

# Computerized Support of Pressure Ulcer Prevention and Treatment Protocols

Diana Willson, M.S.N., R.N., Carol Ashton, Ph.D., R.N., Naomi Wingate, M.S.N., R.N.,  
Cora Goff, C.E.T.N., R.N., Susan Horn, Ph.D., Mike Davies, B.S., Roger Buxton, M.S.N., R.N.

*Pressure ulcer prevention and treatment protocols were developed and implemented at LDS Hospital. While the protocols were initially implemented "on paper", compliance was not optimum until the hospital's information system was modified to support the clinician in following the new protocols. Preliminary results indicate a significant reduction in the incidence of pressure ulcers.*

## INTRODUCTION

Intermountain Health Care (IHC) is a leader in the development and implementation of "best care" clinical guidelines and protocols [1]. The guidelines and protocols are developed and implemented in an attempt to reduce variation in the treatment process. IHC understands that if patient care is not delivered in a consistent manner, it will not be possible to accurately measure patient outcomes nor will it be possible to systematically improve the process of care delivery [2].

IHC seeks to develop protocols that may have the greatest impact on improving quality of care and reducing costs. Pressure ulcers, which are largely preventable [3,4,5,6,7,8,9], are estimated to cost IHC over \$1.5 million per year [10]. Therefore, protocols that standardize the prevention and treatment of pressure ulcers should not only improve the quality of care by preventing most pressure ulcers, but should also reduce costs by decreasing the patient's length of stay and decreasing the amount of nursing time necessary to treat pressure ulcers [11,12,13,14,15,16,17,18,19].

In 1991, a multidisciplinary team at LDS Hospital (one of IHC's hospitals) was formed to develop and implement protocols to prevent and treat pressure ulcers. The team is composed of a clinical nurse specialist, skin care specialist, staff nurse, nurse researcher, physician, nursing informaticist, nutritionist, physical therapist, and statistician and is funded by a grant from IHC.

The pressure ulcer protocols were implemented on paper after a one-hour training class for nursing staff. The initial implementation was on four medical/surgical units in the fall of 1993. One medical/surgical unit was used as a control group [10].

## INITIAL "PAPER" IMPLEMENTATION

The prevention protocol was developed based on the Agency for Health Care Policy and Research (AHCPR) guidelines for risk assessment, literature review, consultation and expert consensus of the team. The risk assessment tool selected for the protocol is the Braden Scale. The Braden Scale consists of six subscales and is highly predictive of risk for skin breakdown [3,20,21,22]. The paper prevention protocol developed by the team was a two-sided form that was to be completed on all new admissions and daily for those patients at risk. The front side of the form asked general screening questions about the patient's risk and included the entire Braden Scale risk assessment tool. The back of the form was a grid that suggested appropriate nursing interventions to be performed based on the specific scores of the Braden Scale. The paper forms were to be completed by nurses and placed in a box located at the nursing station for periodic "pick-up" and analysis (See Figure 1).

Compliance with the paper prevention protocol was poor. Nurses stated that while they found the form useful for reminding them about pressure ulcer risk in specific patients, in practice, using the paper forms was inconvenient. Nurses complained that they could not always find the paper forms and they had to remember to file the forms in a special box located at the central nursing station.

Figure 1. Two-sided, risk prevention tool.

The pressure ulcer treatment protocol implemented on paper was ulcer stage-specific and was developed based on literature review and expert consensus. The paper tool consisted of a table of suggested treatments specific to ulcer stage.

Nursing staff compliance with the treatment protocol was problematic. At the time the protocol was implemented, nurses were using the HELP (Health Evaluation through Logical Processing) hospital information system. While the information system included the ability to document pressure ulcer care, it did not support the clinician in following the specific protocol. Nurses would select pressure ulcer care from a menu screen, then would select treatments from a generic list of all possible treatments for all types of wounds (See Figure 2). The documentation screens were not helpful to nurses who would now be required to remember the full treatment protocol for specific ulcer stages. In addition, the documented pressure ulcer treatment data were not useful for chart review and consequent continuous quality improvement because the treatments were not linked to a specific ulcer stage.

TEST, DIANA WILLSON	50000025 N901	J 03/28/95	41Y F
ACUTE CARE CHARTING DRESSING CHANGE/WOUND CARE			
1. Dry sterile dressing	9. Semi-permeable membrane dressing		
2. Wet to dry dressing	10. Occlusive dressing		
3. Packing wound	11. Topical medication (FT):		
4. Bag changed over wound/stoma	12. Suture line care		
5. Irrigation/cleansing wound	13. Pin care		
6. Petroleum jelly gauze	14. Suture/strips/staple removal		
7. Scarlet red gauze	15. Straps and ties		
8. Non-adhesive dressing (Adaptic)	16. Dressing change (FT):		

Please select 1 to 15 of the above options

Figure 2. Generic wound treatment screen.

TEST, DIANA WILLSON	50000025 N901	J 03/28/95	41Y F
BRADEN SCALE			
TOTAL SCORE: 12 04/06/95.07:39			
1. <u>1</u> MOBILITY	1. Completely immobile	3. Slightly limited	Turn/position every 2 hours
	2. Very limited	4. No limitations	Assess skin daily between 0600 and 1200
2. <u>1</u> ACTIVITY	1. Bedfast	3. Walks occasionally	Bathe with soap and water, pat dry
	2. Chairfast	4. Walks frequently	Moisture barrier ointment/cream
3. <u>3</u> SENSORY PERCEPTION	1. Completely limited	3. Slightly limited	Observe skin when positioning
	2. Very limited	4. No impairment	Contact dietician to evaluate status
4. <u>3</u> MOISTURE	1. Constantly moist	3. Occasionally moist	Assist/encourage intake of protein/calories
	2. Very moist	4. Rarely moist	Frequent small feedings as per dietary plan
5. <u>2</u> NUTRITION	1. Very poor	3. Adequate	Tube feedings or TPN (requires an order)
	2. Probably inadequate	4. Excellent	Head of bed at or below 30 degree angle
6. <u>2</u> FRICTION AND SHEAR	1. Problem	3. No apparent problem	Knee gatch up when head of bed elevated
	2. Potential problem		Footboard
			Assistive devices/techniques to move patient
			Transparent film dressing to high risk areas

0 to Add New Data-> 0  
 ESC-Exit F1-Help F4-Store/Update F5-Patient is no longer at risk  
 F6-Previous Score F7-Following Score F8-Edit Displayed Score F9-Delete Displayed Score F12-New Patient

Figure 4. Braden Scale and suggested interventions

TEST, DIANA WILLSON	50000025 N901	J 03/28/95	41Y F
SCREENING QUESTIONS			
If the answer to either or both of the following questions is 'Yes', the patient is considered at high risk for developing a pressure ulcer and the Braden Scale must be completed daily between 0600 and 1200.			
Is the patient immobile? (Y/N) <u>    </u>			
(An immobile patient is defined as being bed or chair-bound or whose ability to reposition self is impaired)			
Does the patient have a pressure ulcer? (Y/N) <u>    </u>			
(If yes, follow the Pressure Ulcer Treatment form, initiate interventions and document appropriately.)			

Figure 3. General screening questions.

### COMPUTERIZED PROTOCOL SUPPORT

Both of these problems, compliance with the paper Braden Scale form and compliance with the pressure ulcer treatment protocol, were addressed with additions and modifications to the existing HELP information system.

A computerized pressure ulcer prevention program was developed to replace the two-sided paper form. The new computer application consists of two screens. The first screen asks general screening questions (See Figure 3). If the answer to either question is "Yes", the program continues to the next screen which is the Braden Scale. The nurse completes the scale and the program automatically displays the protocol-suggested interventions specific to the scores of the Braden Scale (See Figure 4).

The pressure ulcer prevention program simplifies the process of doing a frequent Braden Scale. For patients at risk who require a daily Braden Scale, the program enters directly into the Braden Scale screen

where the previous day's score is displayed. The nurse can simply accept the previous scores with a single keystroke, or may modify any scores that have changed.

The Braden Scale computer application was implemented January, 1994. Preliminary data analysis indicated that the tool was not being utilized consistently on those patients who needed it, as defined by protocol.

The pressure ulcer team, supported by the hospital's nurse practice council, recommended the use of the computer to remind the nurses to follow the prevention protocol. Alert logic was incorporated into the HELP system to remind nurses that Braden Scales have not been done on specific patients. The alerts are for three situations:

1. the patient has a pressure ulcer and has not had a Braden Scale done for the day
2. the patient has previously been identified by the Braden Scale as being at risk and has not had a Braden Scale done for the day
3. the patient has been in the hospital over 24 hours and has not been assessed for pressure ulcer risk.

By protocol, pressure ulcer risk assessment must be completed by noon. The program logic is executed at 1201 whenever a nurse caring for the patient enters the patient documentation program. If the logic identifies that the patient needs a risk assessment, an alert displays (See Figure 5). The nurse has the option of acknowledging the alert and doing the Braden Scale right at that time, or bypassing the alert and entering the patient documentation program. The computer generated alerts were implemented May, 1994.

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TEST, DIANA WILLSON      50000025 W901  J 03/28/95      41Y F
BRADEN SCALE ALERT

ALERT: Patient has previously been identified as being at risk for
developing a pressure ulcer. The patient must continue to have a risk
assessment (Braden Scale) completed every day between 0600 and 1200
until no longer at risk.

Would you like to do the Braden Scale at this time? (Y/N) _Y_
  
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Figure 5. Alert to remind the nurse to complete a Braden Scale.

In addition to the development of a pressure ulcer prevention program, several changes were made to the existing pressure ulcer documentation screens. Additional screens were added to the HELP documentation system. Now, when documenting ulcer care, nurses first select the pressure ulcer stage. Then, based on the stage, the program displays the stage-

appropriate treatment screen. The screen only displays those treatments suggested by protocol for the nurse to select from (See Figure 6). If the nurse does not follow protocol, the screen asks for information about what different treatments were done and why they were done. This information is used to measure compliance to treatment protocol and to modify the protocol as part of the continuous quality improvement process.

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TEST, DIANA WILLSON      50000025 W901  J 03/28/95      41Y F
PRESSURE ULCER CARE
Protocol suggested treatments: skin break exposing subcutaneous tissue, clean

Cleansing/irrigation solutions      Deviation from protocol (both must
1. Saline                          be selected together)
Packing                             5. Non-protocol treatment (FT): ___
2. Gauze, moist with NS            6. Reason for deviation (FT): ___

Dressings
3. Gauze

Time Spent Must Be Entered.
4. Nursing time spent ___ min

Please select 2 to 6 of the above options
  
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Figure 6. Example of a stage-specific ulcer care screen.

## PROTOCOL RESULTS

Compliance to the prevention protocol has greatly increased with the computerized Braden Scale and the computer generated "reminder" alerts. When the team examined the last 50 admissions to a specific unit, it found the compliance rate for appropriate completion of the Braden Scale to be 100%. Of interest, however, is that only six were completed without the prompting of the computer alerts.

Compliance to the treatment protocol has improved. In a computer search of patients admitted to LDS Hospital within the last month, twelve patients received pressure ulcer treatments that differed from protocol. Nine were because of physician orders or recommendations from the clinical nurse specialist. The other three deviations from protocol were explained by "patient request", "patient admitted with another dressing in place", and nurse preference. The pressure ulcer team is monitoring these different treatments and will follow up, as appropriate.

Results show a statistically significant decrease in the incidence of pressure ulcers at LDS Hospital. For example, prior to protocol implementation, the ulcer rate for all patients on a medicine service was 7%. The rate fell to 2% six months post-implementation. It is difficult to attribute the findings solely to the pressure ulcer protocol due to factors in the live clinical environment including documentation inconsistencies

and hospital environmental changes that can impact ulcer incidence. However, the initial goal of reducing variation in clinical practice has been achieved.

The results have been so promising that the protocols has been adopted as a hospital wide practice standard. Plans are now underway to implement the pressure ulcer prevention and treatment protocols throughout IHC.

## DISCUSSION

To date, there are some nurses who still do not comply with the prevention protocol and there are a few nurses who continuously ignore the reminder alerts. Consistent with CQI principles, reasons for not following protocol will first be explored before individuals will be specifically identified. However, in retrospect, the protocol team should have clarified expectations and implemented a process to evaluate nurses' acceptance of the protocol and, ultimately, hold nurses accountable for compliance to the protocol.

Another issue that needs to be addressed is that of "charting by exception". IHC is attempting to streamline documentation and encourage documentation of just the important, exceptional events. How will this philosophy mesh with documentation to protocol? For the Braden Scale prevention interventions, must the nurses document that they did every intervention? Or can they document that they delivered care as per the pressure ulcer prevention protocol? Must nurses document the specific elements of the pressure ulcer care given? Or can they document that they gave care to the stage two ulcer as per protocol? Should the computer store the specific elements of care if the nurses chart by exception?

Despite the issues that still need to be addressed, the pressure ulcer team and nursing staff consider the implementation of the pressure ulcer protocols to have been a success. LDS Hospital has seen a reduction in pressure ulcer rates with consequent cost savings due to reduced treatment and equipment costs. In addition, the reduced variation in clinical management is a precursor to planned clinical trials in which specific interventions can be tested.

The primary benefit of the information system has been to support the nursing staff in implementing and following the protocols. In fact, the pressure ulcer team believes that without an information system to support the clinician, compliance will always be problematic. Clinicians appreciate an information system that reminds them when to do the protocol and supports them in remembering the specifics of the protocol.

It is through compliance with protocols that IHC can be assured that "best care" is being delivered consistently. And it is through an information system that the clinician can be assisted in following and documenting to the protocol. The same information system that assists the clinician with compliance, also collects information about the deviations from protocol and outcome data so that the articulation of best care can be constantly improved.

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