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Signed: Alan Paul Moyer

Dated: <u>3/29/2019</u>

ENHANCING THE COMPUTERIZED PROVIDER ORDER ENTRY SYSTEM TO

OPTIMIZE MEDICAL SUPPLY PRESCRIPTIONS IN A VETERANS AFFAIRS

ACADEMIC TEACHING HOSPITAL

by

ALAN PAUL MOYER

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Introduction:

There are approximately 1 million people in the United States that have ostomies and this number is increasing by 100,000 new procedures completed annually.¹ The indications for ostomies include patients with inflammatory bowel disease, trauma, cancer, and other etiologies.² An ostomy is the surgical exteriorization of the bowel to the abdominal wall. An ostomy may be placed on a permanent or temporary basis which may include the small intestine (ileostomy) or large intestine (colostomy).³ Ostomies result in loss of control of intestinal contents, both stool and flatulence, which result in dramatic changes in patterns of elimination and a need for lifelong use of prosthetic devices. Due to loss of control of the bowel movements, ostomy supplies are medically necessary. This procedure can lead to a large financial burden for patients and institutions due to post-surgical issues including skin irritation, fluid and electrolyte imbalances, stomal prolapse and retraction.⁴

Patients with ostomies often note challenges with sexual intimacy, clothing, travel, and loss of the ability to care for themselves.⁵ The barrier/wafer is designed to protect the skin from the stoma output and to be as neutral to the skin as possible. However, these external devices alter the appearance of the body causing the requirement of new skills for bowel hygiene. For some individuals, the changes that accompany an ostomy, such as the flatulence and odor, can result in a feeling of loss of personal dignity.¹ It is imperative that nurses and health care providers teach patients how to care for their ostomies while being compassionate to those who have an ostomy.

Clinicians are recognizing the importance of measuring the impact of chronic disease based on a patient's health-related quality of life (HRQL). HRQL encompasses social, psychological, and physical well-being and is defined as "the level of satisfaction associated with an individual's life and how this is affected by disease and medical treatments."⁶ Selecting the right ostomy product is essential to providing the best possible quality of life for the patient. Since each patient's needs are unique, there is not a universal pouch that will work for everyone. To help counteract the complications from wearing an ostomy pouch, medical device companies have focused on developing products that provide greater versatility and flexibility to improve patients HRQL. Deciding which product is best for the patient is complex. There are many new innovations and technology that make selecting the right ostomy pouch challenging due to a patient's lifestyle, daily activities, skin condition, and personal preferences.²

Background:

Patient safety is a priority in healthcare systems across the country. At the Veterans Health Administration, when patients run out of their supplies, they present to the emergency department for a refill. Healthcare systems must prevent financial strain on the medical center by decreasing the number of patients who report to the emergency department for non-lifesaving conditions. Throughout the Veterans Affairs Healthcare System, medical supplies including ostomy supply products are dispensed by the pharmacy service for outpatient utilization. Most ostomy products are available through the Consolidated Mail Outpatient Pharmacy (CMOP). In the event a product is not available the prescription may need to be specially ordered and filled at the local medical center. Due to a lack of resources, procuring these specialty orderable items can be challenging on short notice. Veterans must wait for the medical supplies to arrive at the facility before its mailed to their residence.

To help prevent delays in providing medical care, Veterans may need to receive care from a local provider in the community. The VA Mission Act of 2018 enhances care for Veterans in the community. While this improves Veterans access to care, these civilian health systems may not have the same government contracts and provide Veterans with specialized medical supplies that the VA may be unable to procure. Additionally, there is a high demand for provider education on ostomy supplies due to a lack of knowledge about the variety of products available. Medical and pharmacy school curriculum is constantly evolving with little information provided to students and residents about the management of ostomies and medical supplies education. Furthermore, a limited amount of research has been conducted to healthcare providers involving patients with ostomies. By increasing education to providers this can help reduce and eliminate waste and errors due to incorrect prescribing of these products. By educating providers and improving the ordering process this will allow for a more streamlined approach to select the best product available for the patient and hopefully decrease the number of consults for the enterostomal nurses. In 2017, an interdisciplinary Ostomy Supply Task Force was formed at the Michael E DeBakey VA Medical Center with the express purpose to streamline the ostomy supply process for Veterans. This provided a unique opportunity to better identify methods to streamline the ostomy supply process and improve care for our patients.

Methods:

In July 2017, an interdisciplinary Ostomy Supply Task Force at Michael E. DeBakey Veterans Affairs Medical Center (MEDVAMC) in Houston, Texas was established to eliminate all non-value-added time when ordering ostomy supplies in the electronic medical record. The interdisciplinary Ostomy Supply Task Force included an Outpatient Pharmacy Program Manager, Spinal Cord Injury Clinical Pharmacy Specialist, Health-System Pharmacy Administration resident, outpatient pharmacy supply technician, 2 enterostomal nurses, and a logistics technician. A fishbone diagram was created to determine root causes to eliminate waste and improve patient care. A retrospective usage report identified dispensing habits for 113 orderable ostomy pouches (54 ConvaTec[®], 46 Hollister[®], 11 Coloplast[®], 2 CYMED[®]) MEDVAMC from March to July 2017. Each item was analyzed and reviewed for quantity dispensed, price per unit, and whether the prescription was filled locally or at CMOP. An inventory was conducted and all products that we no longer dispense were removed from stock.

The average wait time for patients to receive their ostomy supplies from CMOP was between 4 to 7 days. If the item is unavailable, on average, the patient can wait an additional 3 to 5 days since the pharmacy will need to order the supply from the manufacturer and fill it locally.

Since then, to help consolidate inventory and decrease patient wait times, 64% of the Coloplast[©] orderable items were removed from the electronic health record, compared to 62% of Hollister[©] and 48% of ConvaTec[©] supplies. All the CYMED[©] pouches were removed from the inventory as well. Of the orderable items removed from the electronic health record, 100% of the Coloplast[©] and CYMED[©] pouches were unavailable at CMOP, followed by ConvaTec[©] and Hollister[©] (68% and 38% respectively) at the MEDVAMC. By removing specialty order ostomy products and converting patients' ostomy supplies to similar products this will prevent errors when providers order medical supplies and delay patients from receiving their products. Additionally, we have removed unused supplies from the outpatient pharmacy stock. When patients reorder their ostomy products they are sent directly from the CMOP to the patient's residence.

Veteran's charts will be reviewed for ostomy medical supply prescriptions from MEDVAMC and no patient identifier information will be collected. Additionally, due to the rise of new ostomy supply innovations, the VA electronic health record medical supply order set is obsolete because only one ostomy product can be selected. Also, the ostomy supply orderable item number does not tell the specifics about the individual product. A new updated order set in the electronic health record to assist providers when ordering ostomy supplies needs to be developed. Instead of organizing the ostomy supplies by their orderable item number, we will focus on categorizing the various ostomy products by their stoma size and product specifics. Additionally, pharmacists and medical providers confidence levels when ordering non-formulary ostomy supplies will be assessed by survey both pre and post-order set implementation. After the pre-order set survey is completed, we will provide the primary care team, Clinical Pharmacy Specialists, and outpatient pharmacists ostomy supply education and the electronic health record order set. The primary care team (ordering providers) will receive a handout, the Clinical Pharmacy Specialists (who approve the non-formulary consults) will receive an in-service and handout, and the outpatient pharmacists (who verify the orders) will receive a handout. After three weeks of disseminating the continuing education, then we will distribute the post-order set implementation survey to evaluate the ostomy supply continuing education for the staff.

Specific Aims:

- 1. Providers confidence levels will be evaluated by survey 1 month pre- and post-order set implementation and will increase by 30% in ordering non-formulary ostomy supplies.
- 2. Increase the number of enterostomal nurse consults by 20% in the first 1 month after implementation of the computerized provider order entry system for ostomy medical supplies.
- 3. After implementing the order set and providing provider education at MEDVAMC, there will be an increase in the amount of ostomy supplies filled by the Consolidated Mail Outpatient Pharmacy by 10% within 1 month.

Results:

The survey questionnaire was adapted from nursing confidence in their skills and knowledge to care for patients with ostomies publication. The survey was distributed to medical providers, nurses, pharmacists, physician assistants, and pharmacy residents. Numeric categorized variables were summarized using descriptive statistics such as mean and standard deviation. Frequencies on a 6-point Likert Scale (1 = Strongly Disagree, 6 = Strongly Agree) was computed for all categorical variables. Four of the Likert Scales were reversed to align with positive versus negative survey responses. For example, "I am concerned I may do something incorrectly when ordering ostomy supplies (including accessories)," where "strongly agree" would indicate a negative response. Demographic and clinical practice characteristics were not recorded. A priori of alpha was set at 0.05. The data was analyzed by t-tests to assess the association between provider confidence levels when working with patients with ostomies pre and post-order set implementation. Additionally, Pearson's χ^2 was used to assess the association between the healthcare team's awareness on the availability of an enterostomal consult service pre and post-order set implementation. All analyses were completed in SAS statistical software Version 9.4.

Ninety-nine surveys were returned from the provider confidence pre-order set implementation and ninety-four surveys were returned post-order set implementation. These survey responses were compared to a recent publication on nurse confidence in their skills and knowledge to caring for patients with ostomies (Table1).⁷

Table 1:Healthcare ProvidersConfidence Level WhenWorking with Patients	Prov Confi Pre-Or Implem	vider dence der Set entation	Prov Confi Post-Or Implem	vider dence oder Set entation	Data Analysis		Nurse Confidence Article ⁷	
with Ostomies	Mean	SD	Mean	SD	t	р	Mean	SD
1) I feel confident knowing the difference between colostomy, ileostomy, urostomy. ^a	2.70	1.45	4.95	1.02	-12.38	<.0001	4.89	1.09
2) I feel confident ordering the correct medical supplies for a patient. ^a	2.21	1.19	4.82	1.11	-15.72	<.0001	4.34	1.22
3) I am concerned I may do something incorrectly when ordering ostomy supplies (including accessories). ^b	2.13	1.02	2.41	1.25	-1.72	0.088	3.89	1.36
4) I feel ostomy supplies are easy to order. ^b	1.72	0.87	4.53	1.10	-19.60	<.0001	3.95	1.21
5) Lack of time is a factor when researching/ordering the appropriate ostomy supplies. ^b	1.89	1.12	2.05	0.86	-1.14	0.2539	3.75	1.30
6) I feel comfortable identifying alternative medical supplies/ solutions due to challenges caused by the supply products? (ie. patient skin irritation, identifying alternative sizes, ostomy pouch leaking). ^b	1.86	0.91	4.66	1.11	-19.16	<.0001		

^a1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = disagree, 6 strongly agree

^b Reversed scale: 1 = strongly agree, 2 = agree, 3 = slightly agree, 4 = slightly disagree, 5 = disagree, 6 = strongly disagree

1	6				
	Pre-Order Set	Post-Order Set			
Are you aware of the availability of an	Intervention	Intervention	χ^2	Р	
enterostomal consult at MEDVAMC?	Frequency (%)	Frequency (%)			
Vac	16	83			
res	(16.3%)	(83.7%)	00.51	-0.001	
	82	11	99.51	< 0.001	
No	(83.7%)	(11.7%)			

Table 2: Chi-Square Test of Providers Knowledge of an Enterostomal Consult Service

From December 1-31, 2018 there were 210 MEDVAMC enterostomal consults placed for inpatient and 10 consults for outpatient. After reviewing each of these consults, only 16 of the consults were entered by physicians for ostomy supplies (16/220 = 7.3%). The remaining consults were for wound care evaluation. This information is also highlighted in question 7 from the pre-survey for the ostomy supplies. 83.7% of the survey respondents did not know there was an enterostomal consult service available for ostomy supplies. After provider education, we expect the number of consults to increase. Additionally, we are requiring patients on "non-preferred" non-formulary ostomy products (Coloplast) to have an enterostomal consult prior to ordering the medication for the patient.

After order set implementation, from February 19 - March 21, 2019 there were 219 MEDVAMC enterostomal consults placed for inpatient and 13 consults for outpatient. Only (27/232 = 11.6%) of the consults were entered by physicians for ostomy supplies. The remaining consults were entered for wound care evaluation.

Table 3: Percent of Ostomy Supplies Dispensed from CMOP						
Prior to Order Set Implementation	After Order Set Implementation					
94.8% Ostomy Products sent to CMOP	94.7% Ostomy products sent to CMOP					

Discussions:

Findings from this study suggest that confidence of staff providers, pharmacists, physician assistants, and nurses is higher with training in ostomy care and experience with caring for patients with stomas. After assessing providers confidence levels 1 month pre- and post-order set implementation we found their confidence level increased by over 75% in their ability to confidently know the difference between a colostomy, ileostomy, and urostomy, ordering the correct medical supplies, and ability to identify an alternative medical supplies/solution due to challenges caused by the supply products. Additionally, there is a 69% increase in survey responders who are now aware of an enterostomal consult service, which was also confirmed by a 4.3% increase in the amount of enterostomal consults completed to evaluate Veterans ostomy supplies. However, the average mean confidence level for the healthcare team was lower on understanding the difference between a colostomy, ileostomy, and urostomy, and there was more concern they may do something incorrectly (not statistically significant) when ordering ostomy supplies for a patient compared to the nurse confidence article. In addition, the percent of ostomy products being sent to CMOP did not increase. Even though 108 products were deactivated from the electronic health record, only 50 (46.3%) of these ostomy products were being utilized by

Veterans. However, due to the high volume of products that did not have active prescriptions, this will help reduce the risk of healthcare providers ordering the incorrect product in the future.

Limitations:

Ideally, we would want to measure the durability of our intervention after three months of implementation. Additionally, while the survey was anonymous, we are not able to identify whether the same individuals completed the survey pre and post-order set implementation, if those who completed the survey received the ostomy supply education, and the difference in baseline knowledge amongst the healthcare team. Furthermore, providers preferred ostomy supplies and order set training from a handout, so they could have something to reference, while the clinical pharmacists received an in-service presentation on how to use the order set. Additionally, we were unable to evaluate cost savings from converting patients to alternative ostomy supply products due to the many federal contracts and the lack of updates on pricing information in the local facility databases.

Conclusions:

Furthermore, after removing ostomy supplies that were no longer being utilized from the electronic health record decreased waste and increased patient satisfaction (by decreasing wait time) because the Veterans could receive their ostomy supplies in the mail from the Consolidated Outpatient Mail Pharmacy versus having to pick them up at the local facility. Opportunities for continuing education and getting more comfortable using the ostomy supply order set may further increase healthcare providers, nursing, and resident's confidence in providing ostomy care.

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Supplemental Information:

Survey Responses – Pre-Order Set Implementation:

Q1											
I feel conf	fident kno	wing the diffe	erence betwe	en colosto	my, ileost	omy, urostoi	my?				
		Likert Scale	Responses	Percent	Product	N	Nurse Confidence Ostomy Article				
Strongly A	Agree	6	3	3.06%	18	N	/lean	4.89			
Agree		5	15	15.31%	75	S	Standard Deviation 1.094				
Slightly A	gree	4	10	10.20%	40						
Slightly Di	isagree	3	10	10.20%	30						
Disagree		2	42	42.86%	84						
Strongly D	Disagree	1	18	18.37%	18						
	Mean	2.704									
	SD	1.445									

Q2											
I feel cont	fident orde	ering the corre	ect medical s	upplies for	a patient						
		Likert Scale	Responses	Percent	Product	Nurse C	Nurse Confidence Ostomy Article				
Strongly A	Agree	6	1	1.02%	6	Mean	4.34				
Agree		5	3	3.06%	15	Standar	Standard Deviation				
Slightly A	gree	4	13	13.27%	52						
Slightly D	isagree	3	14	14.29%	42						
Disagree		2	35	35.71%	70						
Strongly D	Disagree	1	32	32.65%	32						
	Mean	2.214									
	SD	1.186									

Q3										
I am conce	erned I ma	y do somethi	ng incorrectly	when ord	ering osto	my supplie	es (includir	ng accessor	ies)	
		Likert Scale	Responses	Percent	Product		Nurse Cor	nfidence Os	stomy Arti	cle
Strongly A	gree	1	24	24.49%	24		Mean	3.89		
Agree		2	50	51.02%	100		Standard	Deviation	1.357	
Slightly Ag	gree	3	17	17.35%	51					
Slightly Di	isagree	4	3	3.06%	12					
Disagree		5	2	2.04%	10					
Strongly D	Disagree	6	2	2.04%	12					
	Mean	2.133								
	SD	1.022								

Q4											
I feel osto	my suppli	es are easy to	order								
		Likert Scale	Responses	Percent	Product	Nurse Co	Nurse Confidence Ostomy Article				
Strongly A	Agree	6	0	0	0	Mean	3.95				
Agree		5	1	1.02%	5	Standard	Deviation	1.213			
Slightly A	gree	4	3	3.06%	12						
Slightly Di	isagree	3	12	12.24%	36						
Disagree		2	34	34.69%	68						
Strongly D	Disagree	1	48	48.98%	48						
	Mean	1.724									
	SD	0.871									

ne is a fact	or when rese	arching/orde	ring the ap	propriate	ostomy sup	oplies			
	Likert Scale	Responses	Percent	Product		Nurse Cor	nfidence Os	tomy Arti	cle
gree	1	40	40.82%	40		Mean	3.75		
	2	44	44.90%	88		Standard Deviation 1.296			
gree	3	8	8.16%	24					
sagree	4	0	0.00%	0					
	5	3	3.06%	15					
Disagree	6	3	3.06%	18					
Mean	1.888								
SD	1.120								
	ne is a fact gree sagree bisagree Mean SD	ne is a factor when rese Likert Scale ogree 1 2 gree 3 sagree 4 5 bisagree 6 Mean 1.888 SD 1.120	ne is a factor when researching/orde Likert Scale Responses ogree 1 40 2 44 gree 3 8 sagree 4 0 5 3 bisagree 6 3 Mean 1.888 SD 1.120	Image <td>ImageI</td> <td>Image: constraint of the second sec</td> <td>Image: constraint of the second sec</td> <td>Image: sector of the sector</td> <td>Image: sector of the sector</td>	ImageI	Image: constraint of the second sec	Image: constraint of the second sec	Image: sector of the sector	Image: sector of the sector

Q6										
I feel com	fortable id	lentifying alte	ernative med	ical suppli	es/solutior	ns due to c	hallenges	caused by t	the supply	product?
(ie. Patier	nt skin irrit	ation, identif	ying alterativ	e sizes, os	tomy pouc	h leaking)				
		Likert Scale	Responses	Percent	Product					
Strongly A	gree	6	0	0	0					
Agree		5	2	2.04%	10					
Slightly Agree		4	5	5.10%	20					
Slightly Di	isagree	3	7	7.14%	21					
Disagree		2	47	47.96%	94					
Strongly Disagree		1	37	37.76%	37					
	Mean	1.857								
	SD	0.908								

Q7								
Are you a	ware of the	e availability	of an enteros	tomal con	sult at MED	VAMC?		
		Likert Scale	Responses	Percent	Product			
Yes		1	16	16.33%	16			
No		0	82	83.67%	0			
	Mean	0.163						
	SD	0.372						

Survey Responses – Post-Order Set Implementation:

Q1										
I feel conf	fident kno	wing the diffe	erence betwe	en colosto	my, ileost	omy, urost	:omy?			
		Likert Scale	Responses	Percent	Product		Nurse Co	nfidence Os	stomy Arti	cle
Strongly A	Agree	6	24	25.53%	144		Mean	4.89		
Agree		5	54	57.45%	270		Standard	Deviation	1.094	
Slightly A	gree	4	10	10.64%	40					
Slightly Di	isagree	3	1	1.06%	3					
Disagree		2	3	3.19%	6					
Strongly D	Disagree	1	2	2.13%	2					
	Mean	4.745								
	SD	1.020								

Q2										
I feel conf	ident orde	ering the corre	ect medical s	upplies for	a patient					
		Likert Scale	Responses	Percent	Product	Nurse Confidence Ostomy Article				
Strongly A	gree	6	23	24.47%	138	Mean	4.34			
Agree		5	47	50.00%	235	Standard I	Deviation	1.22		
Slightly Ag	gree	4	16	17.02%	64					
Slightly Di	sagree	3	3	3.19%	9					
Disagree		2	2	2.13%	4					
Strongly D	Disagree	1	3	3.19%	3					
	Mean	4.622								
	SD	1.107								

Q3												
I am concerned I may do something incorrectly when ordering ostomy supplies (including accessories)												
		Likert Scale	Responses	Percent	Product		Nurse Cor	nfidence Os	stomy Arti	cle		
Strongly Agree		1	25	26.60%	25		Mean	3.89				
Agree		2	35	37.23%	70		Standard	Deviation	1.357			
Slightly Agree		3	9	9.57%	27							
Slightly Disagree		4	21	22.34%	84							
Disagree		5	3	3.19%	15							
Strongly Disagree		6	1	1.06%	6							
	Mean	2.316										
	SD	1.248										

Q4										
I feel ostomy supplies are easy to order										
		Likert Scale	Responses	Percent	Product	N	Nurse Confidence Ostomy Article			
Strongly A	gree	6	12	12.77%	72	N	/lean	3.95		
Agree		5	45	47.87%	225	S	tandard [Deviation	1.213	
Slightly Agree		4	28	29.79%	112					
Slightly Disagree		3	3	3.19%	9					
Disagree		2	2	2.13%	4					
Strongly Disagree		1	4	4.26%	4					
	Mean	4.347								
	SD	1.104								

Q5										
Lack of tin	ne is a fact	or when rese	arching/orde	ring the ap	propriate	ostomy sup	oplies			
		Likert Scale	Responses	Percent	Product		Nurse Cor	nfidence Os	stomy Arti	cle
Strongly Agree		1	23	24.47%	23		Mean	3.75		
Agree		2	50	53.19%	100		Standard I	Deviation	1.296	
Slightly Agree		3	16	17.02%	48					
Slightly Disagree		4	3	3.19%	12					
Disagree		5	2	2.13%	10					
Strongly Disagree		6	0	0.00%	0					
	Mean	1.969								
	SD	0.860								

Q6											
I feel comfortable identifying alternative medical supplies/solutions due to challenges caused by the supply product?											
(ie. Patient skin irritation, identifying alterative sizes, ostomy pouch leaking)											
		Likert Scale	Responses	Percent	Product						
Strongly Agree		6	15	15.96%	90						
Agree		5	51	54.26%	255						
Slightly Agree		4	18	19.15%	72						
Slightly Disagree		3	5	5.32%	15						
Disagree		2	1	1.06%	2						
Strongly Disagree		1	4	4.26%	4						
	Mean	4.469									
	SD	1.113									

Q7											
Are you aware of the availability of an enterostomal consult at MEDVAMC?											
		Likert Scale	Responses	Percent	Product						
Yes		1	83	88.30%	83						
No		0	11	11.70%	0						
	Mean	0.847									
	SD	0.323									