

# Practical selection of neonatal resuscitators

Version 2

## A field guide

Updated November 2006



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## Neonatal Resuscitators

PATH initially evaluated a variety of reusable neonatal resuscitators including both bag and mask and tube and mask designs. This updated version of the “Practical selection of neonatal resuscitators: a field guide” offers additional information about devices that are priced at less than US\$30 each. This guide presents information about the criteria used during the device evaluation, evaluation results for each device, and suggestions for choosing a resuscitator.

## Importance of Resuscitation

Birth asphyxia refers to the condition when a baby does not breathe at birth. Asphyxia is estimated to account for one-third of the estimated four million neonatal deaths that occur annually. This results in over one million neonatal deaths and an unknown number of infants with long-term neurological disability. Reducing birth asphyxia and neonatal death requires appropriate care including a resuscitator available at every birth.

Neonatal resuscitators, when properly used, can lower the incidence of mortality associated with neonatal asphyxia. In order to achieve this, resuscitators need to be made available to all birth attendants in conjunction with adequate training.

## Mechanics of Resuscitation\*

Newborn resuscitation should begin as soon as asphyxia is identified. After clearing the airway and correctly positioning the newborn's head and neck, the health worker positions the mask over the mouth and nose and holds it with light pressure to form an

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\* This section provides a brief overview of a resuscitation procedure but is not meant to be a substitute for proper instruction. More information can be found from the Neonatal Resuscitation Program—online at <http://www.aap.org/nrp/nrpmain.html> and from the International Guidelines for Neonatal Resuscitation at <http://pediatrics.aappublications.org/cgi/content/full/106/3/e29> [accessed November 8, 2006].

airtight seal. Breaths should then be delivered at a rate of 40–60 breaths per minute. While it may be uncommon to have an in-line manometer (pressure gauge), caregivers should observe the infant's chest to ensure chest rise with each breath. Typical pressures may exceed 30 H<sub>2</sub>O for the initial breath and then typically diminish to 15–20 cm H<sub>2</sub>O. Tidal volumes are small, typically 5–8 ml/kg of newborn weight.

## How to Choose a Resuscitator

### ☑ Choose desired features.

Features on most resuscitator models are similar, but variation exists. Depending on your program, features such as oxygen ports and reservoirs, high-quality packaging, or a compact profile may be important.

### ☑ Choose bag and mask or tube and mask.

Both types of resuscitators can reduce the incidence of neonatal mortality, but each has distinct advantages and disadvantages.

### ☑ Decide between disposable and reusable.

Depending on the nature of your program and the rate of neonatal asphyxia, single-use or multiuse resuscitators may be more cost-effective. If the environment of use indicates that resuscitators will always be reused, it may be advisable to invest in a multiuse resuscitator to permit correct cleaning and disinfection after use.

### ☑ Decide on a price range.

Resuscitators are now available from a wide variety of manufacturers and can vary widely in price despite having many of the same features. Resuscitators manufactured in the United States or Europe are often higher priced than similar resuscitators manufactured in other countries. The resuscitators in this field guide are divided into resuscitators costing under US\$30 and over US\$30.

## Important Features for Safe and Proper Resuscitation

### Properly Sized and Form-Fitting Mask

Proper resuscitation depends on a good seal between the resuscitator and the neonate. Resuscitators are equipped with a variety of mask types including air-filled anatomically shaped masks or round, one- or two-piece masks (with a silicone flange). *Resuscitators generally include one mask size, and purchasers will want to purchase an additional mask for each resuscitator (to cover both low and normal-birthweight neonates).*

### Single-Use vs. Multi-use Resuscitators

**Single-use** (disposable) resuscitators can be lower priced than similar reusable models. However, single use resuscitators are often manufactured with lower cost materials that cannot be reprocessed and are often sealed to prevent disassembly. Single-use models are not included in this guide.

**Multi-use** (reusable) resuscitators are often higher priced than similar disposable models. Reusable resuscitators are typically designed for both disassembly and reprocessing (including autoclaving). Due to the possibility of reuse, the cost per use of multi-use resuscitators may be lower than similar single-use resuscitators.

### Pressure Relief Valve

Preventing lung damage is a paramount concern for anyone performing resuscitations. A pressure relief valve is designed to limit the pressure that the resuscitator can deliver. All bag and mask resuscitator models tested had a relief valve except the Blue Cross resuscitator. *Note: Many of the models evaluated lacked any indication regarding the position of the valve—enabling the user to disable the relief valve without their knowledge.*

pressure relief valve



## Minimal Dead Airspace

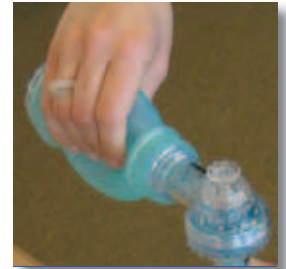
Resuscitators that minimize dead airspace between the neonate's face and the nonbreathing valve prevent the neonate from rebreathing expelled air with a higher concentration of CO<sub>2</sub>. *Note: Dead airspace volume was not determined during this evaluation.*

## Designed for Assembly/Disassembly

Ridged surfaces on parts that disassemble help identify these parts to the user as well as make the resuscitator easier to disassemble with wet hands. Color coding can help users distinguish different components, and quality design can augment the ease of assembly and disassembly.

## Properly Sized Bag (bag and mask only)

A bag specifically designed for providing appropriate tidal volumes for neonates can help reduce errors during use and simplify training. Most bag and mask models had bags that evaluators felt were appropriately sized.



## Standard Mask Connections

Standard-sized connections are important to ensure compatibility with replacement components and masks from other manufacturers. Standard connections are a 15 mm inner diameter and a 22 mm outer diameter mask connector. Similarly, mask stems should have a 15 mm outer diameter or 22 mm inner diameter.

### Critical decision

### Which is right for your program?

## Bag and Mask

### Pros

- Pressure-limiting valve on most models reduces risk of lung rupture.
- More familiarity on part of providers.
- Wider variety on the market.

### Cons

- Higher cost.
- More parts.



## Tube and Mask

### Pros

- Often lower cost than bag and mask devices.
- Users may feel greater control delivering the pressure and monitoring the neonate's progress.
- Fewer parts.

### Cons

- Fatiguing to use.
- Users may need additional training and practice to provide proper and consistent resuscitation.
- Caregiver cannot give instructions or counseling during resuscitation.



## Guide to the Device Comparison Tables (pp. 10–27)

For each of the devices, the following information is provided in order to assist the reader in making an informed choice when purchasing a neonatal resuscitator. More information about specific resuscitators may also be available from the individual manufacturer or distributor.

The ASTM standard used as the basis for several evaluations is F920-93 Standard Specifications for Minimum Performance and Safety Requirements for Resuscitators Intended for Use with Humans.

### Device Information

This section provides basic information on model number, supplier, website (to get more information electronically), and cost (as of June 2006).

### Features That Count

This section provides information on features that have been identified as particularly important in resuscitator selection.

- **Mask size:** Size of mask(s) included with resuscitator.
- **Mask type:** Type of mask included with resuscitator.
- **Properly sized bag:** Based on user input and international guidelines.
- **Pressure relief valve/position indication:** More information on proper valve operation can be found in the Laboratory Evaluations section (see pg. 7).
- **Designed for assembly/disassembly:** Whether the resuscitator was designed to facilitate assembly and disassembly.
- **Standard mask connections:** Whether the resuscitator has standard mask connections that will permit it to be used with masks from other manufacturers or differently sized masks (e.g., normal neonate, low-birthweight neonate).

### Device Features

This section provides information on:

- **Components:** Extra components included with the resuscitator.
- **Features:** Additional features of the resuscitator that are not required for basic operation.
- **Packaging:** Description of resuscitator packaging.
- **Single-use/multiuse:** Whether the resuscitator is designated by the manufacturer for single or multiple uses.

### Laboratory Evaluations

This section provides information from laboratory testing on:

- **Pressure-limiting valve:** The pressure recorded at the patient connection port when air at a flow rate of 15 L/min was passed through the resuscitator (per ASTM standards). This test evaluates the proper function of the pressure-limiting valve in relation to the manufacturer's designation.
- **Cleaning-effectiveness:** Evaluated by introducing blood into the device via the face mask, allowing the resuscitator to dry for one hour, and cleaning the resuscitator in a detergent solution using a soft-bristled brush. Score is based on the amount of blood remaining on the device after one minute of cleaning.
- **Disinfection-device durability:** Disassembled resuscitators were submerged in a 0.5% chlorine solution for 48 hours and evaluated for damage. No microbiological evaluation was conducted to determine the degree of disinfection.
- **Instructions-completeness:** Instructions included with the resuscitators were evaluated for completeness based on complete and correct information, accompanying diagrams, technical information, and reuse instructions.

- **Instructions–ease of reading:** Instructions were evaluated using a Flesch Reading Ease score, a method based on the length of words and sentences. Flesch scores are assigned a grade level as follows: Very difficult–post graduate; Difficult–college; fairly difficult–high school; Standard–8<sup>th</sup> to 9<sup>th</sup> grade; Fairly easy–7<sup>th</sup> grade; Easy–5<sup>th</sup> to 6<sup>th</sup> grade; Very easy–4<sup>th</sup> to 5<sup>th</sup> grade.

## Usability

- **Ease of use/comfort:** Describes the ability of the user to intuitively adopt correct and consistent use of the resuscitator.
- **Disassembly/reassembly:** Describes the ease and completeness of disassembly and reassembly by users without written instructions.
- **Device ergonomics:** Describes an ergonomic analysis of the resuscitators as performed by the evaluation team. This includes size of device in relation to hand size, features to improve comfort or usability, and interaction of users with the device.

**Devices  
Under  
US\$30**

## Anand Medicaids Priv. Lim. Silicone Infant Resuscitator



Device Information	<b>Model Number</b>	<b>IR-01</b>
	Supplier	Anand Medicaids Private Limited 33/16, Punjabi Bagh New Delhi, 110 026 INDIA Tel: 91-11-42464264/ 25225225 Fax: 91-11-25225062 sales@anandind.com
	Website	www.anandind.com
	<b>Cost (as purchased)</b>	<b>US\$18.00</b>
Features That Count	Mask size	Low-birthweight neonate
	Mask type	Round one-piece silicone
	Properly sized bag	Yes
	Pressure relief valve/position indication	Yes / No
	Designed for assembly/disassembly	Yes
	Standard mask connections	Yes
Device Features	Components	Oxygen reservoir bag; oxygen tubing connector
	Features	Pressure-limiting valve Note: cannot lock down
	Packaging	Zippered bag with clear panel
	Single-use/multiuse	Multiuse
Laboratory Evaluations	Pressure-limiting valve (@ 15 L/min air flow)	54 cm H <sub>2</sub> O
	Cleaning—effectiveness	①
	Disinfection—device durability	①
	Instructions—completeness	No instructions
Usability	Instructions—ease of reading	No instructions
	Ease of use/comfort	②
	Dissassembly/reassembly	②
	Device ergonomics	②

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

## Apothecaries Sundries Mfg. Co. Artificial Resuscitator Silicone



Device Information	<b>Model Number</b>	<b>RG401-S2</b>
	Supplier	Apothecaries Sundries Mfg. Co. ASCO House, I-30(a) Kirti Nagar, New Delhi 110 015 INDIA Tel: 91-11-25410008/ 25420779 Fax: 91-11-25410007 Tel USA: (718) 713-8038 info@asco.in
	Website	www.ascoindia.com
	<b>Cost (as purchased)</b>	<b>US\$22.00</b>
Features That Count	Mask size	Normal birthweight neonate
	Mask type	Round one-piece silicone
	Properly sized bag	Yes
	Pressure relief valve/position indication	Yes / No
	Designed for assembly/disassembly	Yes
	Standard mask connections	Yes
Device Features	Components	Oxygen reservoir bag; oxygen tubing connector
	Features	Pressure-limiting valve Note: cannot lock down
	Packaging	Zippered bag with clear panel
	Single-use/multiuse	Multiuse
Laboratory Evaluations	Pressure-limiting valve (@ 15 L/min air flow)	40 cm H <sub>2</sub> O
	Cleaning—effectiveness	①
	Disinfection—device durability	①
	Instructions—completeness	No instructions
	Instructions—ease of reading	No instructions
Usability	Ease of use/comfort	②
	Dissassembly/reassembly	②
	Device ergonomics	③ Note: larger bag may be difficult for small-handed users

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

**Besmed Health Business Corp. Silicone Infant Resuscitator**



<b>Device Information</b>	<b>Model Number</b>	<b>BE-1303</b>
	Supplier	Besmed Health Business Corp. No. 2, Lane 106, Wu-Kong 3rd Road Wu-Ku Industrial Park, Taipei Taiwan, Republic of China Tel: 886-2-2290-3959 Fax: 886-2-2299-9076 info@besmed.com
	Website	www.besmed.com
	<b>Cost (as purchased)</b>	<b>US\$27.70</b> <b>Plastic box available for US\$3.80</b>

<b>Features That Count</b>	Mask size	Low-birthweight neonate (0)
	Mask type	Round one-piece silicone
	Properly sized bag	Yes
	Pressure relief valve/position indication	Yes / No
	Designed for assembly/disassembly	Yes
	Standard mask connections	Yes

<b>Device Features</b>	Components	Oxygen reservoir bag; oxygen tubing connector
	Features	Pressure-limiting valve Note: cannot lock down
	Packaging	Plastic bag Optional plastic box
	Single-use/multiuse	Multiuse

<b>Laboratory Evaluations</b>	Pressure-limiting valve (@ 15 L/min air flow)	24 cm H <sub>2</sub> O
	Cleaning—effectiveness	①
	Disinfection—device durability	①
	Instructions—completeness	③ No instructions specific to neonate
	Instructions—ease of reading	Very difficult

<b>Usability</b>	Ease of use/comfort	①
	Dissassembly/reassembly	②
	Device ergonomics	②

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

**Enter Medical Corporation Silicone Resuscitator**



<b>Device Information</b>	<b>Model Number</b>	<b>ENT-1014</b>
	Supplier	Enter Medical Corporation No. 16-1, Lane 564, Wen Hua San Road Gui Shan Xiang, Tao Yuan Hsien Taiwan, Republic of China Tel: 886-33283653/ 33975247 Fax: 886-33285723 shine.ball@msa.hinet.net
	Website	www.shineball.com.tw
	<b>Cost (as purchased)</b>	<b>US\$15.00</b>

<b>Features That Count</b>	Mask size	Normal birthweight neonate
	Mask type	Round one-piece silicone
	Properly sized bag	Yes
	Pressure relief valve/position indication	Yes / No
	Designed for assembly/disassembly	Yes
	Standard mask connections	Yes

<b>Device Features</b>	Components	Oxygen reservoir bag
	Features	Pressure-limiting valve Note: cannot lock down
	Packaging	Plastic resealable bag
	Single-use/multiuse	Multiuse

<b>Laboratory Evaluations</b>	Pressure-limiting valve (@ 15 L/min air flow)	41 cm H <sub>2</sub> O
	Cleaning—effectiveness	①
	Disinfection—device durability	①
	Instructions—completeness	No instructions
Instructions—ease of reading	No instructions	

<b>Usability</b>	Ease of use/comfort	②
	Dissassembly/reassembly	②
	Device ergonomics	②

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor



**Global Products Corporation (GPC) Medical Silicone Resuscitator**



Device Information	<b>Model Number</b>	<b>#AN108</b>
	Supplier	Global Products Corporation (GPC) Medical G3 Vikas Puri New Delhi 110018 INDIA Tel: 91-11-28541648/ 25841244 Fax: 91-11-28546244 info@gpc-medical.com
	Website	www.gpc-medical.com
	<b>Cost (as purchased)</b>	<b>US\$12.40</b>
Features That Count	Mask size	Low-birthweight neonate
	Mask type	Round one-piece silicone
	Properly sized bag	Yes
	Pressure relief valve/position indication	Yes / No
	Designed for assembly/disassembly	Yes
	Standard mask connections	Yes
Device Features	Components	Oxygen reservoir bag; oxygen tubing connector
	Features	Pressure-limiting valve
	Packaging	Zippered bag with clear panel
	Single-use/multiuse	Multiuse
Laboratory Evaluations	Pressure-limiting valve (@ 15 L/min air flow)	43 cm H <sub>2</sub> O
	Cleaning—effectiveness	①
	Disinfection—device durability	①
	Instructions—completeness	No instructions
	Instructions—ease of reading	No instructions
Usability	Ease of use/comfort	①
	Dissassembly/reassembly	②
	Device ergonomics	①

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

**Hospital Equipment Manufacturing Co. Silicone Resuscitator**



Device Information	<b>Model Number</b>	<b>70-555-03</b>
	Supplier	Hospital Equipment Manufacturing Company 26, Deepak Building 13, Nehru Place New Delhi 110019 INDIA Tel: 91-11-26420769/ 26476106 Fax: 91-11-26221441/ 26212026 hospital@del2.vsnl.net.in
	Website	www.hemcindia.com
	<b>Cost (as purchased)</b>	<b>US\$14.00</b>
Features That Count	Mask size	Low-birthweight neonate
	Mask type	Round one-piece silicone
	Properly sized bag	Yes
	Pressure relief valve/position indication	Yes / No
	Designed for assembly/disassembly	Yes
	Standard mask connections	Yes
Device Features	Components	Oxygen reservoir bag; oxygen tubing connector
	Features	Pressure-limiting valve
	Packaging	Zippered bag with clear panel
	Single-use/multiuse	Multiuse
Laboratory Evaluations	Pressure-limiting valve (@ 15 L/min air flow)	42 cm H <sub>2</sub> O
	Cleaning—effectiveness	①
	Disinfection—device durability	①
	Instructions—completeness	No instructions
	Instructions—ease of reading	No instructions
Usability	Ease of use/comfort	①
	Dissassembly/reassembly	②
	Device ergonomics	①

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

## Kay and Company Silicone Resuscitator



Device Information		Silicone resuscitator
Supplier	Kay and Company 25, Netaji Subhash Marg New Delhi 110002 INDIA Tel: 91-11-23263859 Fax: 91-11-23282678 sales@kaycoindia.com	
Website	www.kaycoindia.com	
<b>Cost (as purchased)</b>	<b>US\$21.00</b>	
Features That Count		
Mask size	Low-birthweight neonate	
Mask type	Round one-piece silicone	
Properly sized bag	Yes	
Pressure relief valve/position indication	Yes / Yes	
Designed for assembly/disassembly	Yes	
Standard mask connections	Yes	
Device Features		
Components	Oxygen reservoir bag; oxygen tubing connector	
Features	Pressure-limiting valve	
Packaging	Zippered bag with clear panel plus separate red drawstring bag	
Single-use/multiuse	Multiuse	
Laboratory Evaluations		
Pressure-limiting valve (@ 15 L/min air flow)	25 cm H <sub>2</sub> O	
Cleaning—effectiveness	①	
Disinfection—device durability	①	
Instructions—completeness	⑤ (brief and incomplete)	
Instructions—ease of reading	Easy	
Usability		
Ease of use/comfort	①	
Dissassembly/reassembly	②	
Device ergonomics	①	

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

## Laerdal Paediatric Pocket Mask



Device Information		820050 Paediatric Pocket Mask
Supplier	Laerdal Medical Limited Laerdal House Goodmead Road Orpington, Kent, BR6 0HX Tel: 01689 876634 Fax: 01689 873800 customer.service@laerdal.co.uk	
Website	www.laerdal.co.uk	
<b>Cost (as purchased)</b>	<b>US\$14.60</b>	
Features That Count		
Mask size	Infant / Child	
Mask type	Round one-piece silicone	
Properly sized bag	N/A	
Pressure relief valve/position indication	No	
Designed for assembly/disassembly	Yes	
Standard mask connections	Yes	
Device Features		
Components	Nitrile gloves; antimicrobial hand wipe	
Features	N/A	
Packaging	Zippered nylon bag	
Single-use/multiuse	Labeled as single-use	
Laboratory Evaluations		
Pressure-limiting valve (@ 15 L/min air flow)	N/A	
Cleaning—effectiveness	①	
Disinfection—device durability	①	
Instructions—completeness	②	
Instructions—ease of reading	Fairly Easy	
Usability		
Ease of use/comfort	④	
Dissassembly/reassembly	①	
Device ergonomics	④	

**Note** \*\*\*This resuscitator was evaluated in 2003 under a different but similar protocol to the other resuscitators included in this guide.\*\*\*  
One-way valve can be purchased separately for use with other masks appropriately sized for neonates for US\$5.95.

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

## Ningbo David Medical Device Co. Ltd Neonate Silicone Resuscitator Bag



Device Information	<b>Model Number</b>	<b>HF-I</b>
	Supplier	Ningbo David Medical Device Co. Ltd #11 722 Lane Sangtian Rd. Ningbo, Republic of China Tel: 0086-574-87800009 Fax: 0086-574-87801111 guojibu@nbip.net
	Website	www.chinadavid.cn
	<b>Cost (as purchased)</b>	<b>US\$26.00</b>
Features That Count	Mask size	Normal and low-birthweight neonate
	Mask type	Round one-piece silicone
	Properly sized bag	Yes
	Pressure relief valve/position indication	Yes / No
	Designed for assembly/disassembly	Yes
	Standard mask connections	Yes
Device Features	Components	Oxygen reservoir bag; oxygen tubing connector
	Features	Pressure-limiting valve
	Packaging	None
	Single-use/multiuse	Multiuse
Laboratory Evaluations	Pressure-limiting valve (@ 15 L/min air flow)	40 cm H <sub>2</sub> O
	Cleaning—effectiveness	①
	Disinfection—device durability	①
	Instructions—completeness	③ No use instructions
	Instructions—ease of reading	Very difficult
Usability	Ease of use/comfort	①
	Dissassembly/reassembly	②
	Device ergonomics	② Requires firm pressure on mask

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

## Shinmed Silicone Resuscitator



Device Information	<b>Model Number</b>	<b>SW72302B</b>
	Supplier	Shinmed (Shining World Health Care Co., Ltd.) 6F, No. 8, Lane 7, Wu-Chun Road, Wu-Ku Industrial Park Taipei County, 248 Taiwan, Republic of China Tel: 886-2-22900966 Fax: 886-2-22903966 shinmed20@shinmed.com
	Website	www.shinmed.com.tw
	<b>Cost (as purchased)</b>	<b>US\$30.00</b>
Features That Count	Mask size	Normal and low-birthweight neonate (0 & 1)
	Mask type	Round one-piece silicone
	Properly sized bag	Yes
	Pressure relief valve/position indication	Yes / Yes
	Designed for assembly/disassembly	Yes
	Standard mask connections	Yes
Device Features	Components	Oxygen reservoir bag; oxygen tubing connector
	Features	Pressure-limiting valve
	Packaging	Plastic box
	Single-use/multiuse	Multiuse
Laboratory Evaluations	Pressure-limiting valve (@ 15 L/min air flow)	40 cm H <sub>2</sub> O
	Cleaning—effectiveness	①
	Disinfection—device durability	② Spring rusted during disinfection
	Instructions—completeness	③ No instructions specific to neonate
	Instructions—ease of reading	Fairly difficult
Usability	Ease of use/comfort	③ Stiff bag
	Dissassembly/reassembly	②
	Device ergonomics	①

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

**Sturdy Industrial Co.,  
Ltd. Topster Silicone  
Resuscitator**



Device Information	Model Number	<b>Topster SR-003</b>
	Supplier	Sturdy Industrial Co., Ltd. No. 168, Sec. 1, Jungshing Rd. Wugu Township, Taipei Country, 248 Taiwan, Republic of China PO Box 1-027 Wugu, Taiwan, Republic of China Tel: 886-2-29837622 Fax: 886-2-29848208 foreign@sturdy.com.tw
	Website	www.sturdy.com.tw
	<b>Cost (as purchased)</b>	<b>US\$13.50</b>
Features That Count	Mask size	Low-birthweight neonate (0)
	Mask type	One-piece silicone
	Properly sized bag	Yes
	Pressure relief valve/position indication	Yes / Yes
	Designed for assembly/disassembly	Yes
	Standard mask connections	Yes
Device Features	Components	Oxygen reservoir bag; oxygen tubing connector; 40-, 50-, 60-mm airways
	Features	Pressure-limiting valve
	Packaging	Cardboard box
	Single-use/multiuse	Multiuse
Laboratory Evaluations	Pressure-limiting valve (@ 15 L/min air flow)	39 cm H <sub>2</sub> O
	Cleaning—effectiveness	①
	Disinfection—device durability	② Spring rusted during disinfection
	Instructions—completeness	②
	Instructions—ease of reading	Fairly difficult
Usability	Ease of use/comfort	② Stiffer bag
	Dissassembly/reassembly	②
	Device ergonomics	①

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

**Tekno**



Device Information	Model Number	<b>N/A</b>
	Supplier	F2H (Frontiers For Health) Jl. Cilaki 35 Bandung 40114 INDONESIA 62-22-7273125  Contact: Mrs. Atte Triyanti (Product Division)
	Website	N/A
<b>Cost (as purchased)</b>	<b>US\$9.00</b>	
Features That Count	Mask size	Normal birthweight neonate
	Mask type	Round two-piece mask with silicone face piece
	Properly sized bag	N/A
	Pressure relief valve/position indication	No
	Designed for assembly/disassembly	Yes
	Standard mask connections	Yes
Device Features	Components	No additional components
	Features	N/A
	Packaging	Sealable plastic bag
	Single-use/multiuse	Multiuse
Laboratory Evaluations	Pressure-limiting valve (@ 15 L/min air flow)	N/A
	Cleaning—effectiveness	①
	Disinfection—device durability	①
	Instructions—completeness	Instructions in Indonesian; line drawings; training information
	Instructions—ease of reading	Not evaluated due to language
Usability	Ease of use/comfort	③
	Dissassembly/reassembly	②
	Device ergonomics	③

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

**Zeal Medical BlowSafe  
Mouth to Mask  
Resuscitator**



Device Information		BlowSafe Mouth to Mask
Supplier	Zeal Medical 4/19-A, Piramal Nagar Indl.Est, SV Road, Goregaon(W) Mumbai 400062 INDIA Tel: 022-28760274 Fax: 022-28761905 zealmedi@bom3.vsnl.net.in	
Website	www.zealmedical.com	
<b>Cost (as purchased)</b>	<b>US\$15.00</b>	
Features That Count		
Mask size	Normal birthweight neonate (0/1)	
Mask type	Round one-piece silicone	
Properly sized bag	N/A	
Pressure relief valve/position indication	Yes / No	
Designed for assembly/disassembly	Yes	
Standard mask connections	Yes	
Device Features		
Components	No additional components	
Features	Pressure-limiting valve Note: cannot lock down	
Packaging	Zippered bag	
Single-use/multiuse	Multiuse	
Laboratory Evaluations		
Pressure-limiting valve (@ 15 L/min air flow)	20 cm H <sub>2</sub> O	
Cleaning—effectiveness	①	
Disinfection—device durability	①	
Instructions—completeness	No instructions	
Instructions—ease of reading	No instructions	
Usability		
Ease of use/comfort	③	
Dissassembly/reassembly	②	
Device ergonomics	③	

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

**Devices  
Over  
US\$30**

## BLS Systems Rescuer Silicone BVM Resuscitator



Device Information	
<b>Model Number</b>	<b>#4525</b>
Supplier	BLS Systems Limited 1108 South Service Road West Oakville, Ontario L6L 5T7 CANADA 905-339-1069
Website	www.blssystemsltd.com
<b>Cost (as purchased)</b>	<b>US\$45.00</b>
Features That Count	
Mask size	Low-birthweight neonate (0)
Mask type	Round one-piece silicone
Properly sized bag	Yes
Pressure relief valve/position indication	Yes / No
Designed for assembly/disassembly	Yes
Standard mask connections	Yes
Device Features	
Components	Oxygen reservoir bag; oxygen tubing connector
Features	Pressure-limiting valve
Packaging	Plastic drawstring bag
Single-use/multiuse	Multiuse
Laboratory Evaluations	
Pressure-limiting valve (@ 15 L/min air flow)	36 cm H <sub>2</sub> O
Cleaning—effectiveness	①
Disinfection—device durability	①
Instructions—completeness	② (not specific for infant resuscitation)
Instructions—ease of reading	Difficult
Usability	
Ease of use/comfort	②
Dissassembly/reassembly	②
Device ergonomics	②

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

## Laerdal Silicone



Device Information	
<b>Model Number</b>	<b>860056</b>
Supplier	Laerdal 167 Myers Corners Rd Wappingers Falls, NY 12590-8840 UNITED STATES 800-431-1055
Website	www.laerdal.com
<b>Cost (as purchased)</b>	<b>US\$195.00</b>
Features That Count	
Mask size	Normal birthweight neonate (0/1)
Mask type	Round one-piece silicone
Properly sized bag	Yes
Pressure relief valve/position indication	Yes / Cannot disable
Designed for assembly/disassembly	Yes
Standard mask connections	Yes
Device Features	
Components	Oxygen reservoir bag
Features	Pressure-limiting valve
Packaging	Plastic resealable bag inside cardboard box
Single-use/multiuse	Multiuse
Laboratory Evaluations	
Pressure-limiting valve (@ 15 L/min air flow)	32 cm H <sub>2</sub> O
Cleaning—effectiveness	③
Disinfection—device durability	①
Instructions—completeness	①
Instructions—ease of reading	Difficult
Usability	
Ease of use/comfort	③
Dissassembly/reassembly	③
Device ergonomics	③

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

## P.J. Dahlhausen



Device Information	
<b>Model Number</b>	<b>CH436-51.5000.00.100</b>
Supplier	P.J. Dahlhausen & Co. Emil-Hoffmann-Str. 53 50996 Koln GERMANY 49-2236-39-130
Website	www.dahlhausen.de
<b>Cost (as purchased)</b>	<b>US\$122.55</b>
Features That Count	
Mask size	Normal and low-birthweight neonate included
Mask type	Round one-piece silicone
Properly sized bag	Yes
Pressure relief valve/position indication	Yes / Cannot disable
Designed for assembly/disassembly	Yes
Standard mask connections	Yes
Device Features	
Components	None included
Features	Pressure-limiting valve
Packaging	Disposable bag inside cardboard box
Single-use/multiuse	Multiuse
Laboratory Evaluations	
Pressure-limiting valve (@ 15 L/min air flow)	23 cm H <sub>2</sub> O
Cleaning—effectiveness	②
Disinfection—device durability	①
Instructions—completeness	① (in English and German)
Instructions—ease of reading	Fairly difficult
Usability	
Ease of use/comfort	③
Dissassembly/reassembly	③
Device ergonomics	②

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

## Blue Cross



Device Information	
<b>Model Number</b>	<b>IBW-01</b>
Supplier	Blue Cross Emergency Co. 3-12-9, Hongo, Bunkyo-ku Tokyo 131-0033, JAPAN 81-03-3815-2220
Website	www.bluecross-e.co.jp/
<b>Cost (as purchased)</b>	<b>US\$95.99</b>
Features That Count	
Mask size	Normal birthweight neonate
Mask type	Round two-piece Clear hard plastic top Opaque silicone face seal
Properly sized bag	Yes
Pressure relief valve/position indication	No / N/A
Designed for assembly/disassembly	Yes
Standard mask connections	Yes
Device Features	
Components	Open-end oxygen reservoir
Features	
Packaging	Plastic resealable bag inside cardboard box
Single-use/multiuse	Multiuse
Laboratory Evaluations	
Pressure-limiting valve (@ 15 L/min air flow)	N/A
Cleaning—effectiveness	③
Disinfection—device durability	③
Instructions—completeness	② (indicates that 50 cm H <sub>2</sub> O pressure should be generated)
Instructions—ease of reading	Standard
Usability	
Ease of use/comfort	③
Dissassembly/reassembly	③
Device ergonomics	③

① Very good    ② Good    ③ OK    ④ Fair    ⑤ Poor

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This research was made possible in part by the generous support of the American people through the US Agency for International Development under the HealthTech program managed by PATH under Cooperative Agreement #GPH-A-00-01-00005-00. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the US Agency for International Development.

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