

Pressure Ulcer Risk in the Incontinent Patient: Analysis of Incontinence and Hospital-Acquired Pressure Ulcers From the International Pressure Ulcer Prevalence™ Survey*

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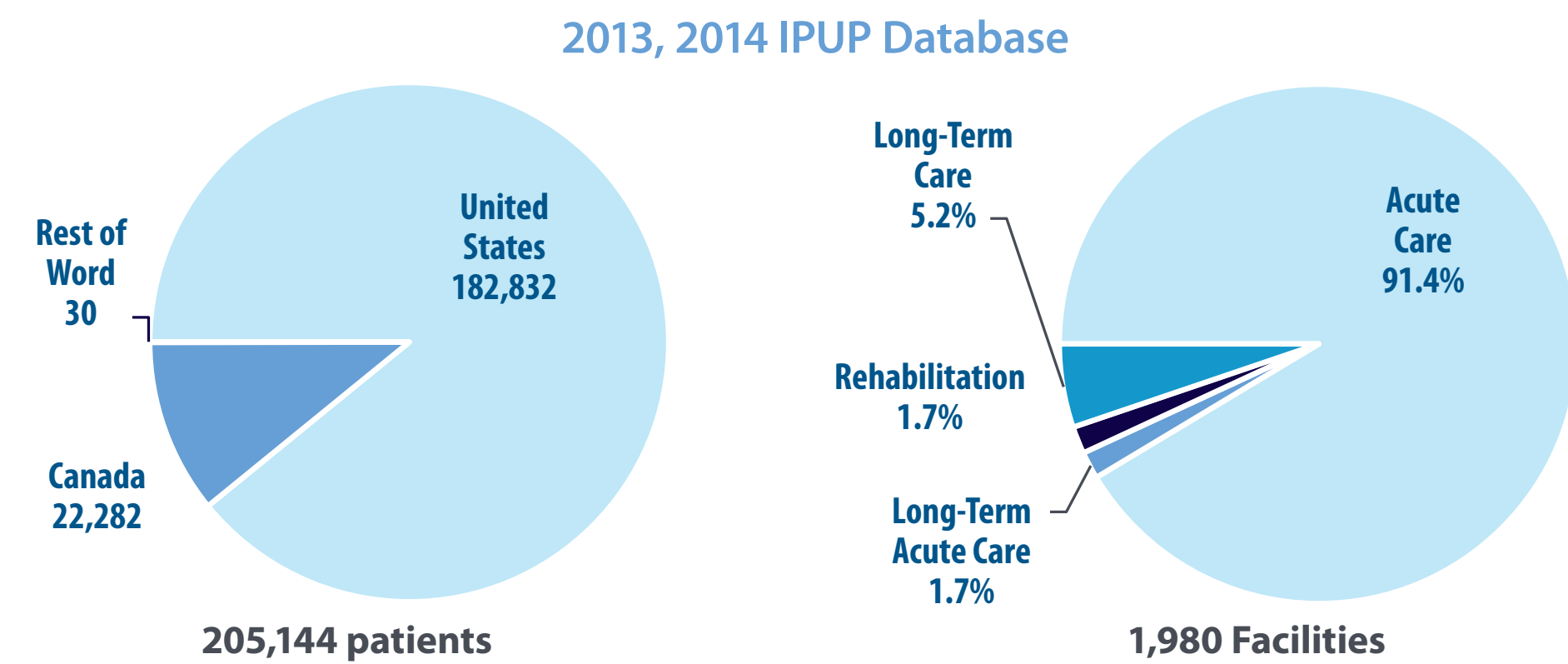
Background

- Incontinence in acute care is common, but reported prevalence rates vary widely, from a low of 19% to a high of 54%.
- Incontinence introduces moisture to the skin, which increases the likelihood of developing a pressure ulcer and is reflected in pressure ulcer risk assessment instruments.
- However, there is limited evidence as to:
 - The strength of the overall association of incontinence with pressure ulcers.
 - Specifically, the strength of the association to serious versus superficial pressure ulcers, and
 - The sufficiency of current risk assessment tools relative to incontinence.

Methods

The IPUP Survey:

- Discovering whether incontinence has a statistically significant correlation with pressure ulcers by stage and risk category required a large data set.
- We based our analysis on the 2013 and 2014 International Pressure Ulcer Prevalence™ Surveys (IPUP).
 - The survey is an annual, voluntary survey of patients, with data collected over a 24-hr period within each facility.
 - Survey results in an observational, cross-sectional cohort database designed to determine the frequency and severity of pressure ulcers in various populations.



Defining Incontinence:

Data collection included limited demographics, presence and stage of pressure ulcers, ulcer risk assessment score, as well as pertinent pressure ulcer risk factors. One of those factors related to incontinence and incontinence management.

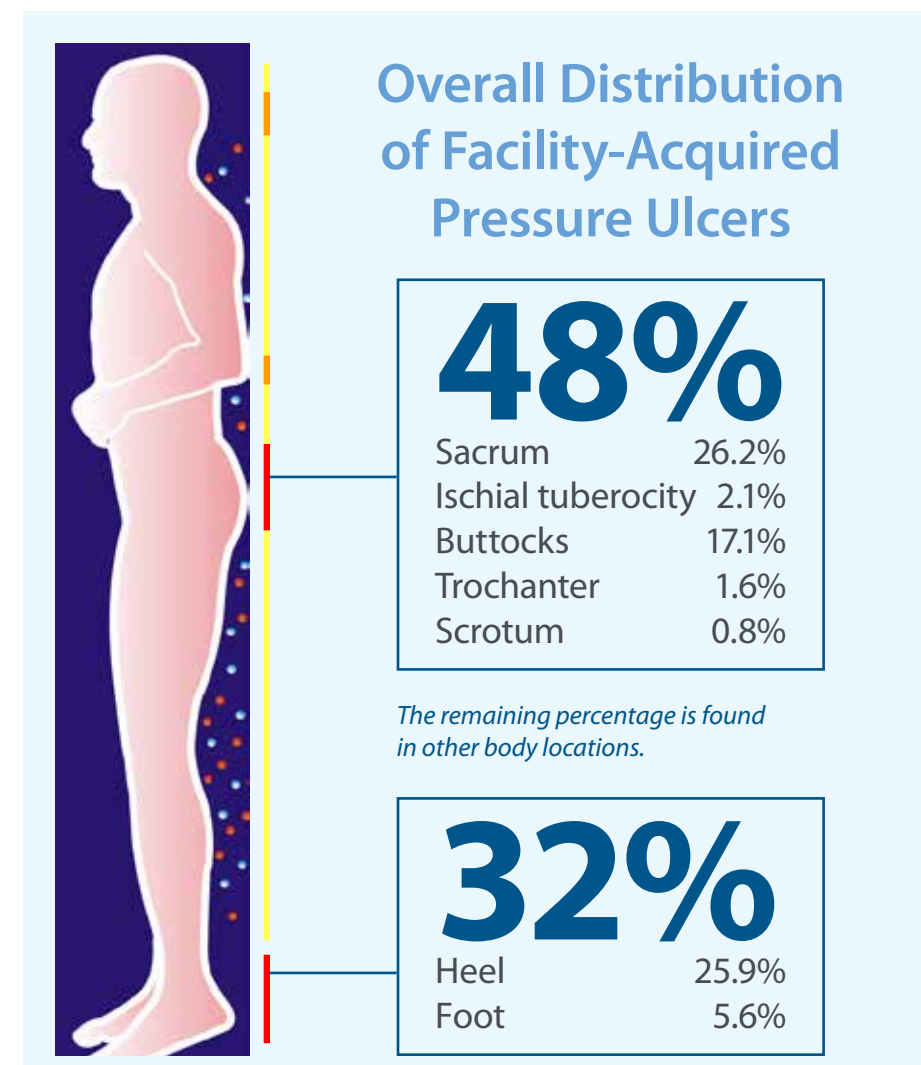
- Incontinence status was indicated by a set of categorical responses that included “no incontinence,” “fecal,” “urine,” “fecal and urine,” “Foley,” “ostomy,” and “fecal management system.”
- Data collectors could check all applicable boxes for each patient.
- Data about the presence of incontinence associated dermatitis or other forms of moisture associated skin damage were not collected.
- If patients were managed by indwelling urinary catheter or fecal management systems, they were considered incontinent in this analysis.

“Relevant Pressure Ulcers”:

- In order to analyze ulcers likely to be affected by incontinence, we operationally defined a subset of ulcers as “Relevant Pressure Ulcers”, which are ulcers that are:
 - Facility-acquired
 - Not device-related
 - Occurring on a pelvic site (sacrum/coccyx, left or right ischial tuberosity, left or right buttocks, left or right trochanter, and left or right scrotum)
- Pressure ulcers in this region generally represent approximately half of all pressure ulcers.

Statistical Analysis:

- Odds Ratios (ORs) were calculated for the rate of Relevant Pressure Ulcers within each incontinent category compared with continent patients.
- Significance was determined using the Chi Square test with Yates correction at $\alpha = 0.05$.



Results & Analysis

Overall Comparison of Continent and Incontinent Patients

	All Patients	Continent	Incontinent	P-value
Patients (N)	176,689	83,800	92,889	NA
Age (yrs)	65.25	62.03	68.15	< 0.0001
Gender (% female)	51.50%	51.07%	51.99%	0.9997
Weight (lbs)	178.68	182.23	174.75	< 0.0001
BMI (kg/m ²)	29.26	29.69	28.78	< 0.0001
Braden Score	18.08	19.47	16.54	< 0.0001
Overall PU Prevalence	10.48%	4.07%	16.27%	< 0.0001
Overall Excluding Stage 1	8.52%	2.88%	13.61%	< 0.0001
Facility-Acquired Prevalence	3.90%	1.59%	5.98%	< 0.0001
FA Excluding Stage 1	2.79%	0.92%	4.47%	< 0.0001
Relevant* PU/Pt	2.16%	0.89%	3.31%	< 0.0001
Relevant* PU Excluding Stage 1	1.60%	0.52%	2.56%	< 0.0001

* “Relevant Pressure Ulcers” operationally defined as those that were facility-acquired, non-device related, located in the pelvic region.

Incontinence is a common problem

- 53%** of all patients experience incontinence in some form.
- 20% Foley catheter
 - 16% fecal
 - 13% urinary
 - 9% both fecal and urinary
 - 1% fecal management system

Is a patient with a Foley catheter “incontinent”?

The definition of incontinence, and specifically the question of whether a patient with an indwelling urinary catheter or fecal/stool management system, should be deemed continent or incontinent has not been definitively resolved. Both Junkin and Selekof (2007) and Gray and Bartos (2013) noted challenges in categorizing patients with indwelling catheters as continent or incontinent.

The IPUP survey does not capture if the Foley catheter was initiated because of their pressure ulcer or if the pressure ulcer was a result of unmanaged incontinence. However, by limiting our analysis to facility-acquired pressure ulcers and eliminating device-related pressure ulcers, we hypothesize that incontinence may have played some role in the formation of these pressure ulcers. However, as noted in the Implications for Research, more detailed data would be helpful in validating that hypothesis.

Incontinence significantly increases odds of developing Relevant Pressure Ulcer

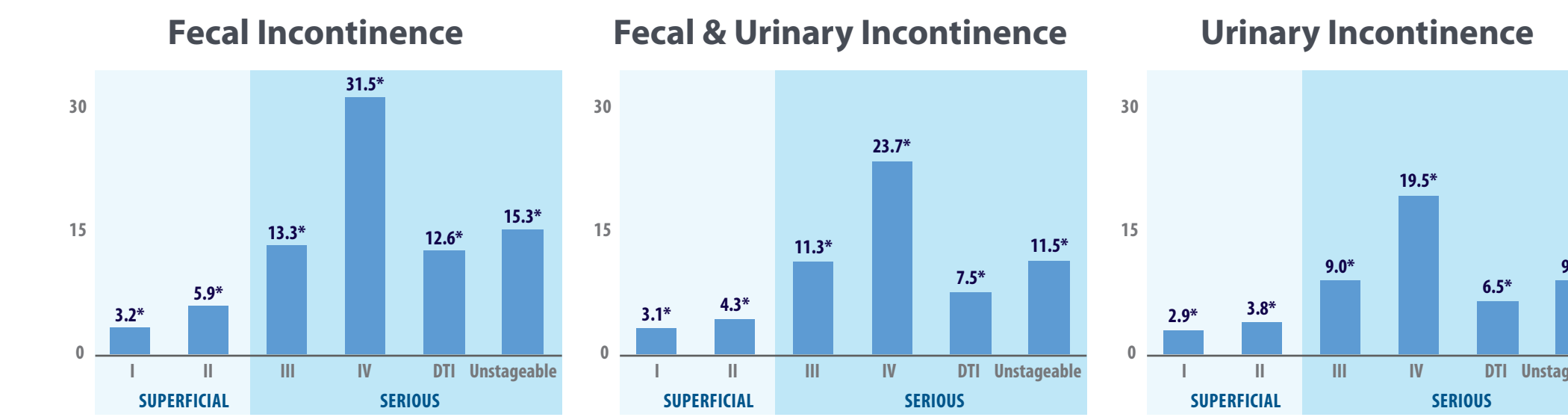
	Odds Ratio of Incontinent Patients Compared to Continent Patients		
	Urinary Incontinence	Fecal & Urinary Incontinence	Fecal Incontinence
All Stages	3.67*	3.82*	5.31*
Stage II+	4.52*	4.72*	6.80*

* P-value <0.0001

3.7x more likely to develop Relevant Pressure Ulcer than continent patient.

Incontinence most strongly associated with serious, rather than superficial pressure ulcers

- Odds Ratios increase as stage becomes more severe, contrary to some reports that incontinence is more strongly associated with superficial damage.

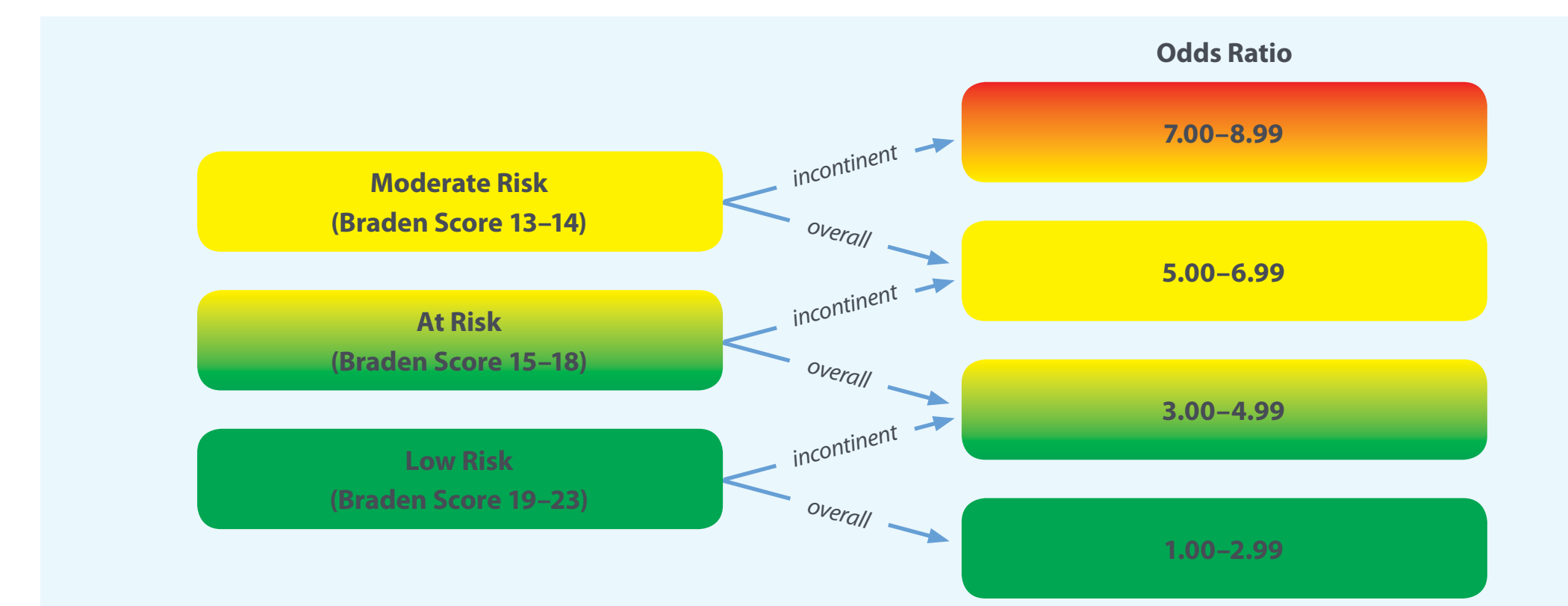


Odds Ratio compare to OR 1.0 for continent patients; *P-value < 0.0001

Braden score does not adequately capture risk of PU if incontinent

- The Braden Score appears to understate the risk of developing a Relevant Pressure Ulcer in lower risk patients - across all stages there is a trend toward significantly increased OR in the lower risk Braden categories.
- The increased risk associated with incontinence is similar to the increase in risk associated with the next-higher Braden Score category. For example, a patient at “Low Risk” according to their Braden Score would actually be at the same risk as a patient in the “At Risk” category.
- Infinite: Although ORs not calculable, OR is significant at the .05 level by the x2 test with Yates correction.
- NA: ORs cannot be calculated due to zero division error.

Odds Ratios for Pressure Ulcers by Stage and Braden Score for Patients with Incontinence vs. No Incontinence (Odds Ratios shaded differ significantly from 1.00 at the $\alpha = 0.05$ level)			
Braden Score	Fecal	Urine	Urine and Fecal
Stage I			
6 to 11	1.80	1.97	1.97
12 to 16	1.46	1.48	1.40
17 to 20	2.96	1.93	2.43
21 to 23	5.78	4.94	6.59
Stage II			
6 to 11	1.76	1.36	1.38
12 to 16	2.00	1.40	1.40
17 to 20	3.50	2.55	3.21
21 to 23	6.06	1.85	2.16
Stage III			
6 to 11	1.13	1.45	1.52
12 to 16	3.70	2.49	2.52
17 to 20	9.01	3.37	6.72
21 to 23	14.64	8.94	20.87
Stage IV			
6 to 11	1.50	2.31	2.20
12 to 16	5.65	3.02	3.28
17 to 20	infinite	NA	NA
21 to 23	NA	NA	NA
DTI			
6 to 11	1.19	0.88	0.79
12 to 16	3.93	2.11	2.29
17 to 20	4.56	3.03	3.78
21 to 23	infinite	infinite	infinite



Implications for Practice

Adequately managing incontinence and implementing measures to help prevent skin damage merits serious attention, including evidence-based pressure ulcer prevention interventions to redistribute pressure such as regular turning and repositioning, along with preventive skin care based on principles of cleansing, protecting, and enhancing the skin’s moisture barrier.

These data indicate that incontinence affects over half of all acute care patients. Rather than managing incontinence as an exception, care practices need to reflect the fact that managing patient incontinence will be part of the care plan for a significant percentage of all admitted patients.

Incontinence is correlated with a significantly increased risk of developing a Relevant Pressure Ulcer, both overall and for Stage II+. The increase is seen for all types of incontinence, ranging from a low of 2.9 for urinary incontinence with Stage I to a high of 31.47 for fecal incontinence with Stage IV.

For patients seen as relatively low risk for developing a pressure ulcer, incontinence effectively increases the odds ratio to that seen in the next higher risk category. For incontinent patients, it may be worth considering pressure ulcer prevention interventions even in lower Braden Score risk categories.

In this study, even patients at low pressure ulcer risk by Braden risk score have increased likelihood of pressure ulcers if they are incontinent. Underestimating the link to pressure ulcers could lead to insufficiently aggressive management of incontinence.

Implications for Research

Data collection and analysis needs to emphasize the distinction between incontinence and unmanaged incontinence:

As discussed earlier, the definition of incontinence, and specifically the question of whether a patient with a Foley catheter is “incontinent,” has not been definitively resolved. We believe it may be useful to collect and analyze data regarding incontinence in terms of “unmanaged incontinence” (i.e., a patient who lacks the ability to control evacuative functions and whose waste thereby comes into direct contact with the patient’s skin and environment, such as linens, underpad, or absorbent undergarment) versus “managed incontinence” (i.e., a patient who is incontinent but whose waste is captured by a Foley catheter, ostomy bag, fecal management system, or other device).

Limiting data to pressure ulcers that could logically be associated with a variable may provide a clearer picture of associations:

Our analysis introduced the operational definition of “Relevant Pressure Ulcers,” or pressure ulcers that could logically be associated with the consequences of unmanaged incontinence. When looking for the consequences of unmanaged incontinence, it seems logical to ignore pressure ulcers found on anatomic sites unlikely to have come into contact with incontinence or whose etiology is most logically explained by their association with a specific medical device.

More generally, we believe there may be value in excluding data regarding pressure ulcers that cannot logically be associated with the factor under examination. Including all pressure ulcers in an analysis may increase the size of the sample, but may introduce irrelevant data that clouds rather than clarifies associations under investigation.

Further research into PU risk scoring instruments should be completed

Our research found that the PU Risk for incontinent patients is a full risk category higher than continent of same Braden Score. While significant, there should be a deeper dive in the weighted risk of each sub-category before changes would be considered.

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• Disclosure: The authors acknowledge that they are all employees of Hill-Rom.

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