WEIGHING THE RISKS:

Hospital Scales, Accuracy and Safety

When was the last time you thought about your hospital's scales?

These silent workhorses sit in hallways and corners in every department of a hospital, used by nearly every patient as part of their intake and daily care. Scales are a necessary piece of equipment for all medical facilities. Knowing a patient's weight provides vital information for detecting fluid retention, calculating proper medication dosages and screening for malnutrition.

However, many hospitals take their scales for granted, and healthcare professionals methodically record the readings without a second thought. Few people think about their accuracy or safety. While many scales function quite well, it's worth taking a closer look.

Overlooking the importance of scales can have consequences. Outdated, unsafe scales can lead to falls and injuries for both patients and healthcare professionals. Miscalibrated or inaccurate scales can cause improper treatment or inconsistencies across a health system – and recent studies show that many inpatient scales are troublingly inaccurate.

It's time to weigh the risks posed by your hospital's scales and take steps to protect your patients, employees and bottom line.

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The Growing Risk of Falls

Patient and caregiver falls are growing more expensive, with the average hospital fall injury costing $14,056.

When a patient slips off a piece of equipment, both the patient and caregiver can suffer costly injuries, leading to potential lawsuits or workers' compensation claims. And since the Centers for Medicare & Medicaid Services (CMS) categorizes in-hospital falls as Healthcare Acquired Conditions, reimbursements can be severely limited. Indeed, The Joint Commission Center for Transforming Healthcare estimates reducing falls can save a 200-bed hospital $1 million per year, as 30 to 35 percent of patients who fall will sustain an injury.[1]

Compared to the general population visiting primary care doctors, hospital patients are more likely to be geriatric, with patients older than 65 making up 40 percent of hospitalizations in the U.S.[2] These patients are more likely to be undergoing surgery or chemotherapy, or struggling with arthritis or neurological issues. They are more likely to be on medication that may affect balance or motor skills. As a result, hospital patients are less mobile and more prone to falls.

Hospital caregivers are trained to help patients as much as they can. However, nurses trying to read a scale and record the results cannot also support a shaky patient. Supporting a patient may inadvertently affect the weight reading, causing inaccuracies in the results. Even more concerning, nurses may try to catch a falling patient and injure themselves in the process. Workers' compensation claims reflect an ever more frequent occurrence of problems, as nurses and other personnel suffer injuries while trying to assist falling patients.

Over the past decade, an increasing number of lawsuits have awarded damages to patients who fell from hospital scales and fractured hips or legs, finding that conditions were "unsafe" or medical staff failed to properly assist patients who were unsteady on their feet.[3]

> ***"Nurses may try to catch a falling patient and injure themselves in the process.***

In many of these lawsuits, injured patients or staff members have alleged "unsafe" conditions, such as the lack of grab bars or rails on or near the scales.

To protect patients, employees and the bottom line, some hospitals are shifting to scales designed for patients with limited mobility. These better-designed scales include rails and very low platforms that minimize the height that patients must step up, reducing the risk of tripping. The rails are considered "live" and let the patient hold on to handrails for stability during the weighing process, while the scale accurately measures weight. Wider platforms allow patients to find a comfortable and secure stance to help maintain their balance. Patients and staff are safer, and hospitals reduce risk and liability.

[1] DuPree, Erin, MD. "Taking a Stand Against Falls." The Joint Commission Center for Transforming Healthcare. May 1, 2014. Web. <http://www.jointcommission.org/jc_physician_blog/taking_a_stand_against_falls/>.

[2] Wier, L. M., K. Levit, E. Stranges, K. Ryan, A. Pfunter, R. Vandivort, P. Santora, P. Owens, C. Stocks, and A. Elixhauser. "Section 1: Overview Statistics for Inpatient Hospital Stays." *HCUP Facts and Figures 2008* – Section 1. The Agency for Healthcare Research and Quality, 2008. Web. 31 Dec. 2015. <http://www.hcup-us.ahrq.gov/reports/factsandfigures/2008/section1_TOC.jsp>.

[3] "Cumbler, Ethan, and David Likosky. "In-Hospital Falls: Evaluation and Response: CONTINUUM: Lifelong Learning in Neurology." *LWW*. American Academy of Neurology, Oct. 2011. Web. 31 Dec. 2015. <http://journals.lww.com/continuum/Abstract/2011/10000/Evaluation_and_Management_of_Increased.11.aspx>.

Higher Weights, Lower Accuracy

3.8 million
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400,000
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more than **400 lb.**

As the obesity epidemic grows, hospitals are seeing heavier patients, many of whom must seek more frequent medical care. According to the National Council on Strength and Fitness, 3.8 million Americans now weigh over 300 lb, and 400,000 weigh more than 400 lb.[4] Many scales have high capacities but are not accurate at higher weights.

As average weight increases, the accuracy of many scales decreases. The results can mean inconsistent readings within and beyond the hospital, leading to an inaccurate representation of a patient's weight over time.

Healthcare standards recommend that scales be precise to 1 lb per 150 lb of weight to ensure accurate dosing and treatment. However, a study of scales in Kansas City-area health facilities found average inaccuracies ranging from 1.3 lb at 100 lb of weight to 3.8 lb for 250 lb of weight.

As the test weights increased, more scales were inaccurate. When tested at 200 lb, the study found that 15.1 percent of scales were off by more than 6 lb, or 1 Body Mass Index (BMI) unit. At 250 lb, the percentage of inaccurate scales increases to 20.8 percent off by 6 lb or more. Since many physicians use a patient's BMI as a critical measure for planning treatment and care options, this inaccuracy can lead to over- and under-treatment, denial of proper treatment or ill-informed guidance.[5]

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[4] "Obesity Awareness Month - Online Articles: National Council on Strength and Fitness." *NCSF*. National Council on Strength & Fitness, n.d. Web. 31 Dec. 2015. <https://www.ncsf.org/enew/articles/articles-obesityawarenessmonth.aspx>.

[5] Stein, Risa J., C. Keith Haddock, Walker S.C. Poston, Dana Catanese, and John A. Spertus. "Precision in Weighing: A Comparison of Scales Found in Physician Offices, Fitness Centers, and Weight Loss Centers." *Public Health Reports*. May-June 2005. Web. 31 Dec. 2015. <http://www.publichealthreports.org/issueopen.cfm?articleID=1468>.

Higher Weights, Lower Accuracy continued...

In one state alone...

479 medication errors were caused by inaccurate patient weight.

67% of these incidents resulted in a patient receiving an incorrect dose.

As scales accomodate heavier weights, accuracy decreases

% of scales tested at each weight that were found to be inaccurate by the indicated value[5]

Average inaccuracy	Weight tested			
	100 lb	150 lb	200 lb	250 lb
4.1-6.0 lb	7.7%	7.9%	7.3%	6.8%
>6.1 lb	5.0%	7.9%	15.1%	20.8%

The risks — and costs — of inaccuracy can be substantial. For a patient undergoing treatment, inaccuracy may mask weight gain or loss that signals health changes. According to a study by *Nursing*, a heart patient with a weight variance as small as 3 lb will trigger assessments for peripheral edema jugular venous distension, dyspnea or abnormal lung sounds. Similarly, patients with renal failure or some cancers typically receive medication doses based on their current weight.[6]

To ensure accuracy across a variety of patient weights, scales should be calibrated regularly. In the course of daily usage, scales are often bumped or jarred, which can affect their accuracy. Many facilities also occasionally use bed scales that do not account for the linens and bed pads that can greatly affect the actual weight measurement.

A study by the UK's National Health Services found that 22 percent of scales were not set to zero, and a third of all scales tested were inaccurate. The study, which examined 7,875 scales at more than 200 hospitals, noted that while small inaccuracies may not be important when monitoring obese adults, inaccurately weighing oncology patients, children or infants to determine medication doses could be dangerous.[7]

The Pennsylvania Patient Safety Authority surveyed four years of state health event reports and found 479 instances of medication errors stemming from inaccurate patient weight. Of these incidents, 67 percent resulted in a patient receiving an incorrect dose, with 1.3 percent of cases causing enough harm to warrant additional treatment.[8]

[6] Byrd, Julie, Anessa Langford, Sherry Paden, Wanda Plackemeier, Caroline Seidelman, Mary Valla, and Rebecca Willis. "Scale Consistency Study: How Accurate Are in Patient Hospital Scales?" *LWW.* Wolters Kluwer, Nov. 2011. Web. 31 Dec. 2015. <http://journals.lww.com/nursing/Citation/2011/11000/Scale_consistency_study__How_accurate_are_in.8.aspx>.

[7] Martin, Daniel. "Hospital Weighing Scales Put the Health of Millions of NHS Patients at Risk." *Mail Online*. Associated Newspapers, 8 Nov. 2008. Web. 31 Dec. 2015. <http://www.dailymail.co.uk/news/article-1082796/Hospital-weighing-scales-health-millions-NHS-patients-risk.html>.

[8] "Medication Errors: Significance of Accurate Patient Weights." *Patient Safety Authority*. Pennsylvania Patient Safety Advisory, Sept. 2010. Web. 31 Dec. 2015. <http://www.patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2009/mar6%281%29/Pages/10.aspx>.

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Infection Control

Hospitals treat the most pervasive and dangerous illnesses, from the common cold through *C. diff* and MRSA. The Centers for Disease Control and Prevention (CDC) estimate that 2 million patients contract an infection while receiving medical care, leading to $45 billion in annual costs and up to 100,000 patient deaths.[9] Hospitals are racing to apply the latest antimicrobial strategies and technologies to their facilities, particularly on things that many patients touch — such as handrails, doorknobs and scales.

Silver-based antimicrobials are increasingly popular, and their use spans thousands of years. The ancient Egyptians, understanding the power of silver to kill germs, used silver pitchers to help purify their water.

During manufacturing, adding antimicrobial powder coating to scales' rails and transport handles helps limit bacteria growth and reduces potential cross-contamination when multiple patients are weighed on the same scale.

Standardization Matters

Many hospital systems or Integrated Delivery Networks (IDN) have not made scale standardization a priority, with most systems using four or more different scale brands throughout their organization's facilities.

This requires staff to be familiar with multiple scales' functionality and creates variances in the weight results. Standardization across a hospital system or network benefits both patients and staff. By using standard scales and calibration procedures, a patient's weight variation across several locations within the network becomes more meaningful. With newer scales that integrate with a facility's electronic medical record system, weight readings are automatically added to a patient's record, reducing the risk of transcription error on date or weight.

Additionally, staff working in multiple locations across a hospital system can apply the same best practices when using standardized equipment.

Overall, standardizing across the continuum of care helps staff provide a consistently high level of patient care while reducing costs to an organization.

[9] Sandler, Don. "Hand Hygiene: The First Defense Against HAI." *OR Today*. MD Publishing, Inc., Jan. 2014. Web. 31 Dec. 2015. <http://ortoday.com/digital-edition-january-2014/>.

Next Steps for Hospitals and IDNs

When was the last time you evaluated your scales? Start by taking an inventory of every scale in your facility or network. How many are there? Where are they located? Who's using them, and how often? Do they have rail supports or low platforms, particularly in departments that see more elderly and frail patients?

Next, evaluate accuracy across the entire range of use. Verify when they were last calibrated, their maximum accurate weight and how often they are calibrated. Is there someone responsible for calibrating scales, and are users trained to zero them out between patients?

Particularly in larger facilities or IDNs, you can centralize responsibility for scales. Develop standards for usage and establish maintenance procedures and schedules to help ensure that accuracy does not lapse. Then, train your staff on how to use scales – and empower them to point out when something doesn't seem right. Your patients' health — and your bottom line — depends on it.

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