Automation of Pressure Ulcer Prevalence Database and its Impact on Patient Outcome

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Memorial Sloan-Kettering Cancer Center

Academic medical center focusing on cancer treatment and research, located in NYC and Tri-state region

- Est. 1884 The world's oldest and largest private cancer center
- 4 470 Inpatient Beds
- 4 520,000 Outpatient Visits
- 4 19,000 Surgical Cases
- 4 11,000 Employees
- 4 2,000 Nursing Staff





Describe the technological change that can result from collaboration among Nursing, NI, QM &IS

 1.

 2.

 3.

 4.

 5.





Describe the technological change that can result from collaboration among Nursing, NI, QM &IS

- Discuss statistics associated with pressure ulcer 1. prevalence
- 2.
- 3.
- 4.





Describe the technological change that can result from collaboration among Nursing, NI, QM &IS

- 1.
- Describe the manual process using paper to collect 2. pressure ulcer prevalence data
- 3.

4.





Describe the technological change that can result from collaboration among Nursing, NI, QM &IS

- 1.
- 2.
- 3. Define the process used to automate pressure ulcer prevalence data collection
- 4.





Describe the technological change that can result from collaboration among Nursing, NI, QM &IS

- 3.
- 4. Describe how SDLC principles were applied to the software application design, development and evaluation



Memorial Sloan-Kettering Cancer Center

1.

2.

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Describe the technological change that can result from collaboration among Nursing, NI, QM &IS

- 1.

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 4.
- 5. Describe clinical benefits of using pressure ulcer database



Describe the technological change that can result from collaboration among Nursing, NI, QM &IS

Independent of the second data conversion process to send data electronically to NDNQI



Pressure Ulcer Incidence and Prevalence

- A 79% increase in pressure ulcers in hospitalized patients between 1993 and 2006 (Ayello & Lyder, 2009)
- Prevalence and incidence remain high across all health settings; costs in terms of human suffering and health care dollars.
- Represent a major quality indicator of nursing care and are now under the close watch of many regulatory agencies.



Pressure Ulcer Prevalence Data Collectors

Pressure ulcer survey team

- 3 wound care specialized nurses
 (1 CWOCN and 2 treatment room nurses)
- 2 data collectors (RN) from each inpatient nursing unit
- Perform the survey each month





PU Data Collection Paper Forms

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Data Collection Analysis Form										
Date: Unit: Unit Census: # Patient Surveyed:										
Data Analysis (Tallying Data) 1. # Parients at risk for Pressure Ulcer on Admission: a. At Risk: b. Not Assessed: c. Not At Risk:										
 # Patients at risk for Pressure Ulcers within 24 – 48 hours of Prevalence Study: At Risk: Not Assessed: Not At Risk; 										
 If patient at risk for Pressure Ulcer with a Braden ≤ 18, either on admission or within last 24 - 48 hours, was a Prevention Care Plan Initiated? A. Yes: 										
b No.										
 If patient has a Pressure Ulcer, was a Pressure Ulcer Flow sheet completed? Yes: No: 										
 If parient has a Pressure Ucer, was a Pressure Ucer Treatment Form Completed? Yes; No; 										
 If parient has a full thickness pressure ulcer(s): Stage 3, 4, Unstageable, or DII, has the parient been seen by a Wound Care Nurse from the treatment Room? Yes: No: No: 										
2. Classification for Patients with Pressure Ulcers										
Code Patient Classification # Patients										
Add W Patients admitted to MSKCC with PU EA Patients who developed PU will admitted to MSKCC (HA) Patients admitted to MSKCC with PU and who developed additional PU (HA) during admitsion										
Total Number of Patients with Pressure Ulcers										
J. # Pressure Ulkers by Staging										
Drage 1 Drage 2 Drage 3 Drage 4 Unstageable DII UID Ad W HA HA										
Total # Pressure Ulcer(s) Stage 3, 4, Unstageable, DTI:										
Iotal # UTD Ulcer Total # Hospital Acquired Pressure Ulcers (All Storach)										
Total # Pressure Ulcer(s) all stages:										



Analysis Phase: Paper based pressure ulcer survey work flow



OP THROWSN

Analysis Phase: Paper based pressure ulcer survey work flow



Analysis Phase: Need Assessment – PIECES

- PIECES framework consists of 6 categories developed by James Wetherbe for classifying problems
- Performance, Information, Economics, Control, Efficiency and Service





Request To Nursing Informatics

Can we automate our paper process of collecting pressure ulcer prevalence in order to :

- Improve accuracy of data
- Improve time management
- Improve utilization of resources
- Analyze data in real time to make the greatest impact on patient care outcomes
- Allow for collection of internal and external data to improve patient outcomes and utilization of resources
- Allow for better protection of patients and organizational sensitive material



Stakeholders

- Pressure ulcer data survey team
- Nursing informatics department
- Quality management department
- Information system department
- Nursing leadership
- Nursing staff at MSKCC
- Patients at MSKCC



Scope of Pressure Ulcer Data Base (PUDB)

- Build database with data entry driven logic
- Ability to download the current patient census
- Secure driven access on any unit clinical work station
- Develop automatic queries that analyze data collection and provide summarized information for data collectors post survey
- Allow data to electronically map to quality management database



PUDB – 5 Logical Flows



Comparison Workflow Paper vs Automated



Comparison Workflow Paper vs Automated



System Development Life Cycle





Evaluation

- Financial indicators
 - Time study
 - Indirect costs (office supply)
- Clinical indicators
 - Improved decision support by faster extracting/utilizing of pressure ulcer data
 - Improved internal and external quality reporting
 - Efficient evaluation of current treatment protocols on nursing units
 - Improved users' satisfaction



Clinical Benefits

Identification of hospital-wide and unit pressure ulcer specific patterns:

- Pressure ulcer identification/locations
- Staging/Diagnosis issues
- Prevention measures initiated
- Treatment appropriateness/preferences

Analysis of hospital-wide and unit specific data :

- Prevalence of Braden risk assessment subscale factors
- Pressure ulcer prevention and treatment outcomes
- Pressure ulcer prevention and treatment product utilization



Clinical Benefits

Interventions in real time:

- Corrections in staging/diagnosis
- Implementation of prevention measures
- Adjustments in treatments to improve outcomes

Evaluation of hospital-wide and unit specific outcomes:

- Pressure ulcer education
- Comparison of prevalence between units and benchmarked against NDNQI NCI and teaching hospital cohorts
- Skin/wound/pressure ulcer product performance



Monthly Pressure Ulcer Prevalence Rate at MSKCC



PUDB Main Menu

Pressure Ulcer Survey Main Menu





Skin Inspection Form

Patient Name	Room	MRN	Age	Gender	Unit Name	Year	Month
Jane Doe	15	1	60	Male 👻	UCC -	2011	3







Assessment Form

Patient Name	Room	MRN	Age	Gender	Unit Nan	ne	Year	Month	
Jane Doe	15	1	60	Male 🗸	UCC	-	2011	3]
		Skin Inspection:	Do	ne		+			
On	Admiss	ion			Ongoin	n As	sessmen	t	
					ongoin	9710	3033111011	<u> </u>	
Admission Date:	3/1/2	111		raden Score	a vavi Last :	> 0 t	o 12 hours		
Admission Date.	0/1/2			raden ocore	S WILASE.	- 01			
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Document w/i 24hrs	of		<u> </u>	Document v	sment wi 24hrs:	Yes			-
admission:									
Braden Score:	23		-	Braden S	Score:	23			-
				if edmitted w/	i last 24-48 h	ours. r	epeat Admis	sion Braden :	Score
						-			
		theo Dressure Lill				_ 1			
		Thas Pressure Oil	ler. No			, i			
		Restraint in Use.	15/7	Afor Feb 201	1	-			



Prevention Care Plan Form

Patient Name	Room	MRN	Age	Gender	Unit Name	Year	Month
Jane Doe	15	1	60	Male 🗸	UCC -	2011	3

Pressure Ulcer (PU) Prevention

-

Prevent Care Plan Initiated Yes

Prevention Measures are documented within last 24 hours

Prevention Measure(s) w/i 24hrs:	Yes	Nutritional Support:	Patient refused
Redistribution surface:	Yes	Moisture Management:	Yes
Specialty Bed:	Unnecessary for patient	Chair Cushion:	No
Repositioning:	Yes	 Increased Mobility Plan: 	Documented contraindication





Treatment Plan Form

Patient Name	Room	MRN	Age	Gender	Unit Name	Year	Month
Jane Doe	15	1	60	Male 🗸	UCC -	2011	3

Pressure Ulcer (PU) Document								
PU Flowsheet Initiated:	Yes 💽							
PU Treatment Plan Initiated:	Yes 💽							
Wound Care Consult * For Stage3, 4, Unstageable, an	NA • d Deep Tissue Injury							





PU Assessment Form

Patient Name	Room	MRN	Age	Gender	Unit Name	Year	Month
Jane Doe	15	1	60	Male 🗸	UCC -	2011	3

Pres	sure Ulcer (PU) #1	Pressure Ulcer (PU) #2				
Stage:	Stage 1 🔹		Stage:	Stage 2		
Location:	Rt. Sacrum 🔹		Location:	Rt. Ischial Tuberosity		
CAPU*:	Yes 🔹		CAPU *:	No -		
			HAPU*:	Yes		
			UAPU*:	No -		
			From which Unit:	ICU -		
Documentation Of Treatment:	Yes		Documentation of Treatment:	Yes -		
Outcomes:	No Change 🔹		Outcomes:	Deteriorated -		
Treatment 1:	Normal Saline moist dressing 🔸		Treatment 1:	Normal Saline moist dressing		
Treatment 2:	Dakin's impregnated gauze 💽		Treatment 2:	Hydrocolloid 🗾		
Treatment 3:	Other Antimicrobial Dressing		Treatment 3:	Ointments 🔹		

* CAPU: Community Accuired PU, * HAPU: Hospital Accuired PU, * UAPU: Unit Accuired PU



Data Review Form

						Find Record Main Menu							
	Тс	otal Num	ber of Ur	hit Cen:	sus in DB:	1	1 Number of Patients Completed Survey: 1						
Mor	nth:	3			Year:	2011		Unit Name:	UCC	•	Room:	15	
Pt N	lame:	Jane Do	e		MRN:	1		Age:	60		Gender:	Male	•
Skin	Inspecti	ion Done	2:		Done		-	Braden Scor	re within) Last:	≻0 to 12 ho	urs	•
Adm	hission D	ate:			3/1/2011			Ongoing Bra	aden Sco	ire:	16		•
Adm	hission B	raden So	ore:		23		-	Skin Assess	ment Do	cument:	Yes		•
Adm	hission S	kin Asse	ssment:		Yes		-	Pt has Press	ure Ulce	er:	Yes		-
Due	in the Court	- Diamina	iti at a di		V			Denesitieni			Vez		
Prev	vent Care	e Pian in	itiated:		res		Repositioning:			res			
Pre	vention M	vleasure	W/last 2	4hrs:	Yes	Nutritional Support:			Patient refused				
Red	istributio	on surfac	e:		Yes		Moisture Management:			Yes		-	
Spe	cialty Be	d:			Unnecessary	for patient	-	Chair Cushion:			No		•
Incr	eased M	obility P	lan:		Documented	l contraindication	-						
PUF	lowshee	et Initiat	ed:		Yes		-	PU Treatment plan Initiated:			Yes		
Wou	und Care	Consult	:		NA		-						
	1 Stage	: Stag	e1	• 1 Lo	ocation: Rt.	Sacrum 💽		1 CAPU	Yes	• 1	LHAPU:		
1 UAPU: 1 Unit Name:			-		1 Documentation of Treatment			nt: Yes 💽		•			
	1 Treatment 1: Normal Saline moist dressin			ig 🗾		1 treatment 2: Dakin's impr			regnated gauze 🔄		•		
1 Treatment3: Other Antimicrobial Dressing			g 🗾		1 Outco	mes:	No Change			•			



Data Report Form

Survey Data Collection Analysis Report

	Year:	2011	Month:	з	Unit:	UCC	3/2/2011	2:55 PM		
1. Un it cens	us:		_					1		
2. Number of patients surveyed:										
3. Number of patients with pressure uker:										
4. Number «	of patients	who develop	ed Pressure UI	erwhile	admitted to MS	SKCC (HA PU):	1		
5. Number «	of patients	with Unit Ac	quired Pressure	Uker (U	IAPU):			0		
6. Total number of Pressure Ulcer:										
7. Total number of HAPU:										
8. Total nur	mberofUA	PU:						0		
9. Number «	of patients	ad mitted MS	KCC with Press	ure Uker	r (CAPU):			1		
10. Number	ofpatient	s who has CA	PU and HAPU:					1		
11. Number	ofpatient	s with no doa	umented Adm	ission Bra	aden Score:			o		
12. Number	ofpatient	swith no do.	urmented Adm	ission Ski	in Assessment:			0		
13. Number	ofpatient	swith a Brad	en Score kor =	18 with i	n last O-24 hour	s without P	revention Care Pla	an: O		
14. Number of patients with a pressure uker without Flow Sheet initiated:										
15. Number of patients with a pressure ulter without Treatment Plan initiated:								o		
16. List of Pressure Uker by stage, location, CAPU, HAPU, UAPU, and treatment plan										

Stage	Location	From	Treatment(1)	Treatment(2)	Treatment(3)
Stage 1	Rt. Sacrum	CAPU	Normal Saline moist dressing	Dakin's impregnated gauze	Other Antimic robial Dressing
Stage 2	Rt. Echiel Tuberosity	HAPU	Normal Saline moist dressing	Hydrocolloid	Ointments

17. The type and number of Specialty beds:

18. The type and number of Treatment options:

Treastment O ptions Count Normal Saline moist dressing 2 Other Antimicrobial Dressing 1 Ointments 1 Distribution of the second se		
Norma ISa line moist dressing 2 Other Antimicrobial Dressing 1 Ointments 1 Hydrocolloid 1 Da kin's impregna ted galuze 1 19. Number of patients who have HAPU and 'No' Speciality Eed: 0 20: Number of patients who have HAPU and 'No' Repositioning: 0 21. Number of patients who have HAPU and 'No' Nutritional Support : 0 22. Number of patients who have HAPU and 'No' Moisture Management : 0	Treatment 0 ptions	Count
Other Antimic robial Dressing 1 Ointments 1 Hydrocolloid 1 Da kin's impregnated gauze 1 19. Number of patients who have HAPU and 'No' Specialty Bed: 0 20: Number of patients who have HAPU and 'No' Repositioning: 0 21. Number of patients who have HAPU and 'No' Nutritional Support: 0 22. Number of patients who have HAPU and 'No' Moisture Management: 0	Normal Seline moist dressing	2
Ointments 1 Hydrocolloid 1 Da kin's impregnated gause 1 19. Number of patients who have HAPU and 'No' Specialty Bed: 0 20: Number of patients who have HAPU and 'No' Repositioning: 0 21. Number of patients who have HAPU and 'No' Nutritional Support: 0 22. Number of patients who have HAPU and 'No' Moliture Management : 0	Other Antimic robial Dressing	1
Hydrocolloid 1 Da kin's impregnated gauze 1 19. Number of patients who have HAPU and 'No' Specialty Bed: 0 20: Number of patients who have HAPU and 'No' Repositioning: 0 21. Number of patients who have HAPU and 'No' Nutritional Support: 0 22. Number of patients who have HAPU and 'No' Moliture Management: 0	Ointments	1
Da kin's impregnated gauze 1 19. Number of patients who have HAPU and 'No' Specialty Bed: 0 20: Number of patients who have HAPU and 'No' Repositioning: 0 21. Number of patients who have HAPU and 'No' Nutritional Support: 0 22. Number of patients who have HAPU and 'No' Mutritional Support: 0	Hydrocolloid	1
19. Number of patients who have HAPU and 'No' Specialty Bed: 0 20: Number of patients who have HAPU and 'No' Repositioning: 0 21. Number of patients who have HAPU and 'No' Nutritional Support : 0 22. Number of patients who have HAPU and 'No' Nutritional Support : 0 22. Number of patients who have HAPU and 'No' Moisture Management : 0	Da kin's impregna ted ga uze	1
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21. Number of patients who have HAPU and 'No' Nutritional Support : 0 22. Number of patients who have HAPU and 'No' Moisture Management : 0	20: Number of patients who have HAPU and 'No' Repositioning:	0
22. Number of catients who have HAPU and 'No' Moisture Management : 0	21. Number of patients who have HAPU and 'No' Nutritional Support :	0
	22. Number of catients who have HAPU and 'No' Moisture Management :	0



Pressure Ulcer Survey Data Flow



Query PU Data Output

abo_P	atient Pressure U	лсе	rs								
Age 👻	Gender1	-	AdmissionD 👻	SkinInspecti 🝷	AdmissionBS 🝷	AdmissionSkin 👻	BSwithinLas 👻	DailyBS 🕞	PreventCare -	PreventionN -	SkinA
76	Female		9/14/2010	Done	16	Yes	12 to 24 hours	10	i Yes	Yes	Yes
74	Male		8/17/2010	Done	18	Yes	12 to 24 hours	20)		Yes
75	Male		8/16/2011	Patient refused						Yes	
69	Male		9/14/2011	Patient off unit						Yes	
60	Female		10/19/2010	Done	20	Yes	> 12 to 24 hour:	20)		Yes
72	Male		9/7/2010	Done	20	Yes	12 to 24 hours	21	L		Yes
77	Female		8/6/2010	Patient actively							
44	Male		8/25/2011	Done	22	Yes	> 0 to 12 hours	21	L		Yes
72	Female		9/19/2011	Done	21	Yes	> 0 to 12 hours	20)		Yes
72	Female		9/10/2011	Done	21	Yes	> 0 to 12 hours	20)		Yes
76	Male		10/7/2011	Done	20	Yes	>0 to 12 hours	20) Yes	Yes	Yes



xGenderFID	xRecencyHoursFID	xPressureUlcerS kinAssessmento nAdmissionFID	xPressureUlcerR iskAssessmentO nAdmissionFID	xUlcerRiskAssmnt FIDOnAdmissionS cale	xUlcerRiskAss essmentScore OnAdmission	xUlcerAtRiskLastAsses smentFID	xUlcerRiskAssmn tFIDLastScale	xUlcerRiskAss essmentScore Last	TotalUlcerC ount	HospAcquired Count	
Female	> 12 to 24 hours	Yes	Yes	Braden	22	No	Braden	20	0	0	[
Female	> 12 to 24 hours	Yes	Yes	Braden	20	No	Braden	19	0	0	
Female	> 12 to 24 hours	Yes	Yes	Braden	18	Yes - based on risk	Braden	18	0	0	
Female	> 12 to 24 hours	Yes	Yes	Braden	20	No	Braden	23	0	0	
Female	> 12 to 24 hours	Yes	Yes	Braden	20	No	Braden	20	0	0	
Female	> 12 to 24 hours	Yes	Yes	Braden	23	No	Braden	20	0	0	
Female	> 12 to 24 hours	Yes	Yes	Braden	16	No	Braden	19	0	0	
Female	> 12 to 24 hours	Yes	Yes	Braden	18	Yes - based on risk	Braden	18	0	0	

PU Data in XML Format

xGender FID	silicoency HoursPID	afta cur cUt cr5k iaAc iaAc	uife ess ure Uile esR isk	atil car No kAo can ntF	上は市会ない	ulli cor Adli bhl. aut Aus	xUlcorRis MosmatP IDLastScal #	adil car No Mo ani can	Tet elU kor Cou nt	Hos pAc quir eC oun T	Steg elCo unt	Stag eBC cumt	Stag eBIC curt	Stag elVC ount	Dite cun t	Stag eUn stag eabl eEcc harS	Stag eind ator min able	aPro coar eUle erPr eve ntio	aUlc erint erve ntio nSki aAcc	xUIC erios erve ntio nPre sour	
Male	>0 to 12 hours	No	No	Γ	Γ	No	Brades	Γ	0	•	0	0	0		•	0	0				
Temale	> 12 to 24 hours	Yes	No			No	Breden		0	0	0	0	0	0	0	0	0				
Female	> 12 to 24 hours	Yes	No	Γ	Γ	No	Brades	Π	0	•	0	0	0	0	•	0	0				
Pemale	> 12 to 24 hours	Yes	No			No	Breden		0	0	0	0	0	0	0	0	0				
Male	> 12 to 24 hours	Yes	No			No	Brades		0	0	0	0	0	0	0	0	0				
Male	Nover assessed for risk					No	Brades		0	•	0	0	0	0	•	0	0				
Female	> 48 to 72 hours	Yes	No			No	Brocken		0	0	0	D	Ð	0	0	D	0				
Male	> 12 to 24 hours	Yes	No	Γ		No	Brades		0		0	0	6	0	6	0	0				
Female	> 12 to 24 hours	Yes	No			No.	Greden			•	0	0	0	0	•	0	0				
Male	> 48 to 72 hours	Yes	No			No	Brades		0		0	0	0	0		0	0				
Male	> 72 hours to 1 week	Yes	No			Na	Brades		•	•	0	0	0	٥	•	0	0				
Male	>0 to 12 hours	Yes	No	Γ	Γ	No	Brades	Π	0	•	0	0	0	0	•	0	0				
Female	> 34 to 48 hours	Yes	No			No	Breden		0	0	0	0	0	0	0	0	0				
Female	> 48 to 72 hours	Yes	No			No	Breden	Γ	0		0	0	0	0		0	0				
Female	> 24 to 48 hours	Yes	No			No	Brades Q (pediatric a only)		•	0	0	0	0	0	•	0	0				
Female	Never accected for risk								0	٥	0	0	0	0	•	0	0				
Mele	>0 to 12 hours	Yes	No			No	Breden		0	0	0	0	0	0		0	0				
Male	> 24 to 48 hours	Yes	No			Na	Brades		0	0	0	0	0	0	0	0	0				
Female	> 48 to 72 hours	Yes	No			Na	Brades Q (pediatric a cmly)		1	1	0	1	0	0	0	0	0				

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NDNQI Data Submission Work Flow



MSK NDNQI Quarterly Submission Work Flow

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