

Ergonomics Case Study

Calibrating Patient Scales for Medical Clinic Exam Rooms

Is it hard work to calibrate patient scales?

The manager of the Scientific Instruments (SI) Department at the University of Washington (UW) asked for ergonomics help in the summer of 2016. His department has to calibrate patient scales to ensure their accuracy. Every scale in all of the UW medical clinics around the state needs to be calibrated once per year.

Technicians transport special weights to and from each clinic. They then have to move 100 kg (220 lb) of official calibration weights on and off each scale before it times out. The job is physically demanding. Between 2010 and 2016, 3 technicians got injured doing this task and filed workers' compensation claims. This doesn't include any of the unreported aches, pains, and injuries.

Moving weights between cart and van



Moving weights between cart and scale



*1 weight = 10 kg (22 lb)
10 weights = 100 kg (220 lb)*

Technicians used to calibrate 1 or 2 centrally located scales per clinic. Due to patient privacy complaints, UW clinics decided to put a scale in every exam room. With 35 scales in 1 clinic, that was a lot of lifting, even when split between 2 people. More scales made the job much more physical and tiring to both workers. They were sweating and panting even part-way through the job.

One roundtrip to a clinic with 35 scales includes:

- 40 lifts between cart and van
- 700 lifts between cart and scales--*if no re-do's*
- Sometimes lifting 1 at a time, sometimes 2 at a time

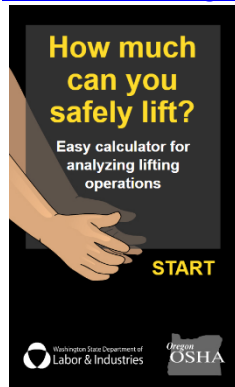
Why is it a problem?

Workers are at high risk for sprains, strains, and over-use (SSO) injuries because of:

- Awkward lifting - all lifts in the clinics are near the floor
- Frequent lifting -20 lifts within 30-45 sec (per scale)
- Rushed activity—they can only calibrate scales in unoccupied exam rooms and they must get all weights on the scale before it times out. If the scale times out, they have to remove all weights and re-do it.

Lifting app results:

[Click to find lifting app](#)



Lifting 1 or 2 weights at low heights is unsafe.

Lifting 22 lb or 44 lb is much heavier than the Recommended Weight Limits (RWLs).

RWL range for low lifts:
1 to 6 pounds

Lifting objects while reaching far in front of the body reduces the Recommended Weight Limit.
Lifting while twisting reduces the Recommended Weight Limit.

How did we come up with solution ideas?

Some ideas were very simple and low cost and others involved varying amounts of equipment and costs.

Relevant Questions:

1. Do the scales have to be calibrated? Is it a requirement or simply their policy?

Even though federal or state regulations don't require calibration for this type of scale, the SI Department calibrates all scales because the Center for Medicare Services (CMS) wants them to do so. The clinics have funding ties related to the CMS. The SI Department wants to stay clear of any possible reason to lose funding. In effect, the CMS requires them to follow the manufacturer's recommendation to calibrate the scales on an annual basis.

2. Can they go back to 1 centralized scale like before?

No, even though it was a much leaner process before. Using only a few scales can reap many benefits without doing much—saving time, physical effort, and requiring far less lifting. Those would lead to fewer work injuries, lower claims costs and lower insurance premiums.

3. Is it OK if the technician weighs himself on a calibrated scale and then walks to every scale using himself as a quasi "calibrated" weight? (All with no eating, drinking, adding/removing things in pockets, etc. that would change the technician's overall weight after starting with the first scale.)

No. There are strict rules about calibration.

4. If they account for the weight of an empty tote (or a mini pallet), is it OK to leave the fully loaded item on the scale during the calibration test? By using a lift device, the full load could be left on the scale without needing to lift individual weights by hand at all.

No. There are strict rules about calibration.

Lift equipment could eliminate manual lifting. Equipment requirements:

- Must be simple and easy to get the equipment into and out of the van. If small and light enough, it can be manually lifted. Otherwise, they'll need a ramp or van lift, too.
- Must be safe to roll the equipment with its load on outdoor surfaces and within medical clinics
- Loaded equipment must fit through all doorways and halls of clinic
- Affordable

What did they decide to do?

The SI Department bought a lifting device (Lift Plus by Magliner). Their in-house machine shop modified it so that it could fit through some narrow exam room doorways.

Department employees decided to get a single unit 100-kg calibration weight instead of using ten lighter weights because it's safer and easier to maneuver the loaded device that way.

They gave the new device a nickname, the "Unicorn". They've been using the Unicorn and the 100-kg weight since November 2016. Employees like the new system and say that it's working really well. They use 2 people to team lift and slide the device (~100 lb) into and out of the van. Manual lifting is kept to a minimum.

