Executive Summary

This design is an accessible weight scale that can be used either at home by handicapped persons or at a health care facility center. The weight scale is accessible to patients who suffer from a variety of disabilities, such as patients with limited movement of the extremities, general frailty, paraplegics, wheelchair users, or those in need of a cane or a walker. Those suffering from renal failure, heart failure, diabetes, and multiple sclerosis, which need to monitor their weight regularly can also benefit from this device.

The weight scale will have a ramp to make it wheelchair accessible and will have removable side support bars for those patients in need of additional support to stand. In order to avoid rolling accidents, the weight scale will have stops maintaining the wheelchair and other walking instruments in place. To accommodate patients with poor eyesight the output will be easy to read, and available in several formats.

Statement of Need

Our clients suffer from paralysis, renal failure, heart failure, multiple sclerosis, stroke, diabetes, and heart attack, and need to monitor their weight regularly. The following is a description of some of these conditions and why weight monitoring is important:

- **Renal failure** is loss of the ability of the kidneys to excrete wastes, concentrate urine, and conserve electrolytes. Those suffering from kidney failure need to measure their weight often because their body may be retaining excess fluid.
- **Heart failure** is a condition where the heart cannot pump enough blood throughout the body. The weakening of the heart’s pumping ability causes buildup of fluid in the feet, ankles, and legs. Weighing oneself is necessary because a sudden weight gain could mean extra fluid building up in the body.
- **Multiple sclerosis** (MS) is a chronic, energy-taxing, debilitating disease that affects the brain and spinal cord. Those with this illness weigh themselves often since weight gain is common in people who are less active, since fewer calories are burned.
- **A stroke** is a disease that affects the blood vessels that supply blood to the brain. Being overweight increases the chance of developing high blood pressure, heart disease, atherosclerosis and diabetes — all of which increase stroke risk.
• **Diabetes** is an illness where either the body does not produce enough insulin or the cells ignore the insulin. Insulin is necessary for the body to be able to use sugar. Being overweight or obese is a leading risk factor for developing type 2 diabetes.

• A **heart attack** occurs when the blood supply to part of the heart muscle itself is severely reduced or stopped. Maintaining appropriate body weight improves cardiovascular health.

**Market Research:** Our research shows the price range for similar weight scale designs to be between $1,500 and $3,000.¹ Many of the scales found were offered from Detecto Medical Supplies. Some of the common features are AC or battery power, LCD display, and portability. To compete with the other products on the market, our scale should accommodate as much of these features as possible.

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Cost</th>
<th>Features</th>
<th>Max Weight</th>
<th>Platform Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detecto</td>
<td>6550</td>
<td>2860.99</td>
<td>LCD display, Keypad Tare, Battery Powered</td>
<td>800lb</td>
<td>28”Wx28”L</td>
</tr>
<tr>
<td>Detecto</td>
<td>25495</td>
<td>1254.93</td>
<td>Mechanical, dual sided balance, removable ramp</td>
<td>350lb</td>
<td>30”Wx 26”L</td>
</tr>
<tr>
<td>Tanita</td>
<td>PWC 620</td>
<td>Not listed</td>
<td>Batter or AC power source, foldable, wheels for easy mobility, tare, adjustable leveling feet</td>
<td>440lb</td>
<td>40”Wx36.25”Dx4”H</td>
</tr>
<tr>
<td>Health O Meter</td>
<td>2450KL</td>
<td>1495</td>
<td>Rail, motion sensing weighing technology, foldable,</td>
<td>600lb</td>
<td>Small</td>
</tr>
<tr>
<td>Detecto</td>
<td>475</td>
<td>865.49</td>
<td>Lift-away arms and footrest, portability, transport.</td>
<td>350lb</td>
<td>Chair Scale: N/A</td>
</tr>
</tbody>
</table>

¹ [www.itinscales.com/phealth1.htm](http://www.itinscales.com/phealth1.htm)
**Similar Projects:** Two similar products were found in the *NSF Engineering Senior Design Projects to Aid Persons with Disabilities*. The first is “A Scale for Weighing a Client While in the Wheelchair” (1999). This design is that of a portable scale, with a cost of only $300. It has two LED displays that come from two bathroom scales that are mechanically attached to the platform. For this scale, assistance is needed because a calculator is used to compute the users weight, and the weight of the wheelchair must be known.

The second design is “Visual Output Weight Scale for Wheelchair Users” (2004). This device uses load cells, which allows for more accurate measurements. It too, is a portable weight scale, with an estimated cost of $1,155. It allows the user to calibrate the weight of the wheelchair, or manually enter its weight. No assistance is needed to use this scale.

**Patent Opportunities:** There is great opportunity for obtaining a patent for our design, since only one patent for a similar design was found after searching the *United States Patent and Trademark Office*. This patent for this device, *Wheelchair Portable Scale Apparatus*, was filed on March 19, 2003, and the patent number is D489,279.

**Conclusion**

This weight scale is intended to improve on other similar scales currently on the market. Our design can be easily operated without any assistance required. The device will have a ramp for wheelchair access, and removable support bars to stand. The display will be clear, easy to read, and available in different formats (kg, lb, etc.). Our goal is to accomplish these features and remain within a cost of about $1,500; comparable scales presently on sale, cost up to $3,000.