

Birthing and Cesarean Section Simulators

Guide to Selection

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BIRTHING AND CESAREAN SECTION SIMULATORS

Skilled attendance at birth is one of the most important components of a strong maternal and neonatal health strategy. The relationship between the presence of a skilled birth attendant (SBA) and maternal/child health is well established, but in some countries only 40% of births are managed by an SBA.ⁱ Furthermore, the skills and knowledge of SBAs in some of the least-developed countries may not be advanced enough to safeguard the health of mother and newborn.ⁱⁱ Such deficiencies in the quality of training can result in maternal and neonatal mortality in the instance of serious complications such as postpartum hemorrhage (PPH), breech birth, and shoulder dystocia. An important training method for addressing such competencies is through the use of birthing and cesarean section simulators.

Birthing simulators come in a variety of styles and prices. While the lowest-cost options do not generally offer the opportunity to practice PPH management, they do offer the ability to practice difficult delivery situations such as shoulder dystocia. The use of a patient-actress simulation has been shown to provide a high-fidelity component to low-fidelity birthing simulation, so that even a very low-cost simulator can provide a quality of experience that is comparable to the high-cost simulator training experience.ⁱⁱⁱ The use of patient-actress simulations may also help trainees improve communication skills with patients, families, medical team members, or others helping with the birth. Cesarean section simulators are less widely available due to the complicated and expensive nature of surgical simulation. Available cesarean section simulators range from pre-incised flaps to vascularized models that offer simulated tissue upon which surgical skills can be practiced.

Birthing and cesarean section simulators can range from US\$150 to US\$50,000. This guide contains a selection of commercialized birthing and cesarean section simulators that are available on the market today. The simulators in this guide are arranged by price.

ⁱ Rosskam E, Pariyo G, Hounton S, Aiga H. Increasing skilled birth attendance through midwifery workforce management. *Int J Health Plann Mgmt.* 2013; 28: e62–e71.

ⁱⁱ PATH. Birthing Simulators Technology Opportunity Assessment. Available at: http://sites.path.org/mnhitech/files/2013/07/Birthing-simulators_FINAL_17July2013.pdf. Accessed October 8, 2013.

ⁱⁱⁱ Crofts JF, Bartlett C, Ellis D, et al. Patient-actor perception of care: a comparison of obstetric emergency training using manikins and patient-actors. *Quality & Safety in Health Care.* 2008;17(1):20–24.

Prices noted here are approximate. Manufacturers often provide discounts for volume purchases or pricing deals for developing countries. Permission was granted from the manufacturers for all included photographs.

MAMA NATALIE



Basic information

Manufacturer	Laerdal
Link	http://www.laerdalglobalhealth.com/
Manufacturer description	Providing realistic and affordable training in maternal and newborn care, the MamaNatalie® birthing simulator and newborn baby help you introduce simulation. User-friendly realism of the simulators and engaging role plays will make the learning sessions efficient and unforgettable for learners and facilitators alike.
Simulator type	Birthing
Features	Strapped onto the operator, who takes the role of the mother at the same time as manually controlling the following features to set the scenario. Scenarios include bleeding, positioning and delivery of the baby, delivery of the placenta, fetal heart sounds, cervix landmark, urine bladder catheterization, uterine massage, and uterine compression.
Characteristics applicable to low-resource settings	Low cost, does not require electricity, portable, training curriculum available for nominal fee.
Pre-/post-sales support	Yes
Approximate price	US\$150–\$200 (Countdown 2015 price for eligible countries)

Characteristics for
birth simulators

Postpartum hemorrhage management	✓
Breech birth	✓
Shoulder dystocia	✓
Fetal heart sounds	✓
Instrument delivery	✓

Characteristics for cesarean
section simulators

Dissectible abdomen with lifelike tissue density	NO
Vascularized model	NO
Realistic anatomical landmarks	NO

Characteristics for birth simulators	Postpartum hemorrhage management	✓
	Breech birth	NO
	Shoulder dystocia	NO
	Fetal heart sounds	NO
	Instrument delivery	NO
Characteristics for cesarean section simulators	Dissectible abdomen with lifelike tissue density	NO
	Vascularized model	NO
	Realistic anatomical landmarks	NO

OBSTETRICAL MANIKIN (180)

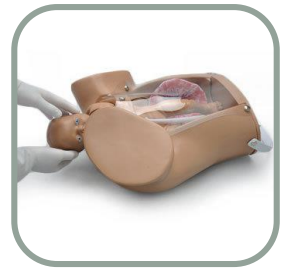


Basic information

Manufacturer	Simulaids
Link	http://www.simulaids.com/
Manufacturer description	Pelvic model with full-term newborn baby and placenta for teaching procedures in emergency childbirth and multiple techniques.
Simulator type	Birthing
Features	Birthing baby is a realistic newborn-size model with fontanels and cranial sutures. The obstetrical manikin has a lifelike pelvic cavity and pronounced pelvic landmarks, a modular pregnant belly overlay, and a clear abdominal overlay. The modular overlay has a self-contained fetus for practicing the Leopold's maneuver. Comes with disposable umbilical cords, clamps, easily replaceable spare vulva, and powder to make simulated blood.
Characteristics applicable to low-resource settings	Does not require electricity, portable.
Pre-/post-sales support	Yes
Approximate price	US\$615

Characteristics for birth simulators	Postpartum hemorrhage management	NO
	Breech birth	✓
	Shoulder dystocia	NO
	Fetal heart sounds	NO
	Instrument delivery	NO
Characteristics for cesarean section simulators	Dissectible abdomen with lifelike tissue density	NO
	Vascularized model	NO
	Realistic anatomical landmarks	NO

CS500 SERIES



Basic information

Manufacturer	Gaumard
Link	http://www.gaumard.com/
Manufacturer description	This versatile childbirth simulator is used worldwide by health care educators. It not only provides an excellent simulation of the normal delivery experience for the student and educator but also provides instruction in abnormal and multiple deliveries.
Simulator type	Birthing, Cesarean
Features	Life-size pelvic cavity with major anatomic landmarks, anatomically accurate backbone and fontanels on birthing baby, low-fidelity cesarean section simulation.
Characteristics applicable to low-resource settings	Lower-cost models in series do not require power of any kind. Higher-cost model requires AA batteries. Portable.
Pre-/post-sales support	Yes
Approximate price	US\$500–US\$1,295

Characteristics for birth simulators	Postpartum hemorrhage management	✓ (higher cost model only)
	Breech birth	✓
	Shoulder dystocia	✓
	Fetal heart sounds	✓ (higher cost model only)
	Instrument delivery	✓
Characteristics for cesarean section simulators	Dissectible abdomen with lifelike tissue density	NO
	Vascularized model	NO
	Realistic anatomical landmarks	✓

PROMPT BIRTHING SIMULATOR



Basic information

Manufacturer	Limbs and Things
Link	http://www.limbsandthings.com/
Manufacturer description	Improve your childbirth training outcome with the PROMPT (Practical Obstetric Multi-Professional Training) course which includes normal delivery, breech delivery, delivery on all fours, shoulder dystocia management, vacuum delivery, delivery of placenta, forceps delivery, and traction and rotational deliveries.
Simulator type	Birthing
Features	Birthing baby is 5.1 lbs. and has a fully articulated body, palpable fontanels and suture lines, palpable clavicles and scapulae, and a detachable placenta with cord. Birthing mother manikin has moveable legs, realistic pelvis, silicone skin and perineal musculature, and detachable abdominal and perineal skin to enable visualization of internal maneuvers and fetal positioning. Patient actress can be integrated into training sessions.
Characteristics applicable to low-resource settings	Does not require electricity; portable.
Pre-/post-sales support	Yes
Approximate price	US\$4,800

Characteristics for
birth simulators

Postpartum hemorrhage management	NO
Breech birth	✓
Shoulder dystocia	✓
Fetal heart sounds	NO
Instrument delivery	✓

Characteristics for cesarean
section simulators

Dissectible abdomen with lifelike tissue density	NO
Vascularized model	NO
Realistic anatomical landmarks	NO

DESPERATE DEBRA®



Basic information

Manufacturer	Adam, Rouilly
Link	http://www.adam-rouilly.co.uk/
Manufacturer description	Desperate Debra® simulator has been designed to facilitate the training and implementation of correct clinical procedures when confronted with impaction of the fetal head—a serious and potentially life-threatening event.
Simulator type	Cesarean
Features	Pregnant abdomen with precut cesarean incision. Replicates fetal head impaction with varying degrees of difficulty. Also allows for training in vaginal examination in advanced labor and general introduction to cesarean section.
Characteristics applicable to low-resource settings	Does not require electricity.
Pre-/post-sales support	Yes
Approximate price	US\$6,300

Characteristics for birth simulators

Postpartum hemorrhage management	NO
Breech birth	NO
Shoulder dystocia	NO
Fetal heart sounds	NO
Instrument delivery	NO

Characteristics for cesarean
section simulators

Dissectible abdomen with lifelike tissue density	NO
Vascularized model	NO
Realistic anatomical landmarks	✓

NOELLE

S574.100



Basic information

Manufacturer	Gaumard
Link	http://www.gaumard.com/
Manufacturer description	NOELLE is perfect for competency-based programs since each delivery can be precisely controlled while devices track student actions. The fetus may be manipulated to resolve a delivery dilemma. See instant feedback of force and torque on the fetus as well as its head position. This data is graphed and synchronized with our fetal monitor for debriefing and evaluation. The fetus is released on command after the instructor has observed and logged required competencies.
Simulator type	Birth, Cesarean
Features	Birth mother has realistic birth canal with dilating cervix, programmable fetal delivery systems, and birth canal which simulates human tissue. Fetus rotates, dips, and rises in response to commands from wireless PC. Ability to practice normal and emergency delivery procedures, as well as practice cesarean sections using dissectible stomach cover including realistic skin, subcutaneous tissue, fascia, rectus muscle, and peritoneum. Ability to perform scenarios involving maternal airway, breathing, circulation, and cardiac.
Characteristics applicable to low-resource settings	Requires electricity.
Pre-/post-sales support	Yes
Approximate price	US\$50,000

Characteristics for birth simulators	Postpartum hemorrhage management	✓
	Breech birth	✓
	Shoulder dystocia	✓
	Fetal heart sounds	✓
	Instrument delivery	✓
Characteristics for cesarean section simulators	Dissectible abdomen with lifelike tissue density	✓
	Vascularized model	✓
	Realistic anatomical landmarks	✓

SIMMOM

Basic information	Manufacturer	Laerdal
	Link	http://www.laerdal.com/
	Manufacturer description	SimMom is an advanced, full-body, interactive birthing simulator. Combining Limbs and Things PROMPT Birthing Simulator and Laerdal's ALS Simulator, SimMom offers the functionality required to train in a wide range of midwifery and obstetric skills.
	Simulator type	Birthing
	Features	Includes a wide range of birthing scenarios including an atonic uterus as well as movement, cardiac, and airway settings for a wide range of emergency scenarios. Birthing baby has a realistically modeled head with fontanels and sutures, scapulae and clavicles, and fully moveable arms and legs. Using additional software, various fetal heart rate scenarios can be included in delivery.
	Characteristics applicable to low-resource settings	Requires electricity.
	Pre-/post-sales support	Yes
	Approximate price	US\$30,000

Characteristics for birth simulators	Postpartum hemorrhage management	✓
	Breech birth	✓
	Shoulder dystocia	✓
	Fetal heart sounds	✓
	Instrument delivery	✓
Characteristics for cesarean section simulators	Dissectible abdomen with lifelike tissue density	NO
	Vascularized model	NO
	Realistic anatomical landmarks	NO

The following simulators are also available on the market today. PATH was unable to obtain sufficient information from the manufacturer to include these devices in the main body of this guide. Please follow up with the manufacturer for more information.

TORSO/PELVIS MANIKIN

OBSTETRIC PHANTOM		FEATURES
MANUFACTURER	Adam, Rouilly	Life size pelvic model with relevant anatomical landmarks. Fetal doll can be placed in various positions to simulate difficult birthing situations.
SIMULATOR TYPE	Birthing	
COST	US\$1,077	
http://www.adam-rouilly.co.uk/		

CHILDBIRTH SKILLS TRAINING MODEL		FEATURES
MANUFACTURER	All Pro	Pelvic model with ability to simulate difficult delivery and assisted delivery scenarios. Also includes perineum cutting and suturing training.
SIMULATOR TYPE	Birthing	
COST	Unknown	
http://www.allprocorporation.com/		

C-CELIA		FEATURES
MANUFACTURER	Operative Experience Inc.	C-Celia is a lifelike model developed to train health professionals in low resource settings how to perform a cesarean section (c-section). Simulated tissue density, vascularization, anatomical landmarks allow for realistic practice of a c-section.
SIMULATOR TYPE	Cesarean Section	
COST	Unknown	
http://operativeexperience.com/		

FULL BODY MANIKIN

ADVANCED DELIVERY AND MATERNAL AND NEONATAL EMERGENCY SIMULATOR		FEATURES
MANUFACTURER	All Pro	Full body manikin that provides the opportunity to practice abdominal palpitation, tracheal intubation, CPR on pregnant woman, and neonatal tracheal intubation. Comes with replaceable cervixes to simulate stages of dilation.
SIMULATOR TYPE	Birthing	
COST	Unknown	
http://www.allprocorporation.com/		

FULL BODY PREGNANCY SIMULATOR		FEATURES
MANUFACTURER	Koken	Offers ability to practice abdominal palpitation and vaginal examination during late stages of pregnancy, breech birth extractions, and diagnosis of normal and abnormal conditions of the puerperal uterus following birth.
SIMULATOR TYPE	Birthing	
COST	US\$29,166	
http://www.kokenmpc.co.jp/english/index.html		

This guide to selection is part of a six-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 PATH Publications Catalogue at <http://www.path.org/publications/index.php>.

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