2017). Insufficient

separation of waste leads to infectious waste contaminating solid waste (McGain et al., 2009; Pereira et al., 2013). This improper separation and subsequent contamination now must undergo treatment collectively as hazardous waste. Non-hazardous waste includes catheters, pads, syringes without needles, and empty intravenous products (Harding et al., 2021). Hazardous and regulated medical waste accounts for 24% of medical waste but represents 86% of the costs (Kwakye et al., 2011). These figures show how easily the costs can be increased by the misallocation of waste into the incorrect containers. Kwakye et al. (2011) examined waste in the hazardous red bags and found greater than 90% not meeting criteria for hazardous waste. Additionally, Hsu et al. (2020) found only 15% of material in hazardous red bags meeting the criteria for RMW. There is a clear problem with the proper identification and separation of waste.

Waste Streams

As the various types of waste are considered, a synonymous term for "types" of waste is "streams." Martin et al. (2017) defined four waste streams as solid waste, RMW, pharmaceutical, and recyclables. Throughout the literature, there are both similarities and differences in the identification of waste streams. Additionally, within the term RMW, there are three types that specifically come from the healthcare setting: radioactive, hazardous-chemical, and infective waste (Regulated Medical Waste, 1994). These defined groups of waste have expanded through the years. Attached below (Figure 1) are common types of disposal containers encountered in the healthcare setting. Common containers in the OR are the regular waste containers, hazardous waste, sharps container, and pharmaceutical boxes.

Figure 1: Waste Disposal



(Medical waste disposal guidelines, 2021)

Waste Disposal Methods

Treatment of waste can occur either in the facility itself or it can be handled by a third party. The determining factor is if the hospital has the treatment capabilities in their facility. Indiana code (2020) specifies five waste treatment options: incineration, steam sterilization, chemical disinfection, thermal inactivation, and irradiation. For referencing purposes, steam sterilization is also known as autoclaving. No disposal method is available that is environmentally friendly and low cost (Windfield & Brooks, 2015). Wohlford et al. (2020) discusses different treatment methods of waste including incineration, autoclaving, or chemical treatment. These three treatments represent most of the waste management literature, however as noted, Indiana code lists five. In the United States, incineration is the most common disposal method (Windfield & Brooks, 2015). Incineration represents 49-60% of waste treatment, autoclaved represents 20-37%, and other technologies account for 4-5% (Windfield & Brookes, 2015).

Significance of Problem

Environmental

The US healthcare sector emits 10% of the nation's total greenhouse gases (GHGs), equating to more than 3 million kg of GHG emissions annually (Thiel, et al., 2018). The US is the greatest GHG contributor in the world, at 7.6% (Rammelkamp et al., 2021). As climate change remains a central focus, hospitals must recognize their carbon footprints. Hospitals carbon footprints are lowest with recycling and low temperature incineration at 21-65 kg carbon dioxide (CO2) emissions, while high temperature incineration has the highest impact on carbon release at 1,074 kg CO2 emissions per ton of hospital waste (Rizan et al., 2021). The healthcare industry accounts for 9% of America's commercial energy use (Kwakye et al., 2011). According to Guetter et al. (2018), air pollution emissions and consequences including acid rain, GHG emissions, smog formation, air pollutants, stratospheric ozone depletion, and carcinogenic/non-carcinogenic air toxins are linked to healthcare facilities. Waste incinerators are in the top five sources of mercury and dioxin emissions in the United States (Guetter et al., 2018). Climate change will affect most populations in the coming decades and influence the health of billions (Guetter et al., 2018). For healthcare providers, the time to act is now to reduce future carbon footprints.

Economical

In 2016, the US spent $3.6 trillion dollars on health care (Denny, et al., 2019). The US spends between $8.8 and $10 billion per year on energy (Wyssusek et al., 2019). Nationwide, average disposal cost of regulated medical waste is $0.28 per pound (Wormer et al., 2013). Although there are differences between facilities, disposal of general waste is $0.04/lb, infectious bagged waste is $0.28/lb, and sharps waste is $2 per pound (Fraifeld et al., 2021). Hospitals' budgets account for the removal and treatment of all waste from their facilities (Wyssusek et al., 2019). Incineration of waste costs $0.40-0.78 per kg (Wyssusek et al., 2019). Seidman & Parker (1998) found that by reducing misuse of sharps container, their facility could save $200,000 annually. Stonemetz et al. (2011) modified waste

production in a way that was not statistically significant; however the institution saved $574,024 over the 24-month period. Following initiation of Green OR strategies at the hospital complex, approximately $158,000 was noted in savings (Wormer et al., 2013). Green OR strategies include reducing solid waste, utilize recyclable, reusable equipment, and reducing energy and water usage. Hospitals that ship RMW to intermediaries, pay six to ten times more than the cost of conventional waste disposal (Stonemetz et al., 2011). These facilities are faced with increasing costs which decrease their respective profit margins. RMW removal costs are up to 500 times as much as standard solid waste (American Society of Anesthesiologists, 2021). The identification and reduction of RMW offers a huge financial incentive to these healthcare institutions.

Summary of Supportive Evidence

A review of literature was conducted to explore solid and regulated medical waste management in the hospital setting. Databases searched included CINAHL Plus, PubMed, EBSCO Biomedical Reference Collection, PsycInfo, and Google Scholar. Boolean search terms included in this review were “AND” and “OR”. The search terms are presented in Table 2-1 below. The literature demonstrates that the production of hospital waste occurs daily and on a massive scale (Denny et al., 2019; Conrardy et al., 2010; Hsu et al., 2020; McGain et al., 2015). Numerous studies have examined waste container contents in the healthcare setting, inside and outside of the OR. As sustainability is pursued in hospitals, economic and environmental benefits become clear (Gaiser et al., 2004; Seidman & Parker, 1998; Shrank et al., 2019; Stonemetz et al., 2011). As rural and urban hospital budgets become more scrutinized and cost cutting measures are suggested, waste management is an area to consider.

Table 2-1: Database Results

Database	Search terms	Results
CINAHL Plus	Waste management AND Operating room	46
	Regulated medical waste AND Hospital	13
	Environmental sustainability AND Hospital	5
	Anesthesia AND Waste	37
	Regulated medical waste	24
PubMed	Regulated medical waste AND Operating room	29
	Waste management AND Healthcare	1,852
	Reducing waste in healthcare	1,069
	Sustainability AND Hospital waste management	745
	Reduction of waste AND Operating room	74
EBSCO Biomedical Reference Collection	Regulated medical waste	2
	Sustainability AND Operating room	6
	Waste in healthcare	21
	Waste in the operating room	6
	Waste management AND Operating room	6
PsycInfo	Waste management AND Healthcare	27
	Waste in healthcare	73
	Reducing waste in healthcare	4
	Lean methodology OR Lean method AND Healthcare	75
	Waste treatment AND Healthcare	11
Google Scholar	Regulated medical waste treatment	17,300
	Hospital waste disposal guidelines in the US	1,910
	Regulated medical waste AND Sharps container	1,460
	Regulations for hospital waste disposal	1,530
	Greening the operating room	408

Chapter 3: Project Design

Project Design

This DNP project, A Strategy to Reduce Regulated Medical Waste in Hospitals, was a quality improvement (QI) project. According to the U.S. Department of Human and Health Services, a QI project provides a systematic and problem focused approach that yields measurable goals in the targeted population or group (2011). Implementation of this project was conducted within three operating rooms at AMH. The QI measures in this project stem from the project manager's identification of improper segregation of waste at AMH. Throughout the project's duration, the anesthesia providers and OR staff were equipped with educational information regarding proper waste disposal that was both evidence based and adherent to hospital policy.

Project Schedule

The pre-implementation phase for this project began on Monday, January 17, 2022, and concluded on January 31, 2022. An educational presentation was given to the participants prior to the beginning of the implementation phase. The implementation phase began on Monday, January 31, 2022, and concluded on Monday, February 14, 2022. See project timeline in Appendix H.

Ethical Considerations

The Project Manager provided the consent form presented below in Appendix C to the four anesthesia providers and OR staff prior to the pre-implementation phase. The consents were delivered to the participants in paper form at AMH. Within the consent form, participation in this DNP project was defined as voluntary and participants were notified that withdrawal at any point in the proposed project timeline was acceptable. Participants were not exposed to attempts of coercion or deception at any point in this project. Refer to Appendix E for the demographic questionnaire, no personal identifying information from the participants was obtained. Institutional Review Board approval form is provided in Appendix I.

Implementation Methods

Prior to the beginning of the pre-implementation phase, initial weighing of the RMW containers at AMH occurred. In addition to the weights, the project manager obtained the number and types of cases for that given week. Including this surgical case information correlated the amount of weight being produced with the number of OR cases. The project manager anticipated that with increased surgical volumes, that there would be a direct relationship of increased waste volumes. The primary reason for early data collection was an attempt by the project manager to limit Hawthorne effect. According to Perera (2021), the Hawthorne effect describes the event where participants who are being observed will increase their performance levels. Pre-implementation began on January 17, 2022 and continued for two weeks. During this phase, RMW sharps containers were strictly weighed with no prompts/instructions for the participants. The RMW sharps containers were weighed weekly at the conclusion of the work week. The purpose of the pre-implementation phase was to provide data prior to the educational intervention of which is described below. Following the conclusion of the pre-implementation phase but before the implementation began, a PowerPoint educational presentation was given to the participants by the project manager. Educational information from the presentation followed and adhered to hospital policy, which served as a guide for the participants waste disposal practices. Following the delivery of this information, the implementation phase began on January 31, 2022, and continued for an additional two weeks. During this implementation period, waste disposal prompts were placed on the RMW sharps containers inside the three operating rooms at AMH. Attached in Appendix K are the waste disposal prompts. These prompts provided guidance to the participants on proper waste disposal practices that adhered to both literature and hospital specific RMW policy.

Measures and Aims

Aim One

Decrease the weight and volume of regulated medical waste produced within the operating rooms.

Outcomes for Aim One

- Reduction of regulated medical waste volume by 5% following the four week implementation period.
- Reduction of weekly regulated medical waste volume by 5% compared to pre-implementation.

Aim Two

Reduce disposal costs of regulated medical waste for Adams Memorial Hospital.

Outcomes for Aim Two

- Waste disposal cost for regulated medical waste will decrease by 5% when compared to pre-implementation.
- Regulated medical waste container replacement will decrease by 5% after the four week implementation period.

Measures/Tools/Instruments

The digital scale at Adams Memorial Hospital is serviced by the Clinical Engineering and Biomedical Engineering Departments every six months. The scale had a zero function which allowed the retrieval of ratio level data. Further, the scale rounded to the tenth place and allowed readings to be either kilogram or pounds. See Appendix B for the digital scale.

Evaluation Plan

Methods for Collection of Data

The project manager utilized the previously described digital scale at AMH. RMW sharps container weights were recorded at the conclusion of each work week, on Friday. The weights obtained from the scale by the manager, were then transcribed onto an excel spreadsheet. This excel data

was maintained on the project managers password protected one drive. Only the project manager had access to this dataset. The access span from January 17th, 2022, to February 14th, 2022. The primary data for this project was the recorded weights of the RMW containers. To ensure accurate retrieval of data, the RMW containers were numbered (1-9) so that the inadvertent disposal of full containers would not occur before the official weighing by the project manager could be completed.

Data Analysis Plan

The project manager utilized Descriptive Statistics - Percentage Change for the analysis of data collected during the DNP project. Descriptive statistics use numbers to summarize datasets (Holly, 2019). The numbers for interpretation purposes were the RMW container weights at the conclusion of each week. The calculation for Percentage Change is as follows: New Value – Old Value/Old Value x 100. The new value for this equation was the weight obtained by the project manager and the old value is represented by the data collected prior to the pre-implementation period as previously described.

Dissemination Plan

A PowerPoint presentation was provided to the four anesthesia providers and OR staff at Adams Memorial Hospital at the conclusion of the implementation period. The presentation can be found in Appendix M. In addition to this presentation, a written executive summary was provided to the participants. Further, a presentation was presented to the project managers fellow peers and DNP faculty. Through this dissemination, project pertinent information was disclosed. The DNP manuscript is retrievable from the USF DNP Project Repository.

Chapter 4: Results and Outcome Analysis

Data Collection Techniques

As described above, the data collection time frames were broken down into pre-implementation and implementation periods. The data from the two periods equated to pre and post intervention data sets. This data allowed the project manager to identify differences in RMW weight from both periods. As the weights were examined, an appreciation for the overall impact and the potential financial benefit of this DNP project was gained. National average disposal costs previously cited were utilized for the purposes of determining the financial impact of this project. Additional information that was gathered included the anesthetic case types at AMH during the four weeks, and this information is presented below in table 4-1. For this project, general anesthetic cases were defined by the presence of an endotracheal tube or laryngeal mask airway for the respective procedure. Monitored anesthesia care cases were defined by the use of a nasal cannula and various sedative medications.

Table 4-1 Types of Cases

Date	General Anesthetic	Monitored Anesthesia Care	Total
Week 1 (Jan 17 – Jan 24)	6	30	36
Week 2 (Jan 24 – Jan 31)	3	20	23
Week 3 (Jan 31 – Feb 7)	7	26	33
Week 4 (Feb 7 – Feb 14)	7	29	36
Total	**23**	**128**	**151**

As pre-implementation and implementation are compared in table 4-1, there were more anesthetic cases in the implementation period when compared to the pre-implementation. The largest number of cases during this project occurred at week one and week four, with both weeks having 36. In theory, one might expect a linear relationship between cases performed and the amount of waste produced. This relationship indicates that more cases equal more waste. The data collected during the implementation period defied this relationship and in fact demonstrated an inverse relationship. An

inverse relationship is identified by the increased number of cases accompanied by a decreased amount of RMW. These conclusions strengthen the findings of this project.

Measures/Indicators

In the previous chapter, aims and outcomes for this DNP project were defined. Aim one intended to decrease the weight and volume of RMW at AMH. The two outcomes for this aim focused on the reduction of RMW volume by 5%. However, these outcomes offered two different perspectives. Outcome number one spanned the entire project duration of four weeks and the second outcome compared data from pre-implementation and implementation periods on a weekly basis. Pre-implementation and implementation weights are presented below in Table 4-2.

Table 4-2 RMW Weight

Date	**Pre-Implementation Weight (lbs.)**
Week 1 (Jan 17 – Jan 24)	153.4
Week 2 (Jan 24 – Jan 31)	69.6
Total	**223**
Date	**Implementation Weight (lbs.)**
Week 3 (Jan 31 – Feb 7)	32.2
Week 4 (Feb 7 – Feb 14)	38.8
Total	**71**

As the data is compared in table 4-2, a 152 pound difference can be appreciated between the pre-implementation and implementation periods. This difference reflected a Percentage Change of 68%. To determine if this project met the second outcome for aim one, an excel data sheet was utilized. As previously mentioned for the second outcome for aim one, comparisons occurred on a week to week basis. The comparisons began with week one of pre-implementation and week three of the implementation period. The comparison resulted in a Percentage Change of 79%, well above the previously mentioned goal of 5%. Additionally, week two of the pre-implementation period was compared to week four of the implementation period. This yielded a Percentage Change of 44%. To

further illustrate the influence this project had on the RMW volume at AMH, presented below in figures 4-1 and 4-2 are visual representations of the data in Table 4-2.

Figure 4-1 RMW Pre-and-Post

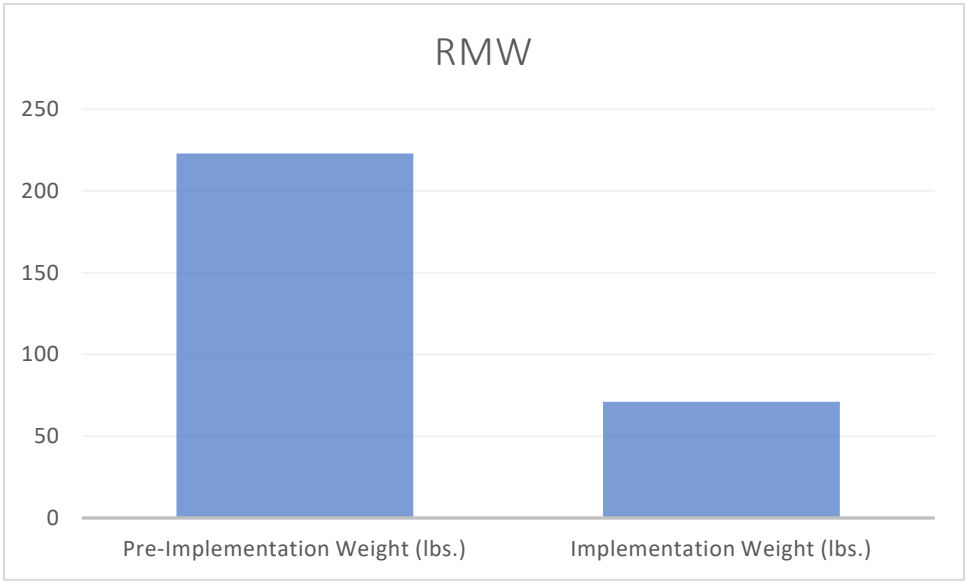
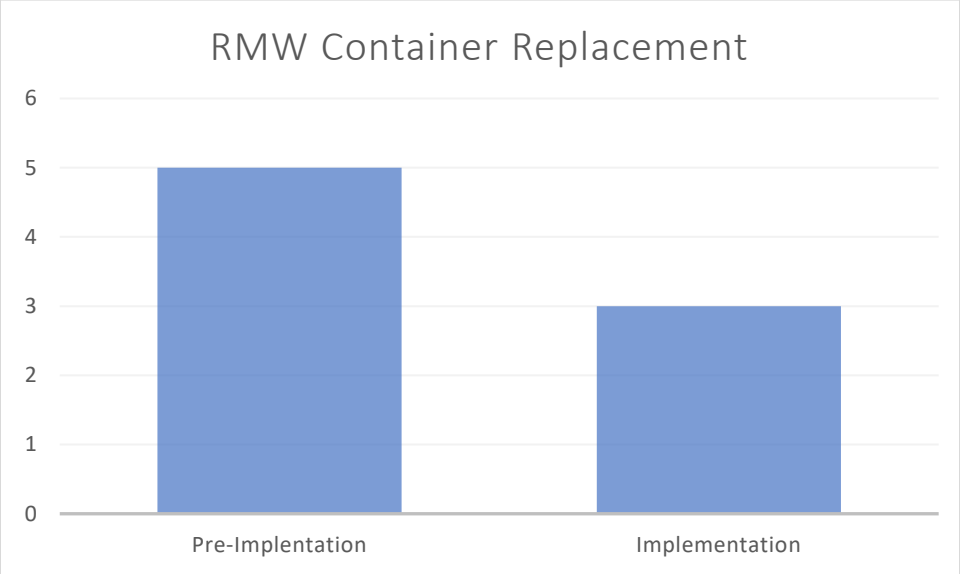


Figure 4-2 RMW Weekly Trend

The second aim for this project pursued the reduction of RMW disposal costs for AMH. The first outcome for this second aim attempted to decrease the RMW disposal costs by 5%. As previously mentioned, the national average disposal cost for RMW sharps containers was approximated at $2 per pound. This approximated cost was utilized for the purposes of this aims' analysis. In addition, Table 4-2 was utilized during this data analysis portion. Utilizing the national average disposal costs, the pre-implementation period disposal costs for AMH was estimated at $446 and the implementation period disposal costs was $142. The percentage change between these two periods was 68%. At the conclusion of the two week implementation period, potential savings for AMH was approximately $304. To extrapolate this into potential monthly and annual savings, the project manager started by multiplying $304 by two to get $608 for monthly savings. From there $608 was multiplied by 12, for a potential annual savings of $7,296 for AMH. The second outcome for aim two sought to decrease RMW container replacement by 5%. The RMW container replacements were completed by various OR staff members throughout the week. During the pre-implementation period, the RMW containers were replaced five times, and three times during the implementation period. The comparisons of these two periods, yielded a Percentage Change of 40% which met the second outcome for aim two. The findings for this outcome are illustrated below in Figure 4-3.

Figure 4-3 RMW Container



Data Analysis Inferences

Reflecting on the statistical analyses performed above, the project manager felt that both aim one and aim two in addition to the four outcomes were met. The participants and other team DNP members fully embraced this project from the conception through the implementation. The potential for this project to be implemented system wide is something that should be considered by the executive team (S. Colclasure, personal communication, February 14, 2022). The excess waste identified in this project expands beyond the OR setting and occurs in every aspect of a healthcare organization. The project manager felt that this project is only the beginning of DNP led initiatives to lessen environmental and economical strains worldwide on the healthcare system.

Gaps

The gap identified during the data analysis portion of the pre-implementation and implementation periods was the lack of facility specific waste disposal costs. While this project demonstrated a reduction in RMW volume and disposal costs with the comparison of pre-implementation and implementation periods. The lack of site specific financial information for AMH limited the full impact this project could have had.

Unanticipated Consequences

There were no unanticipated consequences from either the pre-implementation or implementation periods.

Expenditures

No additional expenditures were noted outside of the proposed budget. The DNP budget approximated $125 in expenditures for this project. Breakdown of this budget included $50 for project specific training, additionally $75 was utilized for the creation of disposal guides, lamination material, and other educational material pertinent to the project. The budget is presented in Appendix J.

Chapter 5: Leadership and Management

Organizational Culture

The institutional and organizational assessment (IOA) model serves as a performance improvement tool for both institutions and organizations. There are three key areas that must be examined, these are the organizations motivation, capacity, and external environment (Universalia, 2021). The motivation, capacity and external environment contribute to the overall performance. Since the creation of the IOA model, it has expanded and adapted alongside the organizations as the business environments and challenges arose (Lusthaus et al., 2002). Provided below is a visual diagram that further breakdowns the separate categories of the IOA model. The IOA model was utilized by the project manager for the analysis of Adams Memorial Hospital (AMH). The performance of AMH was examined through its capacity, motivation, and external environment.

(Universalia, 2021)

Organizational Motivation

AMH is a 25-bed critical access healthcare institution located in Decatur, Indiana. AMH provides diagnostic, therapeutic, and preventative care to the 35,777 residents of Adams County ("People," 2019). Acute care services offered to the community include inpatient and ambulatory surgery, orthopedic surgery, sleep studies, laboratory services, and radiology services ("Serve," 2021). The Center for Medicare and Medicaid Services (CMS) determines the eligibility requirements for a rural hospital to be labeled critical access ("Critical Access Hospitals," 2021). Institutions that seek this status must have 25 or fewer acute inpatient beds, be located more than 35 miles away from another hospital, maintain an annual average length of stay that is 96 hours or less for their hospitalized patients, and provide 24/7 emergency services ("Critical Access Hospitals," 2021). AMH's mission is to serve with compassion and excellence with a vision to remain an independent and trusted healthcare provider for Adams County ("Serve," 2021). Within this vision are additional qualities such as safety, excellence, respect, value, and ethics ("Serve," 2021).

Organizational Capacity

Critical care access hospitals were found to employ on average 127 employees which equated to six million dollars in wages, salaries, and benefits (Doeksen et al., 2016). Hospitals in the rural setting are vital to the communities they serve. These hospitals provide care that is close to home while also offering opportunities for employment and investments within the local community. AMH is a small community hospital, and most of the staff are from the surrounding area (H. Cenko, personal communication, May 20, 2021). In 2018, AMH investments totaled over 14 million dollars ("Audited Financial Statements", 2021). Operating costs for 2018 were 305 million dollars, with revenues totaling nearly 300 million. A portion of the operating costs included 177 million in salaries, wages, and benefits ("Audited Financial Statements", 2021). Additionally, AMH spent almost 30 million dollars in supplies.

External Environment

AMH opened its doors to Adams County in 2010. Since 2010, AMH has become increasingly involved in the community. AMH offers community events such as health coaching services, mammography screening and fitness center classes weekly ("Community Events," 2021). These scheduled events change weekly and establishes great rapport with the public. The events offered by AMH allows a deeper connection to form between the facility and the local community (D. Shepherd, personal communication, May 21, 2021). Prior to COVID-19, AMH hosted several social activities for the staff to participate in but now the facility does not (S. Colclasure, personal communication, May 20, 2021). While it may not seem to a major setback in the scheme of things, there is a sense of missed opportunities for staff bonding (S. Colclasure, personal communication, May 20, 2021). From the political perspective, AMH acknowledged the need for this project and remained open and receptive to changes. There is a growing concern amongst the staff that more must be done in the healthcare setting to reduce the strain on the environment (D. Shepherd, personal communication, May 20, 2021).

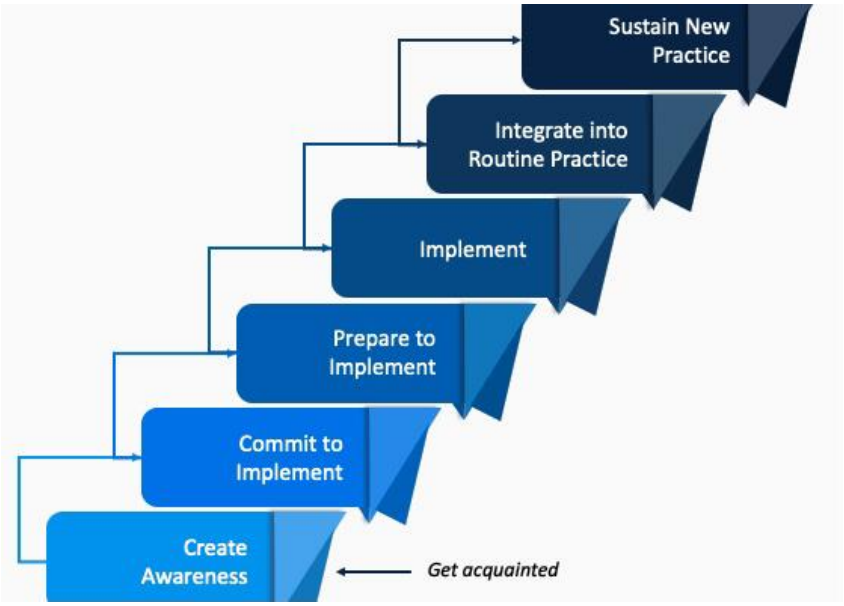
Organizational Performance

AMH demonstrates a need for their organization in the community, both financially and from the health benefit perspective. Comparison of AMH to hospitals nationwide are presented in this section. Quality measures for this comparison include mortality, safety of care, readmission rate, patient experience, care effectiveness, timeliness of care, and efficient use of imaging devices ("Adams Memorial Hospital," n.d.). AMH's current standings are as follows, mortality is equal to the national average, safety of care data is not available, readmissions at AMH are below national average, patient experiences are above national averages, effectiveness of care is equal to the national average, timeliness of care is above national average, and the use of imaging devices is equal to the national average ("Adams Memorial Hospital," n.d.). From the national comparison standpoint, AMH is an exceptional facility. Although it is a small organization, AMH demonstrates its relevancy and viability as a

healthcare facility. AMH is vital to the future of Adams County residents (H. Cenko, personal communication, June 20, 2021). See Appendix G for Strengths, Weaknesses, Opportunities and Threats for AMH.

Change Strategy

Stages of Change Theory



(Stages of Change Model, 2021)

This theory began in 1982, when researchers examined individual's use of processes when undergoing change (Prochaska & DiClemente, 1982). There are five phases in the Stages of Change Theory, collectively illustrating the steps individuals go through when change in a practice or habit occur (White et al., 2021). These five phases can be applied at the experimental and environmental levels (Prochaska & DiClemente, 1982). Within the five phases, there are 10 processes of change. The 10 processes are raising consciousness, self and social liberation, self-reevaluation, environmental reevaluation, counterconditioning, stimulus control, reinforcement management, dramatic relief, and helping relationships (Prochaska & DiClemente, 1983). Prochaska and DiClemente defined individuals as "self-changers" or "therapy changers." (Prochaska & DiClemente, 1983). Self-changers undergo change on their own while therapy changers accomplish change through formalized treatments such as therapy

and other alternative therapies. The first stage is precontemplation, second is contemplation, preparation is the third, fourth stage is action, and maintenance is the fifth and final stage (White et al., 2021). Precontemplation represents the individual being either unaware there is a problem or no acknowledgement that a problem exists, contemplation is the individual's awareness of the problem/issue and the beginning thoughts of changing practice, with this gained knowledge the individual now begins to change the behavior and utilizes coping mechanisms to assist with the changes, the final stage is where the new behaviors must be reinforced to ensure sustained change in practice (White et al., 2021). Stages of Change Theory is also referred to as the Transtheoretical model.

As the project manager progressed through the doctoral studies, this theory was exemplified in both the academic and clinical perspectives. With an extensive literature search completed, the project manager was equipped to discuss the DNP project with the anesthesia providers and OR staff at AMH during rotation. Through these discussions, rapport was built, and an acknowledgement of the waste practice problem was achieved. Progression into stage two was accomplished and work immediately began on the preparation phase or "phase three". The fourth stage, action began once education was provided to the project participants at AMH. Waste disposal practices of the participants were voluntarily modified to align with AMH specific guidelines for this action stage. Upon completion of the implementation period, the fourth stage concluded. The fifth stage began when the project manager provided a presentation to the institution so that the participants could visualize the impact of their contributions to the financial wellbeing of AMH. In addition to this positive reinforcement, the project manager provided further verbal reassurance in hopes of supporting the continuation of the staffs' new waste disposal practices. The sustainment of this practice change had to come from the individual participant, and they demonstrated the readiness and eagerness to do just that.

Leadership Style

Transformational leadership was the preferred style of leadership that the project manager utilized daily prior to this project. This same style of leadership was incorporated into this DNP project. Transformational leadership involves motivating followers' who share similar values and who demonstrate the desire to work towards a better tomorrow. Through these relationships, a close bond is formed. There are four processes in this style of leadership, idealized influence, inspirational motivation, individualized consideration, and intellectual stimulation (Grossman & Valiga, 2017). As the four processes are broken down further, idealized influence is the leader assisting the followers to increase trust, confidence, and respect (Grossman & Valiga, 2017). Inspirational motivation encompasses the teaching of followers to be empowered, goal oriented, and responsible. Individualized consideration is the increasing of the followers' self-esteem, work ethic and achieving self-actualization. The fourth process is the act of assisting the followers to be creative, expand on topics and find new approaches to problems that arise. Through this empowerment of followers, the project manager felt this was key to successful implementation.

The roles of Ms. Heather Cenko, OR manager, and Dr. Colclasure are discussed in the next section, but their individual leadership styles are defined now. The leadership style used within the OR at AMH is shared governance (H. Cenko, personal communication, May 20, 2021). Through the shared governance, Ms. Heather presents a problem to the OR staff and allows them to determine the best course of action. This approach to leadership allows more buy in from the staff and they in turn perform better at work and feel invested (H. Cenko, personal communication, May 20, 2021). Ms. Heather allows the staffs input to be put into action and only intervenes in the process if there are issues in the newly adopted process. Dr. Colclasure seeks to utilize the principles of the Christian faith into his leadership style. From this perspective, Dr. Colclasure sees himself as serving others and not as a position of power.

Dr. Colclasure focuses on treating people with respect and holds himself to a high standard of integrity (S. Colclasure, personal communication, May 20, 2021).

Interprofessional Collaboration

Team *members*

Dr. Carla Mueller was the project managers advisor for the entirety of the project timeline. Dr. Mueller offered the project manager guidance and support and provided excellent critique on all aspects of this DNP project. Ms. Heather Cenko was the OR manager at AMH. Ms. Heather served as an expert on the daily operations of the OR. Dr. David Shepherd, CRNA, served as the site champion. Dr. Shepherd helped guide the implementation phases of this project from within the OR's at AMH. Dr. Shepherd was instrumental in the successful implementation of this project. Dr. Colclasure was the physician anesthesiologist who provided supervision over the CRNA's at AMH and served as an additional resource on the daily operations of the anesthesia providers. Tammy Jones was the environmental services manager who played a pivotal role in the evaluation phase of this project. Currently at AMH, the environmental service department has the sole responsibility of collecting RMW from the OR's. Mr. Chris Butler was an additional member, Chris served as the Chief Nursing Officer at AMH. Chris was utilized for specific facility questions and provided a perspective from the executive position on the daily operations at AMH.

Organizational chain

The organizational structure at AMH represented a hierarchical structure. This structure consisted of various levels of staff, ranging from the executives at the top down to the groundskeepers. The importance of this structure was that no matter the perceived level of positions, everyone and every role had value to offer to the organizations' success. For the aims of this project, the primary lens came from the OR perspective. The project manager involved different perspectives from within AMH, and this act proved to be an important task to accomplish prior to the implementation phase. These

differing viewpoints from the managerial aspect, anesthesia providers, environmental services and the executive team yielded a comprehensive lens on the daily operations of the OR at AMH.

Conflict Management

Initial roadblocks encountered by the project manager centered on establishing contact with team members outside of the OR setting. The project manager overcame this roadblock by performing site visits and through attempts to contact personnel via email and phone. With this communication issue early on, follow-up answers on site specific questions were delayed. The project manager felt that open communication was vital to the success of this project. An additional roadblock was the reluctance of a prominent staff member to participate in this project's aims. The participant was reminded that participation in this DNP project was voluntary and that although AMH waste disposal guidelines supported this project, the provider had the right to continue their preferred waste practices throughout the entire project duration. With any project, there will ultimately be both seen and unforeseen roadblocks or concerns. Although there are these inherent risks, the project manager identified the importance of flexibility and adaptability required for the successful implementation of this project. These two qualities served both the team and the project well. As the project implementation unfolded, the project manager continued to feel confident in the project's team ability to overcome additional obstacles.

Chapter 6: Discussion

Impact of Project

As evidenced in the literature review, waste in healthcare on a national and global scale is at a critical point. Globally, hospitals and clinics must recognize their contribution to the identified waste management problem in this project and seek waste reduction initiatives. The potential impact of this project and many others may assist such an initiative. As discussed earlier, change begins when awareness is brought to the attention of providers and other hospital staff. As the recognition grows regarding insufficient waste practices and the spotlight brightens, the waste disposal issue could be pushed to the national stage. The findings from this project support a continuation of these newly adapted waste practices at AMH. The allocation of waste that defined this projects' implementation period provided a simple, yet effective cost saving measure for AMH. The potential for this type of project to expand outside of the OR's is quite high and this should be brought to the attention of the executive team (D. Shepherd, personal communication, February 14, 2022). The most important factor throughout this project's duration was the desire for change and support from the members and participants. This project could become a six figure initiative for AMH, if it were to be implemented system wide (S. Colclasure, personal communication, February 14, 2022).

Decisions and Recommendations

As this project is considered for future use at AMH and other facilities, 17 willing individuals demonstrated that with small modifications in waste practices, potentially thousands of dollars could be saved annually. This finding could be motivational to other smaller facilities and larger facilities alike. The potential savings from this project could lend new equipment or provide additional training to staff (D. Shepherd, personal communication, February 10, 2022). The possibility of this benefit for hospital staff could be a motivational edge that promotes this type of initiative and increases staff involvement.

Limitations of Project

Potential limitations of this project include sample size and implementation site selection. Initially the sample was four anesthesia providers but later was adjusted to 17 participants which incorporated OR staff to offset this limitation. Other potential limitations include the number of OR's at AMH, the facility only had three OR's and a one GI suite room. As mentioned in the previous chapter, the lack of site specific waste disposal costs is an additional limitation. While AMH was a smaller hospital and it could differ in policies when compared to other hospitals, it served as an excellent site for this project to take place.

Application to Other Settings

As discussed above, waste within the healthcare sector is vast and impacts every nation to varying degrees. The application of this project into a system wide approach outside of the OR is a viable option for institutions to consider. Essentially, any healthcare facility that utilizes RMW containers is an appropriate candidate for this type of project.

Strategies for Maintaining and Sustaining

The initial strategy for maintaining this change was to present the findings back to the project's participants. This presentation would allow individuals to see how their newly adapted waste disposal practices influenced the financial well-being of AMH. In addition to the presentation, Dr. Shepherd, the site champion could be utilized to send out monthly waste reports to AMH staff members for the remainder of fiscal year 2022. As sustainment efforts are considered, the stages of change model must be re-examined. According to LaMorte (2019), behavior changes can take up to six months to solidify into the "maintenance" phase. The action stage is what the participants partook in during the implementation period. The maintenance stage began at the conclusion of the action stage. The maintenance stage relied on the project participants and their newly adapted waste practices. To support the change brought by this project, the mentioned waste reports could be utilized to keep staff

members on track. Many facilities already utilize this type of quality initiative so this practice change could be seamlessly incorporated into that approach. Recycling and renewal strategies are a consideration to add to the scope of this project. AMH began to implement recycling options for medical equipment and disposal containers for unused liquid medication. This act by AMH demonstrated the desire for the institution to incorporate initiatives that are both economically and environmentally sound.

Lessons Learned

Implementation

The importance of a strong support system to endure challenges and obstacles became clear as this project progressed through development. With this support, successful implementation occurred, and this project's aims and outcomes were met. The creation and maintenance of a trustful and respectful relationship amongst participants and team members was an important task to accomplish by the project manager. As mentioned in the previous chapter, the main issue for this project involved one participant who opposed this project and did not wish to alter their waste habits. The initial relationship fostered between the manager and this participant made this issue easy to overcome. Unfortunately this provider was relieved from their position just prior to the implementation phase, which resolved the concern entirely.

DNP Essentials

This DNP project met several essentials defined by the American Association of Colleges of Nursing and the University of Saint Francis. These essentials outline and guide the curriculum for doctorally prepared academic programs. The essentials are numbered 1-8 and serve as a competency based concept. The scope of these essentials includes all advanced practice registered nursing professions (AACN, 2022). The specific DNP essentials that this project met are defined below.

Essential I: Scientific Underpinnings for Practice

This essential began with the identification of the project problem and the initial literature search. Further, the development of the defined PICOT presented in Chapter 1. After these were accomplished, the new practice approach for waste practices at AMH was developed.

Essential III: Clinical Scholarship & Analytical Methods for Evidence-Based Practice

For this essential, the creation of the IRB proposal marked the initial stages. This was an important and necessary task to complete prior to the formal implementation of this project. Upon IRB approval the project's implementation, data collection, data analysis, and dissemination additionally met this essential.

Essential VI: Interprofessional Collaboration for Improving Patient & Population Health Outcomes

The consultation with the DNP project mentor, preceptor, other project team members accounted for this section. As previously mentioned, the significance of this project's team members was crucial to all aspects of this project. Through these collaborative efforts, the project manager was able to participate in an inter-professional team format.

Essential VII: Advanced Nursing Practice

An expansion from essential I, AMH as an organization was assessed in the practice setting. The dissemination of findings occurred in two phases and is defined in previous sections of this paper. The two presentations included one for DNP faculty and fellow classmates and the other was presented to the medical staff, executive team, and project participants at AMH. Through these implementation and dissemination acts, the project manager was equipped to mentor health care providers.

Chapter 7: Conclusion

Potential Project Impact on Health Outcomes Beyond Implementation Site

As areas outside of AMH are considered, the potential impact of this project is quite large. The waste disposal gap identified in this paper occurs in most healthcare facilities. Through this project, there was a potential for lessened environmental and economical strain on AMH. This same approach could be applied in other healthcare settings within or outside of Adams County. The waste practices identified in this project have the potential to impact the environment positively and create a healthier atmosphere for nearby residents.

Health Policy Implications of Project

Each hospital system has a different waste disposal policy, meaning that large healthcare systems may be able to process their waste while smaller systems might be required to use a third-party disposal company. As mentioned in the literature review, the costs associated with a third-party disposal company could be much higher than if the facility were able to process its waste. Within the state of Indiana, health care policymakers could examine state requirements for both types of facilities. Through these investigations and verification steps, lawmakers could acquire testimonies from hospitals, medical disposal companies, and environmental agencies throughout the state. This collaborative effort could lend an opportunity to align the disposal guidelines for the states' healthcare systems. With this alignment, cost considerations between the two systems could be compared and perhaps lessened if there are disparaging differences between them. Waste disposal costs should be equal across the healthcare system, no matter the size of the facility.

Proposed Future Direction for Practice

Anesthesia providers are encouraged to research local hospital waste disposal policies and determine if there are gaps in practice within the group or the OR staff. Both CRNAs and Anesthesiologists should consider their place as leaders in RMW disposal within the OR, and thus

commit to working together on this issue. This inter-professional collaborative effort should be expanded outside of the OR setting and include every unit of a hospital. As waste disposal gaps are identified and corrected, recycling efforts and re-purposing of select medical equipment could be considered to further lessen environmental and economical strains.

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Appendix A

Management of the Environment of Care
Plan for Hazardous Materials and Waste Management
Adams Health Network
Review Date: January 2021
Revision: 1/2021

Statement

The Hazardous Materials and Waste Management Plan for Adams Health Network is designed to provide a standardized manner by which to dispose of regulated and non-regulated waste from all facilities.

The Plan for Hazardous Materials and Waste Management is designed to support all campus activities, which includes: Adams Memorial Hospital, Adams Woodcrest Nursing Home and Independent Living (IL) apartments, Adams Heritage, Adams Woodcrest AL, and hospital-owned physician office buildings.

This plan is composed of the elements listed below. It is managed and coordinated by the Haz/Mat Sub-Committee. The safety officer provides oversight review and evaluation of the Hazardous Materials and Waste Management Plan.

A. Hazardous Materials Selection, Handling, Storing, Using, and Disposal.

1. A system has been developed that addresses the identification of hazardous materials and waste from the point of entry into the facility to the point of final disposal. Policies and procedures related to various hazardous materials and wastes are reviewed, revised, and approved annually by the appropriate committee.

B. Written criteria to identify, evaluate, and inventory hazardous materials used or generated.

1. Each department will be responsible for identifying and labeling all hazardous materials and waste within its department/area. Upon ordering these materials, the department manager-initiating the order will inform Materials Management that the materials are being ordered. Materials Management will follow proper guidelines by using the Hazardous Materials Tracking Log for receiving, identifying, and delivering these materials to their destination. Inventory levels of all hazardous materials will be routinely reviewed by the department using them for appropriateness as a part of the overall inventory management program.

2. A safety data sheet (SDS) is to be obtained for every chemical used in each department in every facility and identified as hazardous. The SDS is given to Safety Chair Person. The SDS is then scanned into a master file that is available online through the hospital network. Any computer on the Adams Health Network has access to the SDS master file 24 hours a day

3. SDS are available on the hospital intranet under the information tab. Clicking on the information tab will display a link for Safety Data Sheets which are organized alphabetically by chemical name. All AHN employees are educated at orientation and annually during RACE Day of the location and use of the SDS.

Management of the Environment of Care
Plan for Hazardous Materials and Waste Management
Adams Health Network
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C. Management of chemical waste, chemotherapeutic waste, radioactive waste, regulated and non-regulated medical waste.

1. Policies and procedures relating to chemical, infectious hazards, and physical hazards shall be reviewed by the Safety Committee on an annual basis.

2. All regulated waste is placed in red plastic containers provided by a contracted service and is processed off premises; this includes patient waste, sharps (needles and syringes), and pathology wastes.

3. Oncology waste is placed in yellow containers and disposed of by a regulated carrier.

4. All radioactive materials are disposed of in accordance to the Nuclear Regulatory Commission Regulations, through the Radiology Department.

5. Non-regulated waste is handled by an outside vendor.

D. Hazardous gas and vapors monitoring and disposal.

1. Personnel concerned with the use and transport of compressed gas shall be trained in the proper handling of cylinders, and cylinder valve protection caps. All cylinder storage areas shall be protected from extremes of heat and cold and from access by unauthorized individuals.

2. Materials which ignite easily under normal conditions (flammable) are considered to be fire hazards and will be stored in a cool, dry, well-ventilated storage space.

3. Highly flammable materials will be kept in an area separate from oxidizing agents (materials susceptible to spontaneous heating, etc.).

4. Protective clothing and equipment will be available for use when handling these materials.

E. Reporting and investigation of hazardous materials incidents.

1. A security report form will be completed on all hazardous materials and waste spills. The Haz/Mat Sub-Committee will obtain copies of all hazardous materials and waste-related incident reports for review by the Safety Committee.

2. All employee exposures to hazardous materials shall be reported as an employee injury. An employee incident report should be completed and investigated accordingly.

F. Employee orientation and education program.

Management of the Environment of Care
Plan for Hazardous Materials and Waste Management
Adams Health Network
Review Date: January 2021
Revision: 1/2021

1. Before starting to work or during orientation, each employee will be provided information regarding definition, proper handling, and disposal of regulated and non-regulated waste in their work area.
2. The Department Manager is responsible to ensure that all employees in his/her department are properly trained. Training records will then be sent to and maintained by the Human Resources Department.

3. At least one of the following performance indicators shall be addressed annually for the Hazardous Materials and Waste Management Plan, either through measurable numerical scores, or by quarterly and annual summaries that identify problem areas or developing trends, and indicate corrective actions or conclusions.
    a. Number of spills
    b. Number of spills requiring outside intervention
    c. Percentage of staff knowledgeable of spill response procedures
    d. Staff knowledge of SDS, (location, and use of)

G. Emergency procedures for hazardous material and waste spills or exposures.
    1. If a leak or a spill is found the following actions shall be taken:
        a. Identify the chemical before attempting to clean up any hazardous chemical spill or splash.
        b. Follow the directions found on the SDS for cleaning up that kind of chemical spill or splash.
        c. Notify people in the immediate area, supervisor, and maintenance staff.
        d. Wait by the spill until help arrives.
        e. Avoid tracking through the spill.
        f. Complete an incident report on the spill or leak.

H. Annual evaluation of the Hazardous Materials and Waste Plan.
    1. The Hazardous Materials and Waste Sub-Committee Chairman will conduct an annual evaluation of the Hazardous Materials and Waste Plan's objectives, scope, performance, and effectiveness. The Annual Evaluation will be presented to the Safety Committee by the November Safety Subcommittee meeting every year.

Appendix B


ZERO
0.0
LB
Healthweigh™
BMI
TARE
kg-lb
ON-OFF/ZERO
REWEIGH
RICE LAKE
adams
Biomedical Engineering Dept.
Completed by: Rex Morgan
Date
100 Lbs reads as _____ Lbs.
adams
Clinical Engineering Dept.
Safety Inspection
Completed By: Rex Morgan
Date: July 2021
Next Inspection: Jan. 2022

Appendix C

ADULT CONSENT TO PARTICIPATE IN A QUALITY IMPROVEMENT PROJECT
A Strategy to Reduce Regulated Medical Waste in Hospitals

SUMMARY INFORMATION

Things you should know about this Quality Improvement project:

- **Purpose:** The purpose of the project is to reduce the amount of regulated medical waste produced in the operating rooms at Adams Memorial Hospital.
- **Procedures**: If you choose to participate, you will be asked to modify your waste practices.
- **Duration:** This project will span over four weeks.
- **Risks**: The main risk or discomfort from this research is changes in your current waste practices.
- **Benefits:** The main benefit to you from this project is cost savings lead by your anesthesia group for Adams Memorial Hospital in addition to environmental benefits.
- **Alternatives:** There are no known alternatives available to you other than not taking part in this project.
- **Participation:** Taking part in this Quality Improvement project is voluntary.

Please carefully read the entire document before agreeing to participate.

PURPOSE OF THE PROJECT

The purpose of this Quality Improvement project is to reduce the amount of waste that is placed into the regulated medical waste sharps containers in the operating room. Through modifications in the anesthesia providers and OR staff placement of waste products, there will be less regulated medical waste volume. Regulated medical waste compared to regular waste produced inside the OR requires treatment before proper disposal. Reducing the volume of regulated medical waste will serve as a potential cost saving measure for Adams Memorial Hospital.

NUMBER OF PROJECT PARTICIPANTS

If you decide to be in this project, you will be 1 of 17 participants in this project.

DURATION OF THE PROJECT

An assessment of the current practices in utilization of the regulated medical waste sharps containers in the operating room at Adams Memorial has been completed and compared to best practices to aid in decreasing the volume of waste placed into the regulated medical waste sharps containers in the operating room.

- Your participation in this quality improvement project would involve a time investment of approximately four weeks. The time commitment would be for an educational presentation regarding best practices in medical waste disposal and methods for decreasing the volume of regulated medical waste.
- You will then be asked to contribute to implementation of best practices in medical waste disposal in the operating room. This should take no additional time on your part during clinical practice, except for perhaps a quick self-reminder to dispose of materials in the new way. Visual reminders will be added to the disposal containers to make this process easier for providers.
- Success of implementation of best practices will be assessed by the project manager after a two week period by December 13th, 2021.

PROCEDURES

If you agree to be in the project, we will ask you to do the following:

1. *Modify your waste practices*
    a. *You will be asked to refrain from placing unbroken, empty medication vials into the regulated medical waste sharps container.*
    b. *Instead, this item will be placed into the regular trash container*

RISKS AND/OR DISCOMFORTS

The project has no risks to you as the participant, however there is a potential discomfort stemming from the changes in your waste practices as you partake in this project.

BENEFITS

The project has the following possible benefits to you: as anesthesia providers and OR staff, you will given the opportunity to participate in positive change that will lessen the strain on the environment directly related to waste production in hospitals. Further, with your participation, your carbon footprint as an individual will be lessened. Benefits to your healthcare facility will be potential financial savings through modifications in allocation of waste products.

CONFIDENTIALITY

The records of this study will be kept private and no personal information will be requested from the participants. In any sort of report we might publish, we will not include any information that will make it possible to identify you. However, your records may be inspected by authorized University or other agents who will also keep the information confidential.

USE OF YOUR INFORMATION

Your information collected as part of the project will not be used or distributed for future research studies or scholarly projects even if identifiers are removed.

COMPENSATION & COSTS

There will be no compensation for your participation in this project. Additionally, there are no costs to you for participating in this project.

RIGHT TO DECLINE OR WITHDRAW

Your participation in this project is voluntary. You are free to participate in the project or withdraw your consent at any time during the project. The project manager reserves the right to remove you without your consent at such time that he/she feels it is in the best interest.

CONTACT INFORMATION

If you have any questions about the purpose, procedures, or any other issues relating to this research study you may contact Dylan Reagan at University of Saint Francis, 812-264-2406, reaganda@cougars.sf.edu.

IRB CONTACT INFORMATION

If you would like to talk with someone about your rights of being a participant in this QI project or about ethical issues, you may contact the USF Institutional Review Board by email at irb@sf.edu.

PARTICIPANT AGREEMENT

I have read the information in this consent form and agree to participate in this study. I have had a chance to ask any questions I have about this project, and they have been answered for me. I understand that I will be given a copy of this form for my records.

Signature of Participant	Date
Printed Name of Participant	
Signature of Person Obtaining Consent	Date

Appendix D

adams
MEMORIAL HOSPITAL
Member of Adams Health Network

1100 Mercer Avenue
Decatur, IN 46733

p: 260 724 2145

adamshospital.org

April 21, 2021

To the University of Saint Francis Institutional Review Board:

This letter is being written in support of University of Saint Francis DNP Dylan Reagan Doctor of Nursing Practice Project Scholarly Project entitled A Strategy to Reduce Regulated Medical Waste in Hospitals. Adams Memorial Hospital understands that the aims of the DNP Scholarly Project are to reduce the amount of regulated waste in the operating rooms and provide potential cost savings to the facility.

Adams Memorial Hospital is supportive of the aims of the project. We will allow Dylan Reagan to observe, evaluate, and educate anesthesia staff on the amount of non-regulated waste being placed in regulated waste receptacles. Since this project does not include patient or medical record involvement, an IRB is not required.

Adams Memorial Hospital and surgery and anesthesia leadership is happy to support Dylan Reagan's DNP Scholarly Project A Strategy to Reduce Regulated Medical Waste in Hospitals.

Sincerely,

Heather Cenko

Heather Cenko, RN, BSN, CNOR
Perioperative/Ambulatory Manager
Adams County Memorial Hospital

Appendix E

PARTICIPANT DEMOGRAPHIC SURVEY

1. What is your gender?
    a. Male
    b. Female
2. What is your age range?
    a. 18-29 years
    b. 30-49 years
    c. 50-69 years
3. How long have you worked at Adams Memorial Hospital?
    a. Less than 5 years
    b. 5 – 10 years
    c. More than 10 years
4. What is your current role at Adams Memorial Hospital?
    a. Certified Registered Nurse Anesthetist
    b. Anesthesiologist
    c. Registered Nurse
    d. Surgical Tech
5. What is your highest level of education?
    a. Associates Degree
    b. Bachelors Degree
    c. Master's degree
    d. Doctoral degree
    e. Doctor of Osteopathic Medicine (DO)
    f. Doctor of Medicine (MD)

Appendix F

Forces		
Driving Forces (For)	**Restraining Forces (Against)**	**Action to Be Taken**
Support from OR management and staff for implementation of project at Adams Memorial Health	Change in the anesthesia group waste disposal practice	-Provide education and additional information on best practices for waste disposal -Offer support to staff during implementation
Financial incentive for Adams Memorial Health • Potential of decreased waste disposal costs	Communication barriers with team members outside of the OR setting	-Have the site champion and OR manager establish contact via email with team members outside of the OR -Perform site visits before, during, and after project implementation
Opportunity to establish an environment friendly disposal practice • Through implementation of project, establish re-processing device containers from MedLine	Availability of a scale for weighing Regulated Medical Waste containers	-Determine scale availability at Adams Memorial Hospital. • Awaiting confirmation from CNO regarding scale

Appendix G

Strengths	Weaknesses
• Adams Memorial Health's reputation in the community • Substantial financial earnings at Adams Memorial • Adams Memorial Health has adequate investments and assets • Long tenured staff in OR at Adams Memorial	• Communication barriers to team members outside of the OR setting • Financially operates in the red • Initial investment costs for implementation
Opportunities	**Threats**
• Increasing environmental awareness and support • Potential reduction of waste cost for the facility • Improved waste management and resource recovery • Establish vendor contract to MedLine for reprocessing of surgical equipment • Re-establish connection with staff and community through the reopening of events	• Availability of disposal facilities • Low public awareness • Providers may be unwilling to separate waste at source • Increasing population and economic growth may increase consumption and waste

Appendix H

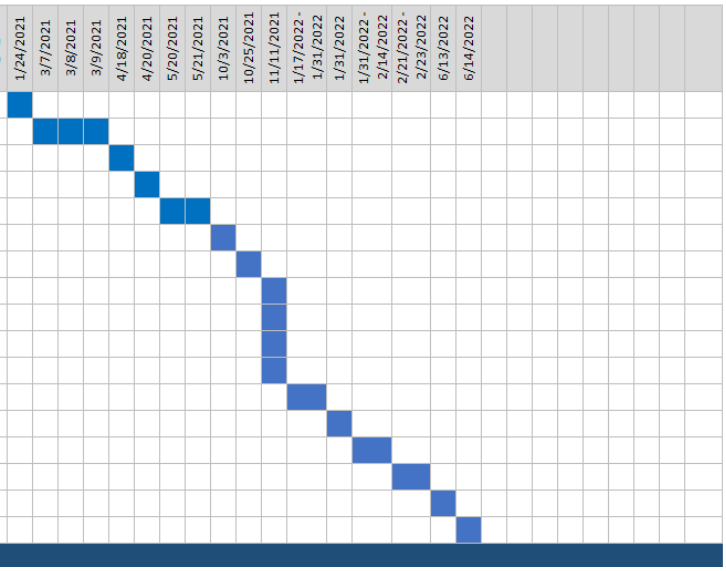
A Strategy to Reduce Regulated Medical Waste in Hospitals — PROJECT NAME

Dylan Reagan — CLIENT NAME

24-Jan-21 — START DATE

14-Jun-22 — END DATE

Task ID	Task Name	Start Date	End Date	Duration (In Days)
T01	DNP Project Topic	1/24/2021	1/24/2021	1
T02	Review of Literature	3/7/2021	3/10/2021	3
T03	CITI Training	4/18/2021	4/18/2021	1
T04	Implementation Site Selection	4/20/2021	4/20/2021	1
T05	Organizational Assessment	5/20/2021	5/21/2021	2
T06	IRB Submission	10/3/2021	10/3/2021	1
T07	IRB Approval	10/25/2021	10/25/2021	1
T08	Faculty Presentation	11/11/2021	11/11/2021	1
T09	Faculty Approval	11/11/2021	11/11/2021	1
T10	Facility Specific Requirements	11/11/2021	11/11/2021	1
T11	Prompt Creation	11/11/2021	11/11/2021	1
T12	Preimplementation Phase	1/17/2022	1/31/2022	14
T13	Educational Intervention	1/31/2022	1/31/2022	1
T14	Implementation Phase	1/31/2022	2/14/2022	14
T15	Data Analysis - Percentage Change	2/21/2022	2/23/2022	2
T16	Disseminations of Findings to DNP Faculty	6/13/2022	6/13/2022	1
T17	Disseminations of Findings to AMH	6/14/2022	6/14/2022	1



Appendix I

University of Saint Francis
Institutional Review Board
Human Subjects Review Committee/ACUC/IBC
Institutional Review Board Approval Form

Protocol Number: 16332248987
Reviewed by (underline one): HSRC ACUC IBC
Date Reviewed: Monday, October 25, 2021
Principal Investigator: Dylan Reagan
Faculty Advisor: Dr. Carla Mueller
Protocol Title: A Strategy to Reduce Regulated Medical Waste in Hospitals
Study Site(s): University of Saint Francis, Main Campus

Type of Proposal:
☐Original research
☐ Replication or extension of previous research
☒Quality Improvement/Evidence-Based Practice Project

Items submitted for review:
☒CITI Certificate
☒Initial protocol
☒Abstract
☒Informed Consent Form (if applicable)
☒Approval letter from outside institution
☐Other – explain: Email request was made for waiver

Type of Review:
☒Full Review
☐Expedited Review
☐Exempt Review

Approval:
☒Approval granted on Monday, October 25, 2021 for a period of one year.
☐Conditional approval* granted on _____for a period of one year.
☐Not approved*
☐IRB approval is not required:
☐Other

*Comments:

The committee performing this review is duly constituted and operates in accordance and compliance with local and federal regulations and guidelines.

Michael P. Bechill, IRB Chair	Michael P. Bechill	2021.10.25
Printed Name (Chair or designee)	Signature	Date

IRB Committee Approval Form mpb 01/01/2021

Appendix J

DNP Project Budget				
Legend	Direct Costs			
Project Expenses				
Salaries and Wages	**Description**	**Year 1**	**Year 2**	**Total**
DNP Project Manager	Myself	$ -	$ -	$ -
DNP Project Advisor	Dr. Mueller	$ -	$ -	$ -
Representative at Implementation Site	Dr. Shepherd	$ -	$ -	$ -
DNP Academic Advisor	Dr. Cotrell	$ -	$ -	$ -
				$ -
Total Salary Costs		$ -	$ -	$ -
Startup Costs	**Description**	**Year 1**	**Year 2**	**Total**
Project Training	Before, during, and after project	$ 50.00	$ -	$ 50.00
				$ -
				$ -
				$ -
Total Start Up Costs		$ 50.00	$ -	$ 50.00
Supplies and Materials	**Description**	**Year 1**	**Year 2**	**Total**
Container Signs, lamination	Guides evidence based waste disposal	$ 50.00	$ -	$ 50.00
Education material	Defining RMW, waste recepatcles etc.	$ 25.00	$ -	$ 25.00
				$ -
Total Supplies and Materials		$ 75.00	$ -	$ 75.00
Capital Costs (costs >2,000)	**Description**	**Year 1**	**Year 2**	**Total**
				$ -
				$ -
				$ -
Total Capital Costs		$ -	$ -	$ -
Total Expenses		$ 125.00	$ -	$ 125.00
Project Revenue	**Description**	**Year 1**	**Year 2**	**Total**
Disposal of RMW	Aim of project is to reduce volume	$ 250.00	$ 500.00	$ 750.00
				$ -
				$ -
				$ -
				$ -
Total Project Revenue		$ 250.00	$ 500.00	$ 750.00
Project Benefit/Loss				
Total Revenue		$ 250.00	$ 500.00	$ 750.00
Less Expenses		$ 125.00	$ -	$ 125.00
Total Project Benefit/Loss		$ 125.00	$ 500.00	$ 625.00

Appendix K


Do NOT Place Empty, Unbroken Medication Vials Here


Place Empty, Unbroken Medication Vials Here

Appendix L

Policy 4.15.1
Created June 2019

DNP Scholarly Project Proposal Initial Approval

TO: Caitlin Krouse, DNP, FNP-BC, RN
Assistant Professor and Graduate Nursing Program Director

FROM: Dylan Reagan, BSN, RN, DNP-NAP Student

RE: DNP Project Proposal Review Council Endorsement

DATE: November 11, 2021

DNP Scholarly Project Title:

A Strategy to Reduce Regulated Medical Waste in Hospitals

DNP Scholarly Project Review Council:

DNP Project Advisor Signature: Carla Mueller PhD, RN
Dr. Carla Mueller

DNP Project Proposal Review Council Member Signature: Susan Lown, DNP, RN, CNE 11/13/2021
Dr. Susan Lown

DNP Project Proposal Review Council Member Signature: DNAP CRNA
Dr. Greg Louck

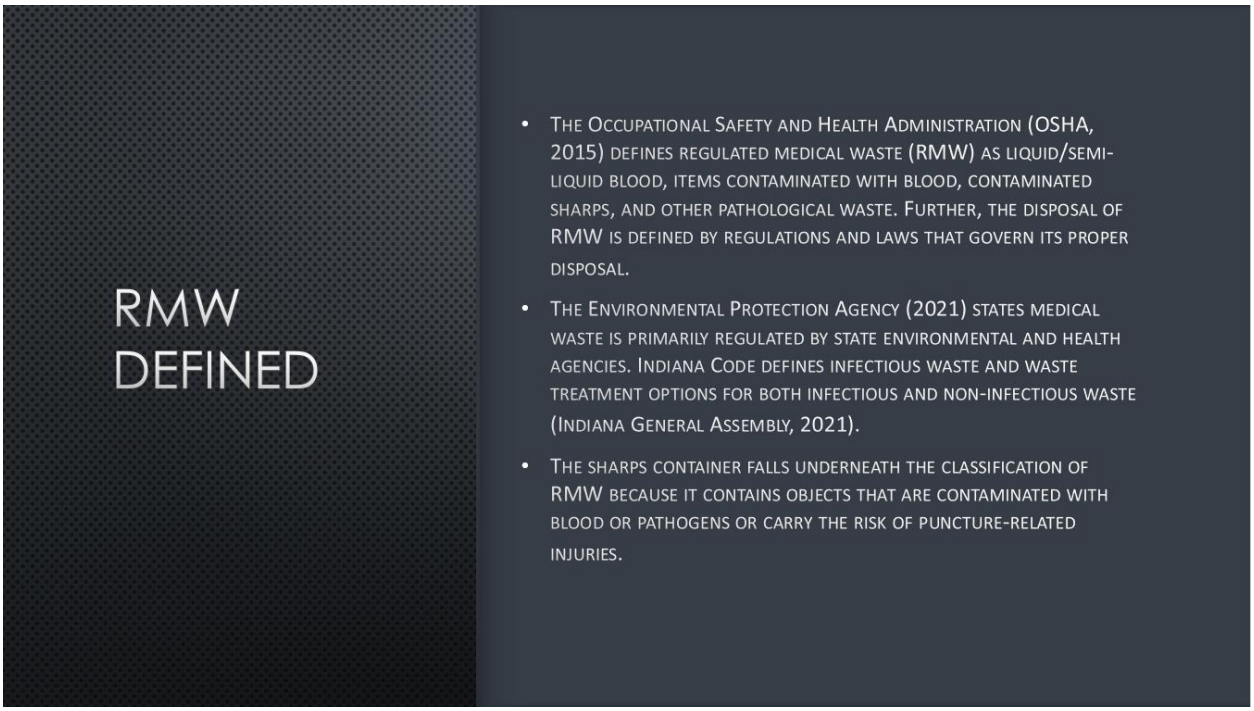
Date of initial approval to implement: November 11, 2021

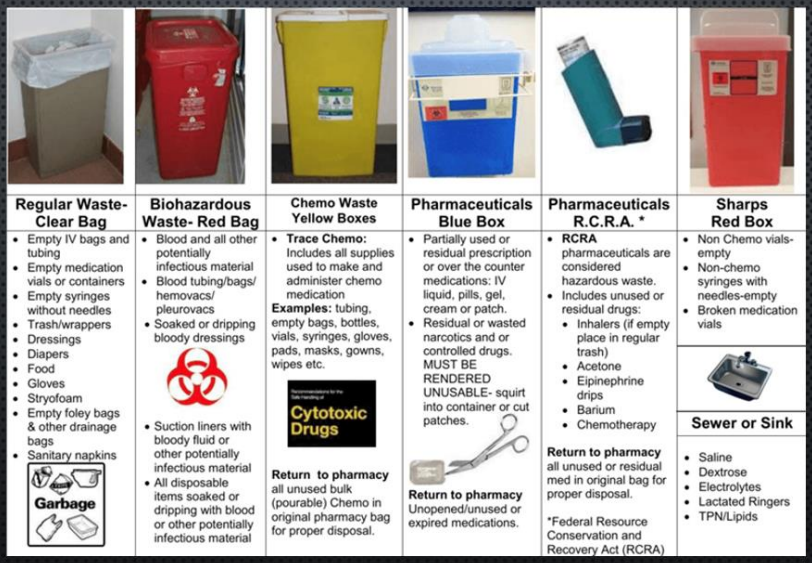
1 - Student File
3 - Attached to Proposal

6-2019. Rev. 11-2021

Appendix M


REGULATED
MEDICAL WASTE
(RMW)


RMW
DEFINED
• The Occupational Safety and Health Administration (OSHA, 2015) defines regulated medical waste (RMW) as liquid/semi-liquid blood, items contaminated with blood, contaminated sharps, and other pathological waste. Further, the disposal of RMW is defined by regulations and laws that govern its proper disposal.
• The Environmental Protection Agency (2021) states medical waste is primarily regulated by state environmental and health agencies. Indiana Code defines infectious waste and waste treatment options for both infectious and non-infectious waste (Indiana General Assembly, 2021).
• The sharps container falls underneath the classification of RMW because it contains objects that are contaminated with blood or pathogens or carry the risk of puncture-related injuries.



Regular Waste- Clear Bag	Biohazardous Waste- Red Bag	Chemo Waste Yellow Boxes	Pharmaceuticals Blue Box	Pharmaceuticals R.C.R.A. *	Sharps Red Box

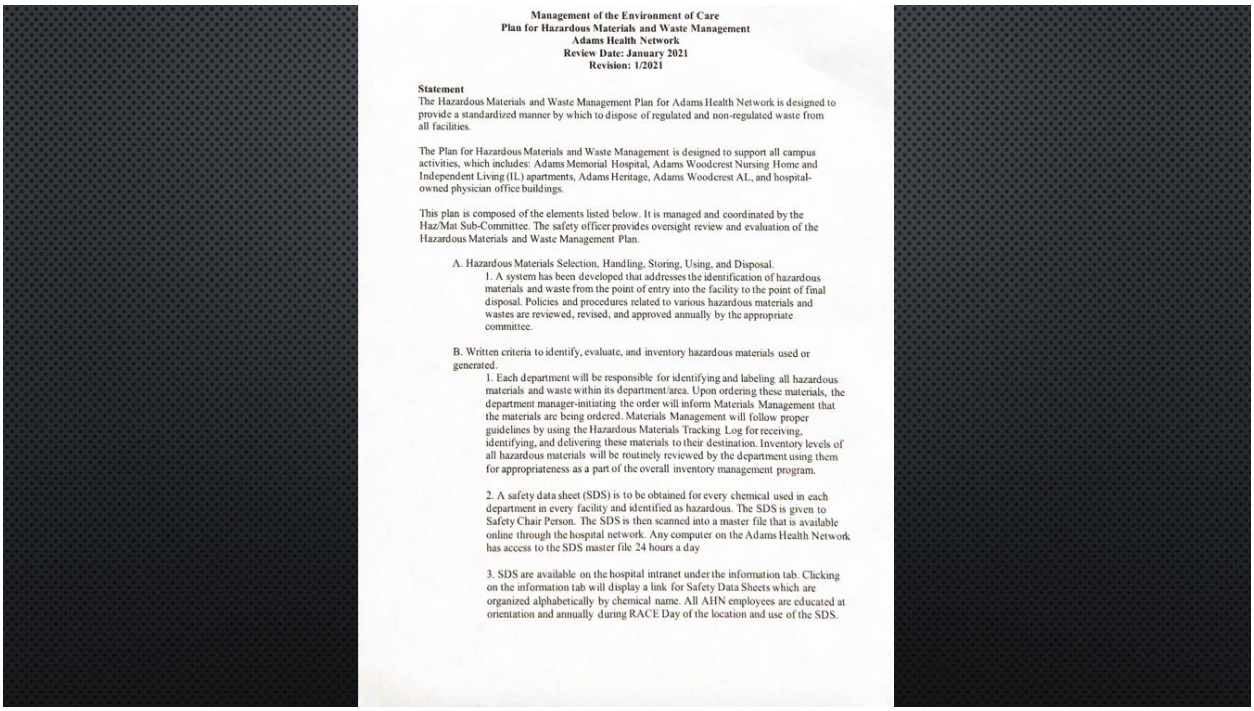
• Empty IV bags and tubing
• Empty medication vials or containers
• Empty syringes without needles
• Trash/wrappers
• Dressings
• Diapers
• Food
• Gloves
• Stryofoam
• Empty foley bags & other drainage bags
• Sanitary napkins
Garbage
	• Blood and all other potentially infectious material
	• Blood tubing/bags/ hemovacs/ pleurovacs
	• Soaked or dripping bloody dressings
	• Suction liners with bloody fluid or other potentially infectious material
	• All disposable items soaked or dripping with blood or other potentially infectious material
		• **Trace Chemo:** Includes all supplies used to make and administer chemo medication
		Examples: tubing, empty bags, bottles, vials, syringes, gloves, pads, masks, gowns, wipes etc.
		Cytotoxic Drugs
		Return to pharmacy all unused bulk (pourable) Chemo in original pharmacy bag for proper disposal.
			• Partially used or residual prescription or over the counter medications: IV liquid, pills, gel, cream or patch.
			• Residual or wasted narcotics and or controlled drugs. MUST BE RENDERED UNUSABLE- squirt into container or cut patches.
			Return to pharmacy Unopened/unused or expired medications.
				• **RCRA** pharmaceuticals are considered hazardous waste.
				• Includes unused or residual drugs:
				  • Inhalers (if empty place in regular trash)
				  • Acetone
				  • Eipinephrine drips
				  • Barium
				  • Chemotherapy
				Return to pharmacy all unused or residual med in original bag for proper disposal.
				*Federal Resource Conservation and Recovery Act (RCRA)
					• Non Chemo vials- empty
					• Non-chemo syringes with needles-empty
					• Broken medication vials
					Sewer or Sink
					• Saline
					• Dextrose
					• Electrolytes
					• Lactated Ringers
					• TPN/Lipids

(Medical waste disposal guidelines, 2021)

DISPOSAL METHODS

- Treatment of waste can occur either in the facility itself or it can be handled by a third party. The determining factor is if the hospital has the treatment capabilities in their facility.
- Indiana code (2020) specifies five waste treatment options: incineration, steam sterilization, chemical disinfection, thermal inactivation, and irradiation. For referencing purposes, steam sterilization is also known as autoclaving.
- No disposal method is available that is environmentally friendly and low cost (Windfield & Brooks, 2015).
- In the United States, incineration is the most common disposal method (Windfield & Brooks, 2015).

AMH WASTE POLICY



Management of the Environment of Care
Plan for Hazardous Materials and Waste Management
Adams Health Network
Review Date: January 2021
Revision: 1/2021

Statement
The Hazardous Materials and Waste Management Plan for Adams Health Network is designed to provide a standardized manner by which to dispose of regulated and non-regulated waste from all facilities.

The Plan for Hazardous Materials and Waste Management is designed to support all campus activities, which includes: Adams Memorial Hospital, Adams Woodcrest Nursing Home and Independent Living (IL) apartments, Adams Heritage, Adams Woodcrest AL, and hospital-owned physician office buildings.

This plan is composed of the elements listed below. It is managed and coordinated by the Haz/Mat Sub-Committee. The safety officer provides oversight review and evaluation of the Hazardous Materials and Waste Management Plan.

A. Hazardous Materials Selection, Handling, Storing, Using, and Disposal.
1. A system has been developed that addresses the identification of hazardous materials and waste from the point of entry into the facility to the point of final disposal. Policies and procedures related to various hazardous materials and wastes are reviewed, revised, and approved annually by the appropriate committee.

B. Written criteria to identify, evaluate, and inventory hazardous materials used or generated.
1. Each department will be responsible for identifying and labeling all hazardous materials and waste within its department/area. Upon ordering these materials, the department manager-initiating the order will inform Materials Management that the materials are being ordered. Materials Management will follow proper guidelines by using the Hazardous Materials Tracking Log for receiving, identifying, and delivering these materials to their destination. Inventory levels of all hazardous materials will be routinely reviewed by the department using them for appropriateness as a part of the overall inventory management program.

2. A safety data sheet (SDS) is to be obtained for every chemical used in each department in every facility and identified as hazardous. The SDS is given to Safety Chair Person. The SDS is then scanned into a master file that is available online through the hospital network. Any computer on the Adams Health Network has access to the SDS master file 24 hours a day

3. SDS are available on the hospital intranet under the information tab. Clicking on the information tab will display a link for Safety Data Sheets which are organized alphabetically by chemical name. All AHN employees are educated at orientation and annually during RACE Day of the location and use of the SDS.

C. Management of chemical waste, chemotherapeutic waste, radioactive waste, regulated and non-regulated medical waste.

1. Policies and procedures relating to chemical, infectious hazards, and physical hazards shall be reviewed by the Safety Committee on an annual basis.

2. All regulated waste is placed in red plastic containers provided by a contracted service and is processed off premises; this includes patient waste, sharps (needles and syringes), and pathology wastes.

3. Oncology waste is placed in yellow containers and disposed of by a regulated carrier.

4. All radioactive materials are disposed of in accordance to the Nuclear Regulatory Commission Regulations, through the Radiology Department.

5. Non-regulated waste is handled by an outside vendor.

D. Hazardous gas and vapors monitoring and disposal.

1. Personnel concerned with the use and transport of compressed gas shall be trained in the proper handling of cylinders, and cylinder valve protection caps. All cylinder storage areas shall be protected from extremes of heat and cold and from access by unauthorized individuals.

2. Materials which ignite easily under normal conditions (flammable) are considered to be fire hazards and will be stored in a cool, dry, well-ventilated storage space.

3. Highly flammable materials will be kept in an area separate from oxidizing agents (materials susceptible to spontaneous heating, etc.).

4. Protective clothing and equipment will be available for use when handling these materials.

E. Reporting and investigation of hazardous materials incidents.

1. A security report form will be completed on all hazardous materials and waste spills. The Haz/Mat Sub-Committee will obtain copies of all hazardous materials and waste-related incident reports for review by the Safety Committee.

2. All employee exposures to hazardous materials shall be reported as an employee injury. An employee incident report should be completed and investigated accordingly.

F. Employee orientation and education program.

Management of the Environment of Care
Plan for Hazardous Materials and Waste Management
Adams Health Network
Review Date: January 2021
Revision: 1/2021

1. Before starting to work or during orientation, each employee will be provided information regarding definition, proper handling, and disposal of regulated and non-regulated waste in their work area.
2. The Department Manager is responsible to ensure that all employees in his/her department are properly trained. Training records will then be sent to and maintained by the Human Resources Department.

3. At least one of the following performance indicators shall be addressed annually for the Hazardous Materials and Waste Management Plan, either through measurable numerical scores, or by quarterly and annual summaries that identify problem areas or developing trends, and indicate corrective actions or conclusions.
   a. Number of spills
   b. Number of spills requiring outside intervention
   c. Percentage of staff knowledgeable of spill response procedures
   d. Staff knowledge of SDS, (location, and use of)

G. Emergency procedures for hazardous material and waste spills or exposures.

1. If a leak or a spill is found the following actions shall be taken:
   a. Identify the chemical before attempting to clean up any hazardous chemical spill or splash.
   b. Follow the directions found on the SDS for cleaning up that kind of chemical spill or splash.
   c. Notify people in the immediate area, supervisor, and maintenance staff.
   d. Wait by the spill until help arrives.
   e. Avoid tracking through the spill.
   f. Complete an incident report on the spill or leak.

H. Annual evaluation of the Hazardous Materials and Waste Plan.

1. The Hazardous Materials and Waste Sub-Committee Chairman will conduct an annual evaluation of the Hazardous Materials and Waste Plan's objectives, scope, performance, and effectiveness. The Annual Evaluation will be presented to the Safety Committee by the November Safety Subcommittee meeting every year.