

Weight Scales

Guide to Selection

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MAILING ADDRESS

PO Box 900922
Seattle, WA 98109
USA

ADDRESS

2201 Westlake Avenue
Suite 200
Seattle, WA, USA

TEL: 206.285.3500

FAX: 206.285.6619

www.path.org



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WEIGHT SCALES

Accurate determination of weight is a critical component of maternal, newborn and child health (MNCH) care, especially in resource-constrained settings. Weight measurements are used to track fetal growth during antenatal care visits, determine if a newborn is of low or very low birth weight, monitor child growth, calculate weight-specific doses of medication, and monitor minute, daily weight gain/loss in infants suffering from severe acute malnutrition, among others.

This guide reviews three main types of weight scales: electronic (adult/child and infant), beam (adult/child and infant), and spring (infant). Because dial-based floor scales are not included the World Health Organization (WHO) recommendations for anthropometric equipment in health care settings, they are not discussed in this guide.ⁱ



Top: Electronic scale,
adult/child
Bottom: Electronic scale,
infant

Top: Beam scale,
adult/child
Bottom: Beam scale,
infant

Top: Dial scale,
adult/child, not
recommended
Bottom: Spring scale,
infant

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The health care setting and the types of interventions delivered at different levels of the health care system determine the necessity of each of the three recommended scale types. The WHO 2016 *Interagency list of priority medical devices for essential interventions for reproductive, maternal, newborn and child health* defines the types of medical devices that are essential for different levels of the health care system, including weight scales.ⁱ A table of these recommendations is found below. Additionally, community health workers who deliver nutrition and MNCH interventions should be equipped with appropriate weigh scales to perform their duties in the community setting.ⁱⁱ

The following tables indicate types of scales recommended by WHO according to type of care provided. This information is reproduced from *WHO Interagency list of priority medical devices for essential interventions for reproductive, maternal, newborn and child health*.ⁱ

Medical examination and diagnosis

Type of scale	Measuring range	Minimum gradation	Health post	Health center	District hospital
Electronic, mother/child	0–150 kg	100 g	x	x	x
Electronic, infant	0–10 kg	5 g			x
Beam, adult	6–180 kg	100 g	x	x	x
Beam, infant	0–16 kg	10 g	x	x	x
Spring, infant (with set of weighing trousers)	0–25 kg	100 g	x	x	x

Triage and basic emergency care

Type of scale	Measuring range	Minimum gradation	Health post	Health center	District hospital
Electronic, mother/child	0–150 kg	100 g	x	x	x
Electronic, infant	0–10 kg	5 g			x
Beam, adult	6–180 kg	100 g	x	x	x
Beam, infant	0–16 kg	10 g	x	x	x
Spring, infant (with set of weighing trousers)	0–25 kg	100 g	x	x	x

Labor, delivery, and recovery

Type of scale	Measuring range	Minimum gradation	Health post	Health center	District hospital
Electronic, infant	0–10 kg	5 g			x
Beam, infant	0–16 kg	10 g		x	x

Inpatient care for mother, newborn, and child

Type of scale	Measuring range	Minimum gradation	Health post	Health center	District hospital
Electronic, mother/child	0–150 kg	100 g	N/A	x	x
Electronic, infant	0–10 kg	5 g	N/A		x
Beam, infant	0–16 kg	10 g	N/A	x	x
Spring, infant (with set of weighing trousers)	0–25 kg	100 g	N/A	x	x

Intensive care in district hospital or higher

Type of scale	Measuring range	Minimum gradation	Intensive care of:		
			Adult	Newborn	Child
Electronic, infant	0–10 kg	5 g		x	x
Beam, infant	0–16 kg	10 g		x	x
Spring, infant (with set of weighing trousers)	0–25 kg	100 g		x	x

Electronic scales are the most accurate, but can be heavy and costly. Spring scales are the least accurate as movement prevents them from displaying the most accurate weight. This creates a challenge when weighing an agitated infant. Further, the measurement of very small weight gains or losses, which are critical to the monitoring of the health of infants less than six months of age suffering from severe acute malnutrition, cannot be easily assessed with spring scales. In such cases, WHO recommends the use of a scale that is precise to 20 g.ⁱⁱⁱ and that when weighing infants and very young children on an electronic floor scale, the scale must offer tared (resetting to zero) weighing capabilities in order to obtain the most accurate weight. This

allows the mother to step on the scale, the weight can then be tared, and then the infant/young child can be placed in her arms.

To ensure accuracy, all scales should be calibrated on a predetermined basis. Calibration is not only important for beam and spring scales, but also for electronic scales,^{iv} which can lose accuracy over time due to general use, frequent movement, or environmental conditions.^{v,vi} Calibration of any type of scale must be done with certified test weights, which may not always be feasible in resource-constrained settings. Multiple public health and nutrition programs recommend calibration of weight scales anywhere from daily to every six months.^{vii,viii} When recalibration is needed, some models can be recalibrated by the user, but others must be recalibrated by a professional.

Key features to consider for MNCH weight scales include:

- Measurement range: Is it appropriate for the population being weighed?
- Minimum gradation: Are the gradations appropriate for the type of use? For example, are the weight gradations appropriate when calculating a dose of medication?
- Accuracy or precision. Although these are different concepts, some manufacturers report accuracy and some report precision.
 - Accuracy is the closeness of a measurement to a known/standard value.
 - Precision is the closeness of two or more measurements to each other.
- Allows tared weighting: Can the scale be tared (reset to zero)? This is particularly important if weighing the mother and child together or if, for example, the infant scale must be lined with a towel or blanket to keep the infant warm.
- Units: Does the scale offer the option to measure in either kilograms or pounds?
- Cleaning: Is the scale easy to clean?
- Weight of device: This is a consideration for scales that are intended to travel with health workers.
- Required accessories or consumables (batteries, sling, or weighing trousers).
- Ease of maintenance and repair in resource-constrained settings.
- Calibration/recalibration: How often is calibration recommended? What is required for recalibration?
- Durability.
- Cost.

The products in this guide represent a selection of commercialized weight-scale options that can aid health workers in provision of care. Users of this guide should also check the United Nations Children’s Fund Supply Catalogue for current offerings and prices (<https://supply.unicef.org>).

ⁱ World Health Organization (WHO). *Interagency List of Priority Medical Devices for Essential Interventions for Reproductive, Maternal, Newborn and Child Health*. Geneva: WHO; 2016. Available at: http://www.who.int/medical_devices/md_maternal_BOOK_May2016_D.pdf?ua=1.

ⁱⁱ WHO. *Strengthening the Capacity of Community Health Workers to Deliver Care for Sexual, Reproductive, Maternal, Newborn, Child and Adolescent Health*. Geneva: WHO; 2016. Available at: http://www.who.int/workforcealliance/knowledge/resources/h4_chws/en/.

ⁱⁱⁱ WHO. *Updates on the Management of Severe Acute Malnutrition in Infants and Children*. Geneva: WHO; 2013. Available at: http://apps.who.int/iris/bitstream/10665/95584/1/9789241506328_eng.pdf.

^{iv} Service and product support page. TANITA website. Available at: <http://www.tanita.com/en/service-and-product-support/>. Accessed August 30, 2016.

^v Scale calibration frequency page. Doran Scales Inc. website. Available at: <http://doranscales.com/news/scale-calibration-frequency-how-often-should-i-calibrate-my-doran-digital-scale>. Accessed August 30, 2016.

^{vi} Selectable calibration feature page. A&D Weighing website. Available at: <http://www.balances.com/and/calibration.html>. Accessed August 30, 2016.

^{vii} WHO. *Pocket Book of Hospital Care for Children*. Geneva: WHO; 2013. Available at: http://apps.who.int/iris/bitstream/10665/81170/1/9789241548373_eng.pdf?ua=1.

^{viii} Minnesota Department of Health. Instructions for testing scales for accuracy. St. Paul, MN: Minnesota Department of Health; 2013. Available at: <http://www.health.state.mn.us/divs/fh/wic/localagency/wedupdate/moyr/2013/07jul/31/instructions.pdf>.

Prices noted here are approximate. Manufacturers often provide discounts for volume purchases or pricing deals for developing countries.

Electronic weight scales for adult, child, and infant

SECA 813

Basic information	Manufacturer	seca
	Link	www.seca.com
	Manufacturer description	seca has designed the seca 813 with a high capability of up to 440 lbs and an extra-wide platform. The tough rubber mat ensures a secure stance and flat construction allows for easy accessibility.
	Type	Electronic (adult/child)
	Characteristics applicable to low-resource settings	Durable, easy to clean, good for smaller clinics.
	Features	Designed for individual patient use, automatic shut-off, tap-on automatic switch-on.
	Pre-/post-sales support	2-year warranty
	Approximate price	US\$143
Considerations for use	Measurement range:	0–200 kg
	Minimum graduation:	100 g
	Accuracy/precision:	Not stated
	Tared weighing:	No
	Units:	Metric and imperial
	Weight of device:	2.9 kg
	Easy to clean:	Yes
	Required accessories/consumables:	Requires 4 AAA batteries. One set included with the scale.
Easy to maintain:	Not stated.	

Calibration/recalibration:	Not stated.
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Durable:	Yes
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HEALTH O METER 500KL

Basic information	Manufacturer	Health o meter Professional
	Link	www.homscales.com
	Manufacturer description	None provided.
	Type	Electronic (adult/child)
	Characteristics applicable to low-resource settings	Scale has the ability to interface with a computer, EMR software or other electronic device. Low platform height requires only minimal step up, offering patient a more comfortable and stable weighing experience.
	Features	Stadiometer (76–214 cm), auto-off, casters for moving scale, USB connectivity, able to interface with a computer.
	Pre-/post-sales support	2-year warranty
	Approximate price	US\$360
Considerations for use	Measurement range:	0–200 kg
	Minimum graduation:	100 g
	Accuracy/precision:	Not stated
	Tared weighing:	Yes (reset-to-zero capability)
	Units:	Metric and imperial
	Weight of device:	11.1 kg
	Easy to clean:	Yes
	Required accessories/consumables:	Requires 6 AA batteries. One set is included with the scale. Optional 120V adapter available. Some tools may be required for assembly.
	Easy to maintain:	Professional maintenance required for defects.

	Calibration/recalibration:	Calibration/recalibration can be performed by user with a set of certified test weights.
	Durable:	Not stated

TANITA BD-590

Basic information	Manufacturer	Tanita
	Link	www.tanita.com
	Manufacturer description	The BD-590 pediatric scale is designed as an all-in-one unit with no moving parts, making it a breeze to clean. Tanita's patented load cell technology guarantees incredible sensitivity for your smallest patients. The BD-590 is lightweight, yet durable enough for the health care professional on the move.
	Type	Electronic (infant)
	Characteristics applicable to low-resource settings	No moving parts, easy to clean.
	Features	Includes length measurement device, motion stop feature allows accurate weighing of moving infant, and tip resistant tray.
	Pre-/post-sales support	3-year warranty
	Approximate price	US\$300
	Considerations for use	Measurement range:
Minimum graduation:		10 g
Accuracy/precision:		Not stated
Tared weighing:		Yes (reset-to-zero capability)
Units:		Metric and imperial. Also comes in metric-only model.
Weight of device:		2.2 kg
Easy to clean:		Yes

Required accessories/consumables:	Requires four AA batteries. One set of batteries is included with the purchase of the scale. Optional carrying case can be purchased.
Easy to maintain:	Not stated.
Calibration/recalibration:	Professional calibration recommended annually.
Durable:	Not stated.

SECA 354

Basic information

Manufacturer	seca
Link	www.seca.com
Manufacturer description	The seca 354 baby scale has a comfortable weighing tray and a fine graduation of 10 g. In no time at all, it can be converted into a floor scale for children with a capacity of 44 lbs.
Type	Electronic (infant)
Characteristics applicable to low-resource settings	Two types of scales in one design (infant and toddler/small child), easy to clean.
Features	Can be converted into a floor scale for children up to 20 kg, automatic shut-off.
Pre-/post-sales support	2-year warranty
Approximate price	US\$205

Considerations for use

Measurement range:	0–20 kg
Minimum graduation:	10 g < 10 kg > 20 g*
Accuracy/precision:	Accuracy ± 30 g or ± 0.6%
Tared weighing:	Yes (reset-to-zero capability)
Units:	Metric and imperial
Weight of device:	2.3 kg
Easy to clean:	Yes
Required accessories/consumables:	Requires four AA batteries. One set of batteries is included with the scale. Manufacturer states that batteries should last for 20,000 weighing operations. Optional carrying case available.

	Easy to maintain:	Professional maintenance required for defects.
	Calibration/recalibration:	Manufacturer states that they do not have a set calibration recommendation, but suggests that patient scales be calibrated every two years and not more frequently than once per year. Calibration must be professionally done.
	Durable:	Yes

* This is standard way that manufacturers notate the graduation on electronic scales. It means that the graduation is by 10g for weights under 10kg and then the graduation is 20g for weights over 10kg.

Beam weight scales for adult, child, and infant

HEALTH O METER 1522KL

Basic information	Manufacturer	Health o meter Professional
	Link	www.hom scales.com
	Manufacturer description	None provided.
	Type	Beam (infant)
	Characteristics applicable to low-resource settings	No batteries/electricity required, can be calibrated by health facility staff.
	Features	Includes length measurement device (0–58cm), measures in kg or lb.
	Pre-/post-sales support	2-year warranty
	Approximate price	US\$320
Considerations for use	Measurement range:	0-65 kg
	Minimum graduation:	20 g
	Accuracy/precision:	Accuracy \pm 113 g
	Tared weighing:	No
	Units:	Metric and imperial
	Weight of device:	14.1 kg
	Easy to clean:	Instructions not provided.
	Required accessories/consumables:	Some tools may be required to assemble and maintain scale.
Easy to maintain:	Technical support can be contacted for guidance in performing maintenance tasks, such as leveling the platform.	

	<p>Calibration/recalibration: Calibration should be tested by certified test weights. Recalibration can be done by health facility staff using an 8 mm (5/16") hexagon socket wrench.</p>
	<p>Durable: Not stated</p>

* Professional is included in the title here, because the Health o meter Professional website is different than the consumer site. The link provided is for the Professional website.

SECA 725

Basic information	Manufacturer	seca
	Link	www.seca.com
	Manufacturer description	This model combines classic design with high-quality precision mechanics. Determining an exact weight is child's play, thanks to the smooth movement of precise sliders.
	Type	Beam (infant)
	Characteristics applicable to low-resource settings	No batteries/electricity required, durable.
	Features	Durable (impact resistant, scratchproof), spirit level.
	Pre-/post-sales support	5-year warranty
	Approximate price	US\$612
Considerations for use	Measurement range:	0-16 kg
	Minimum graduation:	5 kg
	Accuracy/precision:	Up to 4 kg, accuracy is ± 10 g. From 4 to 16 kg, accuracy is $\pm 0.25\%$.
	Tared weighing:	Yes (reset-to-zero capability; tare range to 2.5 kg)
	Units:	Metric
	Weight of device:	6.4 kg
	Easy to clean:	Yes
	Required accessories/consumables:	Some tools may be required to assemble scale.

Easy to maintain:	Manufacturer recommends professional servicing of scale every 3 to 5 years.
Calibration/recalibration:	Not stated
Durable:	Yes

DETECTO 2391

Basic information	Manufacturer	Detecto
	Link	www.detecto.com
	Manufacturer description	Detecto's world-renowned eye-level weigh beam physician scales feature a heavy-duty solid stable platform, a dual-reading die-cast weigh beam which may be read from either side of the scale.
	Type	Beam (adult/child)
	Characteristics applicable to low-resource settings	No moving parts, easy to clean.
	Features	Includes length measurement device, motion stop feature allows accurate weighing of moving infant, and tip resistant tray.
	Pre-/post-sales support	3-year warranty
	Approximate price	US\$300
	Considerations for use	Measurement range:
Minimum graduation:		10 g
Accuracy/precision:		Not stated
Tared weighing:		Yes (reset-to-zero capability)
Units:		Metric and imperial. Also comes in metric-only model.
Weight of device:		2.2 kg
Easy to clean:		Yes

Required accessories/ consumables:	Requires four AA batteries. One set of batteries is included with the purchase of the scale. Optional carrying case can be purchased.
Easy to maintain:	Not stated.
Calibration/ recalibration:	Professional calibration recommended annually.
Durable:	Not stated.

SECA 700

Basic information	Manufacturer	seca
	Link	www.seca.com
	Manufacturer description	The slip-resistant, cast-iron base and anti-tip column design allows patients to be safely managed and weighed.
	Type	Beam (adult/child)
	Characteristics applicable to low-resource settings	No batteries/electricity required, reset-to-zero capability, durable.
	Features	Stadiometer (60–200 cm with 1 mm graduation), transport casters for mobile use.
	Pre-/post-sales support	5-year warranty
	Approximate price	US\$310
Considerations for use	Measurement range:	0–220 kg
	Minimum graduation:	10 g < 10 kg > 20 g
	Accuracy/precision:	Up to 50 kg, accuracy is ± 100 g At 100 kg, accuracy is ± 200 g At 200 kg, accuracy is ± 400 g
	Tared weighing:	Yes (reset-to-zero capability)
	Units:	Metric and imperial
	Weight of device:	16.2 kg
	Easy to clean:	Yes
	Required accessories/consumables:	Some tools may be required to assemble scale.
	Easy to maintain:	Manufacturer recommends professional servicing of scale every 3 to 5 years.
	Calibration/recalibration:	Not stated.
	Durable:	Yes

Spring weight scales for infant

DETECTO HS25KGP

Basic information	Manufacturer	Detecto
	Link	http://www.detecto.com/
	Manufacturer description	Ideal for doctors and nurses working in remote locations, Detecto's model HS25KGP baby scale is lightweight and portable without requiring any battery or AC power.
	Type	Spring scale (infant)
	Characteristics applicable to low-resource settings	No batteries/electricity required, durable, lightweight, waterproof sling seat included (sling seat is intended for older infants, approximately 6 to 24 months of age).
	Features	Shatterproof glass dial, waterproof sling seat.
	Pre-/post-sales support	2-year warranty
	Approximate price	US\$41
Considerations for use	Measurement range:	0-25 kg
	Minimum graduation:	100 g
	Accuracy/precision:	Not stated
	Tared weighing:	Yes (reset-to-zero capability)
	Units:	Metric
	Weight of device:	1.8 kg (shipping weight)
	Easy to clean:	Yes

Required accessories/consumables:	None
Easy to maintain:	Not stated
Calibration/recalibration:	Not stated
Durable:	Yes

SECA 310

Basic information	Manufacturer	seca
	Link	www.seca.com
	Manufacturer description	Tough and reliable, the seca 310 has been designated especially for work in areas where there is no access to hospitals and baby clinics.
	Type	Spring scale (infant)
	Characteristics applicable to low-resource settings	No batteries/electricity required, lightweight, durable. Another model, the seca 312, is similar in construction to the seca 310, but also includes color indicators (red, yellow, green) to assess nutritional status. The seca 312 is only for infants up to 5 kg.
	Features	Shatterproof glass dial, corrosion-resistant metal casing and internal components.
	Pre-/post-sales support	2-year warranty
	Approximate price	US\$80
Considerations for use	Measurement range:	0-25 kg
	Minimum graduation:	50 kg
	Accuracy/precision:	Not stated
	Tared weighing:	Yes (reset-to-zero capability)
	Units:	Metric
	Weight of device:	1.5 kg
	Easy to clean:	Yes
	Required accessories/consumables:	Washable sling (one sling is included with basic package)

Easy to maintain:	Not stated
Calibration/recalibration:	Not stated
Durable:	Yes

This guide to selection is part of a seven-piece series of Survive and Thrive guides, including birthing and cesarean section simulators, continuous positive airway pressure (CPAP), fetal monitors, portable ultrasound, rechargeable lighting, and thermoregulation devices. You can search for any of these guides in the following website: <http://www.path.org/publications/detail.php?i=2511>.

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