

ASSESSMENT OF TRACHEOSTOMY CARE PRACTICES  
IN A SIMULATED SETTING

by

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## ABSTRACT

**Background:** Although a tracheostomy is a common procedure for patients who require prolonged mechanical ventilation, little evidence exists as to the best practices for performing tracheostomy care to maintain the airway and promote skin integrity. Therefore, variability is likely, which may negatively impact patient outcomes. This study described tracheostomy care practices of registered nurses (RNs) and respiratory therapists (RTs) who regularly perform tracheostomy care in critical care settings.

**Methodology:** The descriptive study was conducted following informed consent. RNs (n=15) and RTs (n=5) were asked to perform tracheostomy care on a simulated mannequin patient. An array of supplies (both required and not necessary) was available to perform tracheostomy care. The procedure was video-recorded and the researchers also used an observation checklist. Equipment used and steps performed were compared to hospital policy and the *American Association of Critical-Care Nurses (AACN) Procedure Manual*. Data were analyzed with descriptive statistics.

**Results:** The majority (80%) of participants were female and held a baccalaureate degree; median experience was 5 years. Equipment selection varied widely; supplies used by 50% or more of participants included non-sterile gloves, hydrogen peroxide, cotton swabs, disposable cannula, foam ties, and gauze dressings. The order of steps was variable with unique differences

noted among all participants. The most common sequence was hand hygiene, clean flange, clean stoma, change inner cannula, change ties, and apply dressing. No one performed in the order recommended in the *AACN Procedure Manual*. Wide variability in practices emphasizes the need for establishing an evidence-based approach for performing tracheostomy care.

**Discussion:** Research supported the belief that variation to technique and supplies does exist when performing tracheostomy care. Tracheostomy varied from provider to provider within one hospital unit, demonstrating the need for further research and protocols for tracheostomy care. Education on existing protocols and evidence-based practice should be conducted to ensure that providers are following unit protocols.

The views expressed are those of the author and do not reflect the official policy or position of the US Navy, Department of Defense or the US Government.

## DEDICATIONS

This dissertation is dedicated to my wife Allison, and my three amazing sons, Gavin, Noah, and Colin.

To my sons, I know there were times during school that you wish I could stay home and play with you, but I hope you realize that I did this for you. The three of you keep me young and vibrant, and I look forward to the adventures that lie ahead of us.

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## CHAPTER 1: INTRODUCTION

### Statement of the Problem

Skin breakdown and other airway complications can lead to an array of significant problems for the patient and, consequently, the entire healthcare team. There continues to be no defined standard technique for tracheostomy care. It is important for nurses to use a technique that minimizes the occurrence of skin breakdown and adverse airway complications for the patient. Due to the inconsistency of current literatures, textbooks, and conflicting findings of credible research, nurses are performing tracheostomy care with techniques that may result in skin breakdown and various adverse airway complications.

### Purpose of the Study

The purpose of this study was to assess evidence-based practice methods and identify what procedural steps are recommended for the reduction of skin breakdown and airway complications during tracheostomy care. Furthermore, the study aims to determine what procedural steps nurses are currently performing, and determine whether or not their policies reflect such findings. By documenting the best practices, this research will aid in improving patient outcomes and overall health, while lowering the hospital's financial responsibility for never events and adverse outcomes.

### Research Questions

The following research questions were identified:

1. What supplies, methods, and techniques will providers choose when performing tracheostomy care on a simulated patient?
2. Will providers who are performing tracheostomy care on a simulated patient follow the guidelines set forth in the *AACN Procedure Manual*?

### Definitions and Terms

**Table 1: Definitions and Terms**

<b>Term</b>	<b>Definition</b>
AACN	American Association of Critical-Care Nurses
ETT	Endotracheal tube
ICU	Intensive Care Unit
OR	Operating Room
ORMC	Orlando Regional Medical Center
RN	Registered Nurse
RT	Respiratory Therapist
WOB	Work of breathing

### Summary

This chapter introduced the problem of variability amongst providers performing tracheostomy care on hospitalized patients. Chapter 2 reviews relevant literature; Chapter 3 describes methods; Chapter 4 lists the findings; and Chapter 5 discusses results.

## CHAPTER 2: REVIEW OF LITERATURE

A thorough review of literature was conducted related to tracheostomy care practices and resulting skin breakdown or airway complications. Information was retrieved using the Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE, and EBSCOhost databases searching the terms “tracheostomy” or “tracheotomy care” to investigate studies related to tracheostomy care practices. Inclusion criteria consisted of articles in the English language that focus on tracheostomy care in the hospital setting for an adult population. Exclusion criteria involved any articles that focus on pediatric populations or tracheostomy care outside of a hospital setting. A thorough analysis of the type of study, the population sample size, individualized interventions, the credibility of the author to determine the integrity of the study, and whether or not the findings of the literature are relevant to current practice were evaluated. Additionally, nursing textbooks and procedure manuals currently in use were reviewed to assess their recommended procedures, and if they too reflect practices recommended to reduce skin breakdown and airway complications. The date range was 2009 to 2015 with the following key words: “tracheostomy care.” The results were further limited to academic journals and articles about adult patients. This produced nine results. Of these, only three were deemed relevant to this study.

As a result of not being able to locate many articles that researched the procedures and outcomes of tracheostomy care in a hospital setting; it was necessary to broaden the review of literature to other procedure manuals and publications. Additional information was referenced from the *AACN Procedure Manual for Critical Care*, *Lippincott's Nursing Procedures*, and *Medical-Surgical Nursing: Assessment and Management of Clinical Problems*.

## Tracheostomy Care Practices

A tracheostomy tube is an artificial airway inserted into the anterior wall of the trachea inferior to the cricoid cartilage (Dennis-Rouse & Davidson, 2008). Tracheostomy procedures are commonly performed on critically ill patients who may require prolonged intubation or mechanical ventilation. The procedure is also a treatment for certain head and neck cancers. Placement of a tracheostomy tube is one of the oldest surgical procedures and very common among patients who are critically ill (Mitchell et al., 2013). The use of a tracheostomy tube reduces the work of breathing (WOB) on a patient because it is shorter in length, compared to a longer endotracheal tube (Pierce, 2013). Tracheostomy tube placement is a surgical procedure that can be performed in an operating room (OR) or at the bedside in an intensive care unit (ICU). Placement of a tracheostomy tube has many benefits when compared to oral endotracheal (ET) tubes. For instance, patients are typically more comfortable, thus tolerating tracheostomy tubes more than ET tubes. Tracheostomy tubes also allow for easier communication and airway clearance (Parker et al., 2010). Additionally, patients who undergo tracheostomy tube placement require shorter periods of mechanical ventilation, fewer number of days in the ICU, less sedation, and reduced use of restraints (Parker et al., 2010; Pierce, 2013). Patients who undergo tracheostomy placement must be carefully assessed and routinely monitored for airway complications such as infection, mucus plugging, hemorrhage, skin breakdown, or accidental decannulation of the tracheostomy tube (Skillings & Curtis, 2011).

After a tracheostomy tube has been placed, careful consideration must be given to care for the artificial airway to limit complications. Potential complications of tracheostomy placement or tracheostomy care can cause serious adverse effects for the patient (Barnett, 2012).

Research, policy manuals, and hospital protocols all agree that tracheostomy care should be completed, but many differ on the appropriate methods for tracheostomy care (Björling, 2009). Previous research has demonstrated a considerable variation in the care of a patient with a tracheostomy tube. Despite facilities with clinical guidelines in place, compliance with protocols is estimated to be less than 50% (Mitchell, Parker, & Giles, 2013). Most clinicians agree that tracheostomy care needs to include skin care and hygiene of the stoma, cleaning or replacing of the tracheostomy ties, cleaning or changing of the inner cannula, and placement of a dressing to minimize skin irritation and breakdown (Björling, 2009; Skillings & Curtis, 2011). While there is much that is agreed upon, there are also differences in recommendations. Nurses caring for patients with tracheostomy tubes must understand the needs of the patient in order to provide safe care. Currently there is a lack of empirical evidence in which to base that care (Dawson, 2014).

Researchers have examined variations of tracheostomy care techniques, but many questions remain unanswered. How often should tracheostomy care be performed? No current evidence supports a standard interval for performing tracheostomy care. Decisions are commonly left to the health care provider (Morris, Whitmer, & McIntosh, 2013). Who should perform tracheostomy care? Some recommendations identify a respiratory therapist (RT) as the responsible provider for performing tracheostomy care, while others place a registered nurse (RN) in charge of conducting tracheostomy care (Dennis-Rouse & Davidson, 2008). Some hospitals have begun to employ specialist tracheostomy care teams to reduce complications (Mitchell, Parker, & Giles, 2013). Should providers use commercial Velcro straps or twill tape? What dressing should be used for the stoma? The type of skin barrier used around a



tracheostomy tube can impact skin integrity and the overall cost of care (Chuang et al., 2013).

Should hydrogen peroxide be used in the cleaning of the flange and inner cannula? Many studies disagree or contradict one another on the use of hydrogen peroxide for cleaning tracheostomy tubes (Mitchell et al., 2013; Silva, Carver, Ojano-Dirain, & Antonelli, 2013).

In order for tracheostomy care to be effective and to minimize airway complications, certain steps must be included in the care of a tracheostomy. The variations in policy and procedure leave providers to question what is truly the best practice for performing tracheostomy care.

A study conducted by Mitchell, Parker, & Giles (2013) suggested the formation of tracheostomy care teams made of up registered nurses within hospital settings in order to reduce the amount of variance among tracheostomy care providers, thus reducing tracheostomy-related complications. The study found that the creation of tracheostomy care teams further enhanced the consistency of tracheostomy care, reducing the length of stay in the ICU, and overall length of stay in the hospital. A similar study conducted by Parker et al. (2010) looked at the progress of teams consisting of clinical nurse consultants, a physiotherapist, a speech pathologist, a dietician, a social worker and medical officers. Respiratory therapists were also available for consultation. This study found a significant reduction in the average length of stay for tracheostomy patients from 50 days to 27 days. Another study conducted by Cetto et al. (2011) examined the creation of a tracheostomy multidisciplinary team to improve tracheostomy care and reduce the number of tracheostomy-related clinical incidents. The researchers in this study developed a task-based checklist for the delivery of tracheostomy care, and found the model significantly expedited the decannulation process and reduced the average time that a patient

needed the tracheostomy tube. The study found a reduction in clinical incidents, and shorter ICU stays.

Variation in practice is often due to lack of education or experience. An article written by Barnett (2012) states that healthcare facilities should have written tracheostomy care protocols in place to reduce variation in practice. Barnett also goes on to state that nurses should be observed regularly in the delivery of tracheostomy care, undergo routine competency assessments, and participate in continuing education in the delivery of tracheostomy care in order to maintain current proficiencies.

Tracheostomy care is a critical element in the care of a patient with a tracheostomy in place. Few studies have assessed the tracheostomy care practices of caregivers. Limited published studies relating to tracheostomy care practices focus on specific equipment, protocols, or order or interventions. Providers are delivering tracheostomy care using a number of different techniques, supplies, and equipment, all of which have not been determined to be safe for the patient.

### Summary

A review of the literature has identified a significant lack of studies researching the tracheostomy care practices of hospitalized patients. The lack of previous research required the researcher to observe and document the practices being performed in one particular hospital. During this research many various methods, techniques, and supplies were observed in the delivery of tracheostomy care, demonstrating a need for further education and research. The use of a simulated patient ensured that no harm was being done to patients if improper techniques or

supplies were observed in use. The nature of this study will serve as a foundation for future research on evidence-based tracheostomy care practices.

## CHAPTER 3: METHODS AND PROCEDURE

### Research Questions

The following research questions were identified:

1. What supplies, methods, and techniques will providers choose when performing tracheostomy care on a simulated patient?
2. Will providers who are performing tracheostomy care on a simulated patient follow the guidelines set forth in the *AACN Procedure Manual*?

### Design

A descriptive design was used for this study. The study was done using a simulated experience. Registered Nurses and Respiratory Therapists were asked to perform tracheostomy care on a simulated mannequin patient. Participants were prompted with a scenario that requires the mannequin patient to need tracheostomy care. An assortment of supplies that may be used by staff to perform tracheostomy care were available, including tracheostomy care kits and cleansing solutions. The participants selected supplies and performed the procedure, which was video recorded. Data were analyzed with descriptive statistics to identify equipment used, and steps performed in the conduct of tracheostomy care.

### Subjects

Subjects in this study were adult registered nurses (RNs) and respiratory therapists (RTs) that routinely provide tracheostomy care (to include suctioning, stoma care, tie changes, inner cannula changing, and application of dressings) to critically ill patients.

### Human Subjects

The Institutional Review Board of the clinical agency approved the study. After a description of the study and requirements, volunteer participants signed consent for participation in the study, including video recording (Appendix B). All data were entered into a computer that was password protected. Data were stored in a locked office of the investigators (Dr. Sole) on the UCF campus and will be maintained for a minimum of ten years after the completion of the study.

### Inclusion criteria

Criteria for inclusion were as follows: 1) 18 years of age or older; 2) Registered Nurse or Respiratory Therapist employed by a large tertiary care hospital in the southeastern United States; 3) Regularly work with tracheostomy patients, as defined as 3 or more tracheostomy patients per month; and 4) able to speak and read English.

### Sample size determination

This study was a pilot study to assess the methods and procedures of participants providing tracheostomy care to hospital patients, therefore, a power analysis was not done. A target sample size of 20 participants (15 RNs and 5 RTs) was selected as an adequate number to gather preliminary information regarding tracheostomy care.

### Variables

This was a descriptive study. Variables included supplies used for the procedure and steps used to perform the procedure. Confidence in performing the procedure as well as time to complete the procedure was also assessed.

## Procedures

The data collection took place between the dates of January 5, 2015 to January 8, 2015. A sample of eligible participants was recruited to perform tracheostomy care on a simulated mannequin patient with a tracheostomy tube. After explanation of the study and procedures, participants were asked to sign a consent form (Appendix B) in order to participate in the research study and also to complete a brief demographic form (Appendix C). Subjects were read a scenario prompt and could begin the tracheostomy care when they were ready. An array of disposable and non-disposable supplies was available for the tracheostomy care (Appendix E). The supplies available for use included those that were both recommended in the literature as well as additional supplies that some individuals might use to perform tracheostomy care. Subjects were asked to choose the supplies they would normally use to perform tracheostomy care, and perform the same tracheostomy care on the mannequin. Each subject was video recorded so that recordings could be analyzed at a later date. The researchers also used a checklist (Appendix E) and noted the supplies chosen as well as the order in which tracheostomy care was performed. Inter-rater reliability in observation between the Principal Investigator (TB) and co-investigator (MLS) was established.

Participants were not evaluated on their ability to perform tracheostomy care. No feedback was given during the data collection or following their delivery of care. Participants were asked to complete a separate document (Appendix F) with their name and email address if they wanted a copy of the study findings at the conclusion of the study. The time needed to complete the procedure was obtained from the video recording.

### Data Analysis

Statistical Package for the Social Sciences (SPSS) version 21.0 was used for data analysis. Data were input into Microsoft Excel and imported into SPSS. Data were summarized with frequencies and descriptive statistics.

### Materials

Materials used for this study included a mannequin patient with a tracheostomy tube in place, various airway and tracheostomy care supplies, a video recording device, demographic data collection tool, and a checklist for the items that were selected during the procedure.

### Demographic Data

Demographic data were collected using a brief tool created by the researchers (Appendix C). Data were collected using a one-page form that was filled out by the participant. Demographic data collected included position (RN or RT), years of experience in the profession, highest degree earned, length of employment at site of research, and years of experience performing tracheostomy care. The demographic tool also included one question asking participants to rate their confidence on a scale of 1 to 10. This question was “How confident are you at performing tracheostomy care? (1 = not at all confident; 10 = most confident)”

**Table 2: Study Duration/Study Timeline**

November 2014	NRC approval
December 2014	IRB approval (Appendix G)
January 2015	Data collection
January - February 2015	Data analysis
April 2015	Report and article(s) for publication Submit abstracts for presentation Present results at the UCF Showcase for Undergraduate

	Research Present results at the Sigma Theta Tau Annual Research Day
May 2015	Follow-up to Nursing Research Committee and units/departments



## CHAPTER 4: FINDINGS

Upon completion of the tracheostomy care data collection, data were analyzed using SPSS. Tables were developed from generated information.

### Sample

Registered nurses and respiratory therapists who met inclusion criteria were approached about willingness to participate in the study. Many providers were approached, but ultimately fifteen RNs and five RTs accepted invitation into the study. Providers from day shift and night shift were selected. Data collection was conducted during four sessions within the dates specified. Two sessions were scheduled between 1400 and 1700 to recruit participants from the day shift, and two sessions were scheduled between 2100 and 2300 to recruit participants from the night shift. Data was not collected on the number of day shift and night shift personnel.

Demographic data are shown in Table 3.

**Table 3: Tracheostomy Care Demographic Data**

<b>Demographic Data</b>	<b>Participants (n = 20)</b>
<b>Position</b>	
Registered Nurse	15
Respiratory Therapist	5
<b>Gender</b>	
Male	4
Female	16
<b>Years experience in profession</b>	
Mean	10.48
Median	6.75
<b>Highest degree earned in field</b>	
Associate Degree	4
Baccalaureate Degree	16
<b>Length of employment at study site</b>	
Mean	8.31
Median	7.00
<b>Years experience performing tracheostomy care</b>	

<b>Demographic Data</b>	<b>Participants (n = 20)</b>
Mean	9.28
Median	5.00
<b>Confidence performing tracheostomy care</b>	
Mean	7.90
Median	9.00

### Research Question One: Tracheostomy Care Techniques

What supplies, methods, and techniques will providers choose when performing tracheostomy care on a simulated patient?

An array of supplies was laid out on a table for providers to choose when conducting tracheostomy care. The available supplies were both necessary and not necessary for performing tracheostomy care. Providers were asked to gather any supplies they would need in order to conduct tracheostomy care on the patient before them. The simulated mannequin was reset after every provider in order not to bias the next provider in his or her selection of supplies. All providers (n = 20) chose a disposable inner cannula, non-sterile gloves, foam tracheostomy ties, and hydrogen peroxide as a cleaning solution. More than half of the providers chose 4x4 gauze (n = 12) and cotton tipped applicators (n = 13) to use when cleaning the stoma and flange. No providers (n = 0) chose to use a tracheostomy care kit, nylon tracheostomy ties, or pipe cleaners when performing tracheostomy care. The number of participants that chose to use each item that was available is presented in Table 5.

**Table 4: Tracheostomy Care Individual Item Analysis**

<b>Items Available</b>	<b>Number of participants who chose item (n = 20)</b>
Disposable Inner Cannula	20
Hydrogen Peroxide	20
Foam Trach Ties	20
Non-Sterile Gloves	20
Cotton Tipped Applicators	13
4x4 Gauze	12
Fenestrated Gauze	8
Sterile Gloves	8
Normal Saline	7
Sterile Suction Kit	7
Cup/Basin	7
Foam Dressing (Mepilex)	5
Suture Scissors	4
Mask	4
Sterile Water	3
2x2 Gauze	3
Pink Oral Swab with Dentifrice	3
Chux Pads	2
Bag Valve Mask	1
Tracheostomy Care Kit	0
Nylon Ties	0
Pipe Cleaners	0

Research Question Two: Following Tracheostomy Care Protocol

Research participants will choose both necessary and unnecessary items to perform tracheostomy care. The selection of items will vary from provider to provider and will not always follow protocol.

Data results were evaluated. Among the participants, none of the providers followed the order of procedural steps outlined in the *AACN Procedure Manual for Critical Care*. The most

common order of tracheostomy care was 1) hand hygiene (n = 20), 2) clean stoma (n = 8), 3) clean flange (n = 11), 4) change cannula (n = 10), 5) change tracheostomy ties (n = 7), and 6) apply dressing (n = 8). Results from SPSS are included in Figure 1.

**Figure 1: Research Question One Test Summary**

**Table 5: Order of Tracheostomy Care Procedures**

						0-Not Performed	
	Order 1-6	Order 1-6	Order 1-6	Order 1-6	Order 1-6	Order 1-6	
Subject	Hand Hygiene	Change Cannula	Clean Stoma	Clean Flange	Change Ties	Apply Dressing	AACN Order
1	1	6	2	3	4	5	No
2	1	5	3	4	2	6	No
3	1	4	2	3	5	0	No
4	1	2	5	4	3	6	No
5	1	4	2	3	5	6	No
6	1	3	5	4	2	6	No
7	1	3	4	2	6	5	No
8	1	4	2	3	5	0	No
9	1	2	4	3	5	6	No
10	1	3	4	5	2	6	No
11	1	2	4	3	5	0	No
12	1	5	2	3	4	6	No
13	1	5	4	3	2	0	No
14	1	4	2	3	5	6	No
15	1	4	2	3	6	5	No
16	1	4	2	3	5	0	No
17	1	4	3	2	6	5	No
18	1	4	3	2	6	5	No
19	1	4	3	2	6	5	No
20	1	4	3	2	6	5	No

## Confidence

One question regarding the confidence of tracheostomy care delivery was presented to the participants prior to the delivery of care. Participants were asked to rate their overall confidence at performing tracheostomy care on a scale of 1 to 10. 1 indicating “not at all confident” and 10 indicating “most confident.” The lowest score reported was a 3 (n = 1), and the highest score reported was a 10 (n = 6). The mean confidence rating was 7.90.

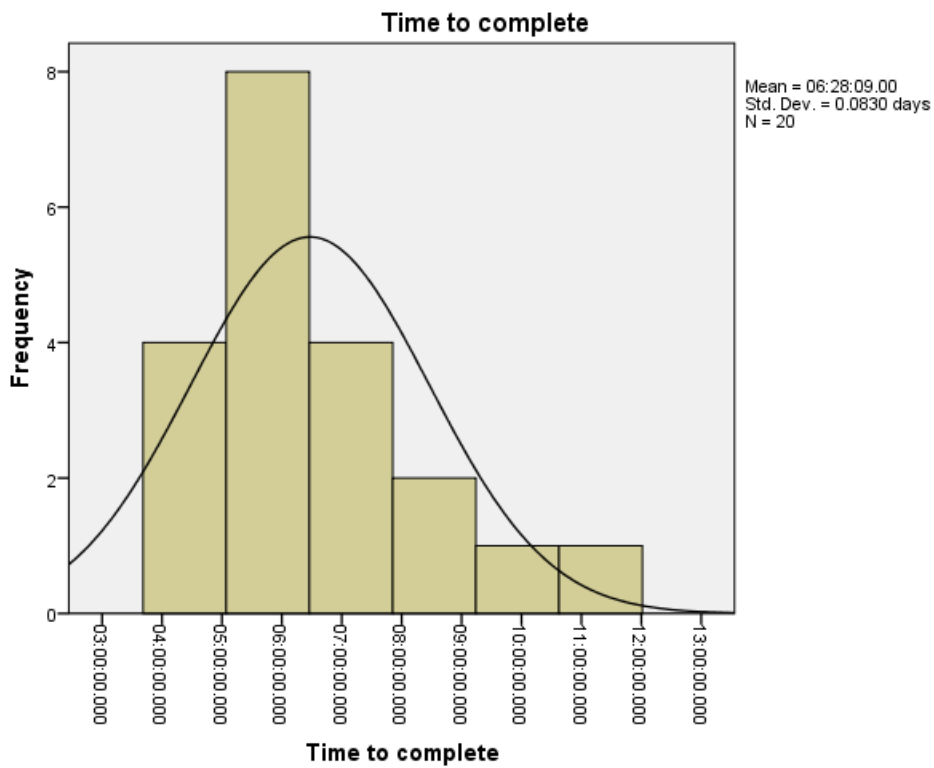
**Figure 2: Confidence Question Responses**



### Time to Complete Procedure

The time needed to complete the tracheostomy care was obtained from the video recording. The shortest time to conduct tracheostomy care was 3:41 (mm:ss) and the longest time to complete tracheostomy care was 10:43. The mean time to conduct tracheostomy care on the simulated patient was 6:28.

**Figure 3: Time To Complete Tracheostomy Care**



## CHAPTER 5: DISCUSSION

### Research Question One: Tracheostomy Care Techniques

Will providers who are performing tracheostomy care on a simulated patient follow the guidelines set forth in the *AACN Procedure Manual*?

None of the providers performed tracheostomy care in the order that is outlined in the *AACN Procedure Manual for Critical Care*. The most common order of steps showed that the participants cleaned the stoma and flange prior to changing the inner cannula. The *AACN Procedure Manual for Critical Care* states that the inner cannula should be changed prior to the cleaning of the stoma and flange. All providers did perform hand hygiene prior to beginning the tracheostomy care procedure. Failure to follow guidelines and protocols could result in unexpected outcomes, including but not limited to: stoma infection, skin breakdown, pressure areas, or stomatitis.

### Research Question Two: Following Tracheostomy Care Protocol

Research participants will choose both necessary and unnecessary items to perform tracheostomy care. The selection of items will vary from provider to provider and will not always follow protocol.

All participants (n = 20) chose at least one item from the table of available items that is not necessary or contraindicated for use while performing tracheostomy care. The *AACN Procedure Manual for Critical Care* advises against the use of hydrogen peroxide for tracheostomy care, yet all 20 providers chose to use hydrogen peroxide during their procedure.

Additionally, some providers (n = 3) chose to use the pink oral swabs containing dentifrice, despite the label on the package instructing for oral use only.

None of the providers performed tracheostomy care in the order that is outlined in the *AACN Procedure Manual for Critical Care*. The most common order of steps showed that the participants cleaned the stoma and flange prior to changing the inner cannula. The *AACN Procedure Manual for Critical Care* states that the inner cannula should be changed prior to the cleaning of the stoma and flange. Failure to follow guidelines and protocols could result in unexpected outcomes, including but not limited to: stoma infection, skin breakdown, pressure areas, or stomatitis.

In addition to all providers choosing to wear non-sterile gloves, some providers (n = 8) chose to wear sterile gloves for the changing of the inner cannula. While this should not be considered wrong, the *AACN Procedure Manual for Critical Care* only states that clean gloves should be worn for the procedure, but does not specify sterile gloves. Subjects who did not apply sterile gloves while changing the inner cannula (n = 12) did indicate that they would not want to touch the shaft of the inner cannula, and maintained control of the inner cannula by holding on to the neck of the inner cannula. These results support the need for continued research and education on the need for universal protocols and policies.

#### Limitations of the Study

Limitations are identified for the study. The small sample size and simulated environment were potential limitations.



### Limited Number of Participants

Given the descriptive nature of the study, we requested approval to enroll only 20 participants. If the researcher were able to conduct research longer than the set timeline, additional providers could have been recruited, and findings may have been different. However, given the diverse ways of completing tracheostomy procedures (no one did it exactly the same), it is likely that a larger sample size would have only identified more ways of completing tracheostomy care.

### Use of a Simulated Setting

Given the complexity of patient care and varied times that tracheostomy care is done throughout the day, a decision was made to conduct the study in a simulated environment. It is not known that practices completed in the simulated setting are those that are done as part of the participants' usual care. It is possible that participants changed their practices in this video recorded sessions.

### Implications for Further Research

During the literature review, a need for research was identified in the area of tracheostomy care protocols and procedures. Further research into identifying the needs of this population is crucial. As the care for this group continues to shift out of the hospital the caregiver population will continue to grow. The research conducted on the outcomes of tracheostomy care interventions was also lacking. A literature search located many bundles and tracheostomy care packages, but limited studies on their effectiveness were noted. Many providers stated that their tracheostomy care practices varied from disposable inner cannula patients to non-disposable inner cannula patients. Additional providers states that tracheostomy

dressings may be indicated for some patients, but not all patients, while other providers stated that their practice included placing a tracheostomy dressing on every patient. Participants remarked that they would use a fenestrated gauze dressing on all patients who did not have skin breakdown, but would look to use a foam tracheostomy dressing, such as Mepilex or Poly-mem, for patients who had skin breakdown around the flange. Some participants requested additional supplies that were not available for the research, including sterile 4x4 tubs of gauze, and

Continued research on this topic to include materials used while conducting tracheostomy care may prove promising. Additional data collection could investigate appropriate suctioning technique and monitoring of tracheostomy cuff pressure, which was not a part of this study. Further research and education may identify areas where the provider needs further instruction or continued support.

### Clinical Implications

This pilot study showed wide discrepancy in practices. Providers are performing tracheostomy care using different methods, procedures, and equipment. At a minimum, providers can be educated on the existing protocols and procedure manuals in place in order to guide their tracheostomy care practices. Additional research can focus on evidence-based practice for the selection of specific items for tracheostomy care. Continued development and refinement could allow this material to reach a multitude of populations in the hospital.

### Summary

None of the providers in the study performed tracheostomy care in the manner recommended by the *AACN Procedure Manual*. This supports the researcher's belief that there

is a significant fluctuation of methods in this population. This research supported the belief that providers would utilize unnecessary materials to perform tracheostomy care and would deliver care in a manner not set forth in the protocol.

## Appendix A: Research Study Recruitment Flyer



UNIVERSITY OF CENTRAL FLORIDA  
College of Nursing

Assessment of Tracheostomy Care Practices in a Simulated Setting

We are looking for volunteers for a brief 15-minute study. Participants will be asked to perform tracheostomy care on a mannequin while being observed and recorded.

In order to participate in this study, you must be:

- 18 years of age or older
- A Registered Nurse or Respiratory Therapist employed by ORMC
- Regularly work with tracheostomy patients, as defined as 3 or more tracheostomy patients per month (managers and supervisors are excluded from participating)

**Why should you participate?**

There are no direct benefits from participation in the study. It is possible, however, that by your participation in this study that your knowledge of tracheostomy care practices will increase. Information gained as a result of this study may add to the knowledge about tracheostomy care practices and will be used for future education, training, and research. In appreciation for your time, you will receive a Starbucks gift card.

To **volunteer** for this study, please contact Thomas Bolsega at [tbolsega@knights.ucf.edu](mailto:tbolsega@knights.ucf.edu), or 407-242-9245

**The study will be conducted on:**

January 05, 2014	1400 - 1700	Trauma ICU Conference Room
January 06, 2014	2100 - 2300	Trauma ICU Conference Room
January 07, 2014	1400 - 1700	Trauma ICU Conference Room
January 07, 2014	2100 - 2300	Trauma ICU Conference Room

Thank you.

Thomas Bolsega, Honors in the Major Student, [tbolsega@knights.ucf.edu](mailto:tbolsega@knights.ucf.edu), 407-242-9245  
Mary Lou Sole, Faculty Supervisor, [mary.sole@ucf.edu](mailto:mary.sole@ucf.edu), 407-823-5496

**No personal information will be collected as part of this study and findings will not be shared with managers/supervisors.**

## Appendix B: Research Consent Form

*ASSESSMENT OF TRACHEOSTOMY CARE PRACTICES IN A SIMULATED SETTING*

**Principal Investigator:** Thomas J. Bolsega, College of Nursing Student  
University of Central Florida  
407-242-9245  
[tbolsega@knights.ucf.edu](mailto:tbolsega@knights.ucf.edu)

**Co-Investigator:** Mary Lou Sole, PhD, RN, CCNS, FAAN, FCCM  
407-823-5496  
[mary.sole@ucf.edu](mailto:mary.sole@ucf.edu)

- You are invited to participate in a study to explore procedures and equipment used by Registered Nurses (RNs) and Respiratory Therapists (RTs) while performing tracheostomy care.
- You are eligible to participate as a subject in this study if you are a RN or RT employed at Orlando Health, and regularly work with tracheostomy patients, as defined as 3 or more tracheostomy patients per month. Unit managers and team members who do not care for 3 or more tracheostomy patients a month will be excluded from the study.
- The research procedures involved in this study includes demonstration of tracheostomy care in a simulated environment. If you choose to participate in the study, we will ask you to complete short information about your education and experience prior to the demonstration. We will then ask you to gather equipment (from that available in the simulation area) and perform tracheostomy care as you usually do in the clinical setting. We will video record your procedures, avoiding video recording of your face. We will use a checklist to record observations during the procedure and review the video recording for more detailed analysis. Demonstration should take no more than 15 minutes.
- Video recordings in which you are able to be identified will not be shown to any other individual except the study investigators. Video clips of the procedure, showing hands and arms only, may be used for professional presentations. Participants with identifying marks or tattoos on the arms will be offered a lab coat. Video recordings will be destroyed after study completion per IRB requirements.
- We do not foresee any possible discomfort(s) associated with participation in the study beyond potential anxiety associated with observation of your performances during the study.
- There are no direct benefits from participation in the study. It is possible however, that by your participation in this intervention that your knowledge of tracheostomy care practices will increase. Information gained as a result of this study may add to the knowledge about tracheostomy care practices and will be used for future education, training, and research.
- Participation in this study is voluntary. Whether or not you agree to participate as a research subject will in no way affect your job. You may refuse to participate or discontinue your involvement at any time without penalty. Your performance will not be shared or discussed with others, including your nurse manager.
- The location of the research will be in Conference rooms on the study units.
- As compensation for your time and participation, you will receive a Starbucks gift card.
- All research data collected will be stored securely and confidentially. The information collected in this study will be stored in locked filing cabinets or in computers with security passwords by the primary

investigator. All of the information collected will be entered in a spreadsheet in which each participant will be identified with a unique number.

- The research team, authorized Orlando Health personnel, and regulatory entities, may have access to your study records to protect your safety and welfare. Any information derived from this research project that personally identifies you will not be voluntarily released or disclosed by these entities without your separate consent, except as specifically required by law.
- If you have any comments, concerns, or questions regarding the conduct of this research please contact the researchers listed at the top of this form. You are free to stop participation in the research study at any time without penalty.
- If you are unable to reach the researchers listed at the top of the form and have general questions, or you have concerns or complaints about the research, or questions about your rights as a research subject, please contact the Orlando Regional Medical Center IRB by phone at (321) 841-5895.

Signature on this form denotes your consent to participate in this research study.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Witness: \_\_\_\_\_ Date: \_\_\_\_\_

You will receive a copy of this information to take home with you.



## Appendix C: Provider Demographic Form

Subject ID: \_\_\_\_\_

**Participant Demographic Data:**

Registered Nurse (RN) or Respiratory Therapist (RT) (circle one)	RN	RT
Years of experience in your profession		
What is your highest degree earned in your field?		
How long have you been employed at ORMC?		
How many years of experience do you have performing tracheostomy care?		
How confident are you at performing trach care? (circle one) (1 = not at all confident; 10 = most confident)	1	2 3 4 5 6 7 8 9 10

## Appendix D: Tracheostomy Care Scenario

The patient before you has a size 6.0 disposable inner cannula tracheostomy tube and is on a humidified trach collar with 28% FiO<sub>2</sub>. The patient has had the tracheostomy tube for 7 days. You are being asked to perform tracheostomy care on this patient. The supplies on the table are for you to use. Feel free to pick and choose any items you would like. Please perform tracheostomy care just as you would for any other patient. There is no right or wrong way; I am simply interested in seeing what you choose. The supplies used by the last provider have been removed and reset. The data collected will not be shared with anyone else. There will be no feedback given during the tracheostomy care. Do you have any questions before we begin?

## Appendix E: Researcher Checklist

ID #: \_\_\_\_\_

Equipment used:

- Tracheostomy care kits
- Disposable inner cannulas (appropriate size only)
- Sterile Water
- Normal Saline
- Hydrogen Peroxide
- 2x2 gauze
- 4x4 gauze
- Tracheostomy fenestrated split gauze
- Foam dressings
- Foam tracheostomy ties
- Nylon tracheostomy ties
- Suture scissors or trauma shears
- Cotton-tipped applicators
- Pipe cleaners
- Cleaning brushes
- Sterile gloves
- Non-sterile gloves
- Bag-valve mask
- Chux pads

## Appendix F: Request For Study Findings

Separate sheet (or index card):

If you would like a summary of the study findings, please provide the following information.

This information will not be recorded in any study record and will be destroyed upon the completion of the study.

Name \_\_\_\_\_

Email address \_\_\_\_\_



## Appendix G: IRB Approval



1414 Kuhl Ave.  
Orlando, FL 32806  
321.843.7000  
orlandohealth.com

FWA # 0000384

DATE: December 12, 2014  
TO: Thomas Bolsega, AAS, AA  
FROM: Orlando Regional Medical Center (ORMC) IRB  
PROJECT TITLE: [688894-1] Assessment of Tracheostomy Care Practices  
REFERENCE #: 14.135.11  
SUBMISSION TYPE: New Project  
ACTION: DETERMINATION OF EXEMPT STATUS  
DECISION DATE: December 12, 2014  
REVIEW CATEGORY: Exemption category # 1

Thank you for your submission of New Project materials for this project. The Orlando Regional Medical Center (ORMC) IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact the IRB Office at (321) 841-5895. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Orlando Regional Medical Center (ORMC) IRB's records.

*Orlando Health Facilities:*

- ARNOLD PALMER HOSPITAL FOR CHILDREN
- SOUTH SEMINOLE HOSPITAL
- UF HEALTH CENTER AT ORLANDO HEALTH
- WINNIE PALMER HOSPITAL FOR WOMEN & BABIES
- SOUTH LAKE HOSPITAL
- DR. P. PHILLIPS HOSPITAL
- ORLANDO REGIONAL MEDICAL CENTER
- HEALTH CENTRAL HOSPITAL

## Appendix H: ORMC Tracheostomy Care Protocol



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Type of Policy:	<b>PATIENT CARE</b>	Category:	<b>PROVISION OF CARE, TREATMENT AND SERVICES (PC)</b>
Title:	<b>Tracheostomy Care</b>	Policy #:	<b>3445</b>
Page:	1 of 3	Replaces #:	
Issue Date:	<b>12/04</b>	Developed By:	Patient Care
Revision Dates:	11/07, 11/08, 1/11, 3/14	Approved By:	Patient Care Executive <i>Anne B. Prack R.N., N.S.N., N.E.A., B.C.</i>

**I. PURPOSE:**

This policy outlines the process for tracheostomy care at Orlando Health.

**II. DEFINITIONS:**

When used in this policy these terms have the following meanings:

- A. Tracheostomy (trach tube): A breathing tube surgically or percutaneous inserted through the neck into the trachea. Trach tubes can be cuffless or cuffed, with an inflatable cuff near the distal end for sealing and protecting the airway.
- B. Obturator: A device used to assist in the introduction of the tracheostomy tube into the trachea.
- C. Primary: The nurse assigned to and responsible for the patient's care, primary person responsible for tracheostomy care.
- D. Complete sterile tracheostomy care: Assessment of stoma skin integrity, cleaning stoma site, replacing trach tie, replacing inner cannula, and suctioning if necessary.

**III. POLICY:**

It is the policy of Orlando Health to:

- A. Maintain a patent airway, maintain skin integrity, and prevent infection of patients with a tracheostomy.
- B. Use a multidisciplinary approach in the management of tracheostomy care.

**IV. PROCEDURE:**

- A. Equipment required to be at the patient's bedside at all times:
  - 1. Obturator.
  - 2. A tracheostomy tube of the same size and type. The pediatric patient has an additional tube one size smaller available at the bedside.
  - 3. Resuscitation bag, mask, and oxygen flowmeter.
  - 4. Suction equipment (including suction catheters).
  - 5. Extra equipment specific to type of trach the patient has:
    - a. Trach with disposable inner cannula – an extra inner cannula and tracheostomy care kit or tracheostomy care supplies.
    - b. Tracheostomy tube with nondisposable inner cannula – tracheostomy care kit.
    - c. Metal trach – trach care kit (same as nondisposable) and spare cuffed trach size 6.
    - d. The pediatric patient has an additional tracheostomy tube holder (trach tie) available at the bedside.
- B. Head and Neck surgical patients with free flaps:
  - 1. No trach ties/holders; secured with sutures.
  - 2. Use safety pins to secure aerosol trach collar to gown.
- C. Do not perform stoma care or change the trach tube holder (tie) within the first 24 hours of tracheostomy placement.



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Title:	<b>Tracheostomy Care</b>	Policy #:	<b>3445</b>
Page:	2 of 3	Replaces #:	
Issue Date:	<b>12/04</b>	Developed By:	Patient Care
Revision Dates:	11/07, 11/08, 1/11, 3/14	Approved By:	Patient Care Executive <i>Anna B. Packer R.N., N.S.N., N.E.A., B.C.</i>

D. After the first 24 hours, the schedule for tracheostomy care is as follows:

Tracheostomy Care Components	Schedule
Outer Stoma Care	Every 4 hours PRN
Complete sterile tracheostomy care	Every shift and PRN
Change commercially approved tracheostomy tube holder (trach tie)	Every 48 hours and PRN

E. Responsibility for tracheostomy care is as follows:

MULTIDISCIPLINARY TEAM				
Procedure	Clinical Technician	RT	RN/LPN/GN	MD or MD Representative
Tracheostomy dressing change	X	X	X primary	
External suction or external cleaning	X	X	X primary	
Tracheal suctioning		X	X	
Change inner cannula		X	X	
Change ties (requires 2 people)	X As second person only	X	X primary	
Assessment of stoma/skin integrity		X	X primary	
Remove sutures per physician's order		X	X	X
Verifies required equipment is at the bedside		X	X primary	

F. If tracheostomy tube is dislodged call the Rapid Response Team.



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Type of Policy:	<b>PATIENT CARE</b>	Category:	<b>PROVISION OF CARE, TREATMENT AND SERVICES (PC)</b>
Title:	<i>Tracheostomy Care</i>	Policy #:	<b>3445</b>
Page:	3 of 3	Replaces #:	
Issue Date:	<b>12/04</b>	Developed By:	Patient Care
Revision Dates:	11/07, 11/08, 1/11, 3/14	Approved By:	Patient Care Executive <i>Jane D. Peack R.N., N.S.N., N.E.A., B.C.</i>

**V. DOCUMENTATION:**

As appropriate in the medical record (to include dressing change, suctioning, inner cannula change/cleaning, tracheostomy tie change and skin integrity).

**VI. REFERENCES:**

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**VII. ATTACHMENTS:**

None.

## Appendix I: Image of Tracheostomy Mannequin



Figure 1. Low cost model anterior view

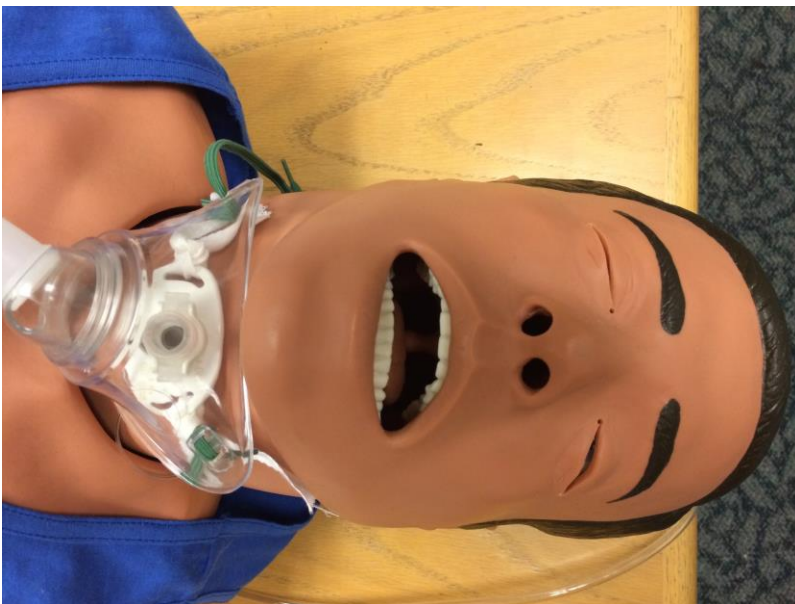


Figure 2. Low cost model lateral view.



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