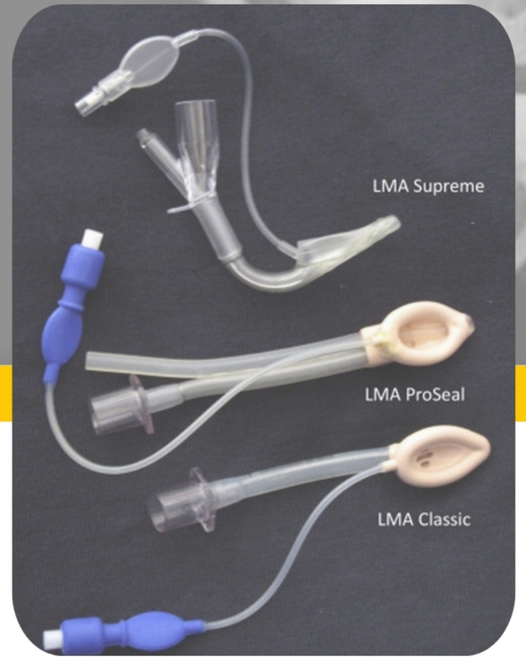

Laryngeal Mask Airway

NRP 9th Edition

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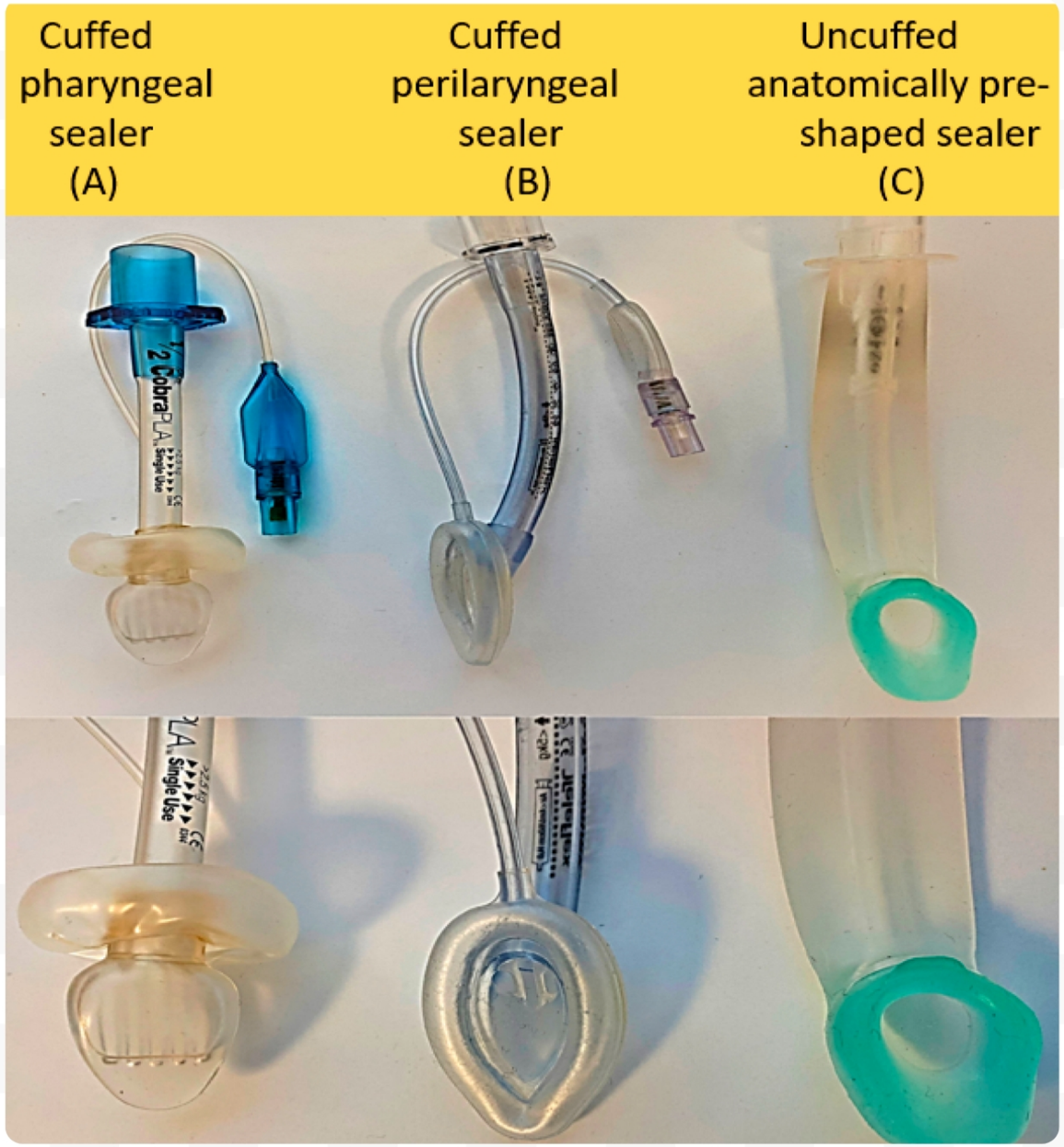
LMA Types



LAM Types

Cuffed Pharyngeal ealer(A)

Cuffed peripharyngeal sealer(B)

Uncuffed anatomically preshaped sealer(C)

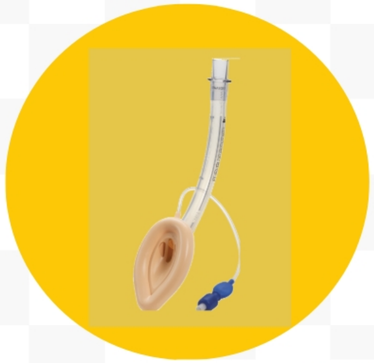
	NRP 8th	NRP 9th
Indication	alternative:"unable to intubate"	Reframe LMA earlier:"valid alternative to face mask"
Patient selection	less prescriptive about exact GA/weight cutoffs	Gives clearer statements that most LMA data apply to infants ≈≥34 weeks or ≥2.0 kg
Timing of Use	rescue after failed mask ventilation and failed intubation	may escalate to LMA sooner when effective mask ventilation cannot be achieved
Medication	Recommended airway epinephrine dosing and route focused on ETT while IV/IO access being established	LMA is fine for ventilation but not yet endorsed as a proven route for epinephrine
chest compressions	noted as usable during chest compressions if a secure airway is needed	LMA is an acceptable device during compressions , adds clarity about confirming adequate ventilation/$ETCO_2$ and monitoring

Evidence:LMA vs Face Mask

Study	Publication year	Design	Inclusion criteria	Sample size LM vs. FM	Outcome
Mathai et al.[39]	2014	Quasi-RCT	Infants with a GA of >36 wk with a BWt of >2 kg requiring PPV at birth (Infants with meconium-stained amniotic fluid or congenital anomalies were excluded)	32 vs. 35	The duration of PPV was shorter, and the risk of device failure (requiring endotracheal intubation) was lower in the LM group than in the FM group (duration of PPV; 95.31 sec vs. 180.86 sec, device failure; 5/32 vs. 12/35). The mortality rate was not different.
Trevisanuto et al.[25]	2015	RCT	Infants with a GA of ≥34 wk and/or a BWt of ≥1.5 kg requiring PPV at birth	71 vs. 71	LMA supreme vs. FM. The success rate of the devices (preventing endotracheal intubation) and Apgar score at 5 min were higher in the LMA group than in the FM group (success rate 91.5% vs. 78.9%).
Pejovic et al.[40]	2018	RCT	Infants with a GA of >34 wk, a BWt of >2 kg requiring PPV at birth (Infants with major malformations were excluded)	24 vs. 25	i-gel vs. FM, Time to spontaneous breathing was shorter in the LM group than in the FM group (153±59 sec vs. 216±92 sec). All resuscitations were effective in the LM group. Device failure was 11/25 in the FM group.
Pejovic et al.[13]	2020	RCT	Infants with a GA of ≥34 wk, or a BWt of ≥2 kg requiring PPV at birth	563 vs. 591	The mortality rate and incidence of moderate-to-severe HIE were similar between the LM group and the FM group. The LM was safe to be handled by midwives.
Qureshi and Kumar[10]	2018	SR	Infants with a GA of ≥34 wk, or a BWt of ≥1.5 kg requiring PPV at birth	661 (5 RCTs)	Resuscitation time and ventilation time were shorter in the LM group than in the FM group. The need for endotracheal intubation was lower in the LM group than in the FM group.
Yamada et al.[12]	2022	SR	Infants with a GA of ≥34 wk requiring PPV at birth	1,823 (6 RCTs)	The risk of device failure and endotracheal intubation were lower in the LM group than in the FM group (device failure; RR, 0.24; 95% CI, 0.17–0.36; *P*<0.001, endotracheal intubation; RR, 0.34; 95% CI, 0.20–0.56; *P*<0.001, respectively). The duration of PPV and time until heart rate reaches >100 beats per min was shorter in the LM group than in the FM group.
Diggikar et al.[11]	2023	SR	Infants with a GA of ≥34 wk, or a BWt of ≥1.5 kg or ≥2 kg requiring PPV at birth	946 vs. 907 (6 RCTs)	The risk of device failure and endotracheal intubation were lower in the LM group than in the FM group. The time to recover spontaneous breathing and ventilation time was shorter in the LM group than in the FM group. Mortality rate and moderate-to-severe HIE were not different.

LM, laryngeal mask; FM, face mask; RCT, randomized controlled trial; GA, gestational age; BWt, birth weight; PPV, positive-pressure ventilation; LMA, laryngeal mask airway; HIE, hypoxic-ischemic encephalopathy; SR, systematic review; RR, relative risk; CI, confidence interval.

LMA vs FM



Evidence: LMA vs ETT

Study	Publication year	Design	Inclusion criteria	Sample size LM vs. ETI	Outcome
Yang et al.[15]	2016	RCT	Infants with GA ≥34 wk, or BWt ≥2 kg with a heart rate <60 beats per minute despite FM for 30 sec (Infants with major malformations were excluded)	36 vs. 32	There were no significant differences in the first-attempt success rate (94.4% vs. 90.6%), insertion time (7.58±1.16 sec vs. 7.89±1.52 sec), Apgar score at 1 and 5 min, ventilation time, and successful resuscitation (86.1% vs. 96.9%) between the LMA and ETI groups.
El-Shimi et al.[41]	2018	RCT	Infants with GA ≥34 wk requiring resuscitation at birth	40 vs. 40	Oxygen saturation and Apgar score were significantly improved in the LMA group and the ETI group. The LMA can be used as an efficient and successful alternative to ETI in neonates >2 kg requiring resuscitation.
Qureshi and Kumar[10]	2018	SR	Infants with GA ≥34 wk, or BWt ≥1.5 kg	158 (3 RCTs)	There were no significant differences in the rate of unsuccessful insertion and insertion time between the LMA and ETI groups. Mortality rate and HIE did not differ.
Diggikar et al.[11]	2023	SR	Infants with GA ≥34 wk, or BWt ≥1.5 kg or ≥2 kg	81 vs. 77 3 RCTs)	There were no significant differences in the rate of unsuccessful insertion, orofacial soft tissue injury, and Apgar scores at 5 min between the LMA and ETI groups.

LM, laryngeal mask; ETI, endotracheal intubation; RCT, randomized controlled trial; GA, gestational age; BWt, birth weight; LMA, laryngeal mask airway; SR, systematic review; HIE, hypoxic-ischemic encephalopathy.

OVERVIEW

Indications

- **Primary** airway device (Alternative to face mask)
- **Secondary** airway device (Alternative to ETT)

High failure rate of ventilation
- ✓ Mask leak
- ✓ Airway obstruction
- ✓ Gastric inflation
- ✓ Trigeminal nerve stimulation

→ Trigemino-cardiac reflex

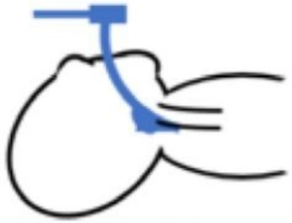
Ineffective during chest compressions
→Decreased tidal volume
→Decreased minute ventilation

Low failure rate of ventilation
- ✓ No gastric inflation

Effective during chest compressions

- ❖ Procedure: first-attempt success rate <50%
- ❖ Proper insertion skills, skilled neonatologists
- ❖ Need a longer time to insert
- ❖ Unsuccessful intubation attempts

→ Delayed and inadequate resuscitation



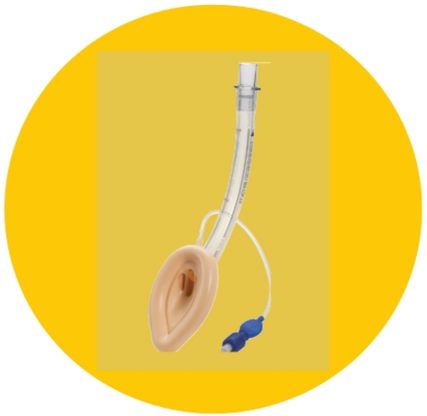
Laryngeal Mask

- ✓ Low failure rate of ventilation (Preventing endotracheal intubation)
- ✓ Effective during chest compressions

Alternative to face mask (Primary airway device)

- ✓ Procedure: simple and easy
- ✓ Healthcare providers can insert
- ✓ Preferred in emergencies
- ✓ Timely and proper resuscitation

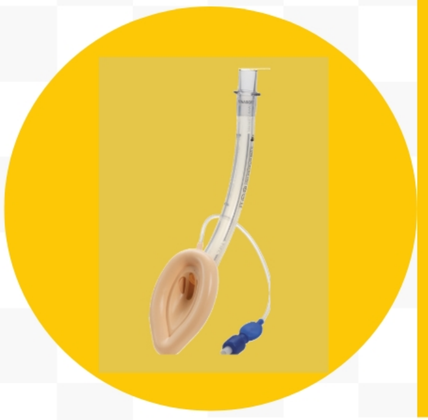
Alternative to endotracheal intubation (Secondary airway device)



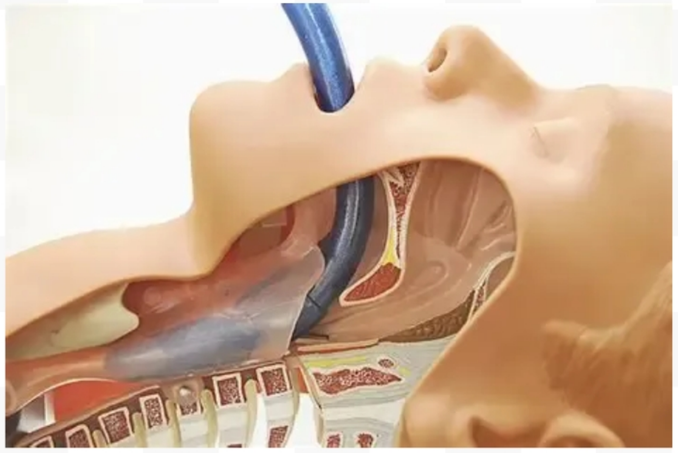
Q **Insufficient evidence in preterm neonates**
Gestational age <34 weeks or birth weight <1.5 kg

Why Use LMA

- Rapid airway access
- Minimal training
- Avoids laryngoscopy trauma
- Useful when mask leaks
- Hands-free ventilation seal
- A better seal than a mask
- Compatible with PEEP delivery
- Bridge to definitive airway
- Suction Possible with new devices
- Surfactant administration possible



Ventilation & Confirmation



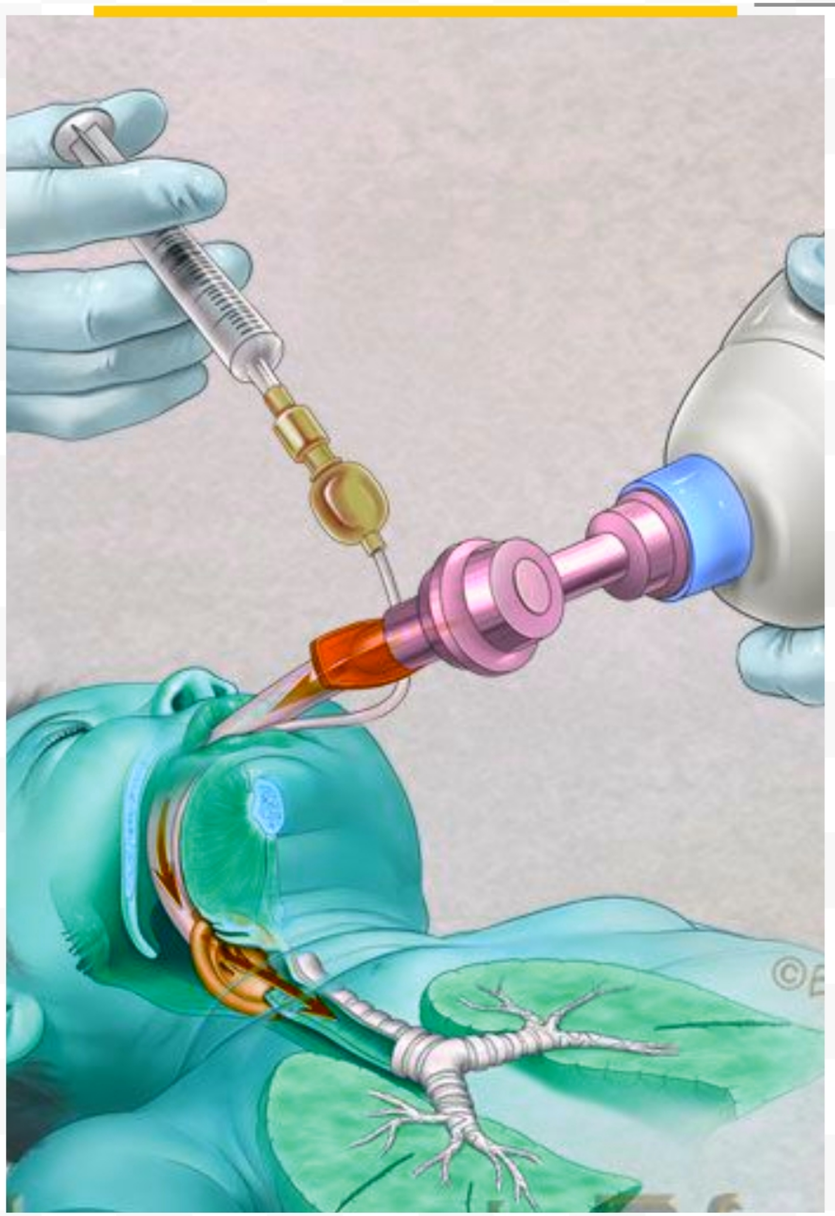
Detect exhaled CO2 within 8 to 10 breaths

Aim for visible chest rise promptly.

Hear equal breath sounds

Should not hear a large leak

should not see buldging in the infant's neck



Training & Safety

Program adoption for delivery units

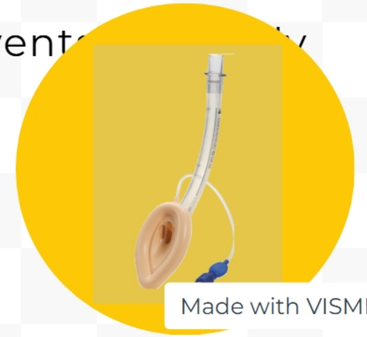
Practice with manikins before clinical use.

Phase 1

- Include LMA in NRP carts
- Conduct competency checkoffs

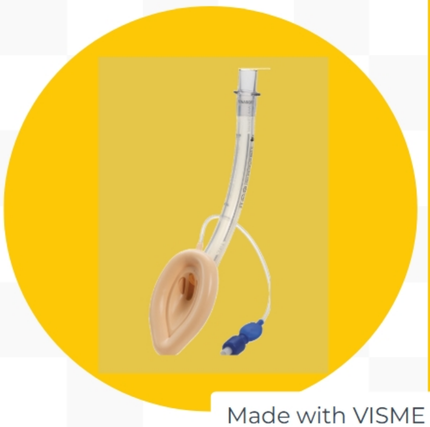
Phase 2

- Simulation drills quarterly
- Track performance metrics
- Review adverse event



TROUBLESHOOTING

- No chest rise: reposition
- Leak: add stabilization
- High resistance: deflate slightly
- Poor CO2: reseat device
- Gastric distension: lower pressure
- Secretions: brief suction
- Persistent failure: escalate airway

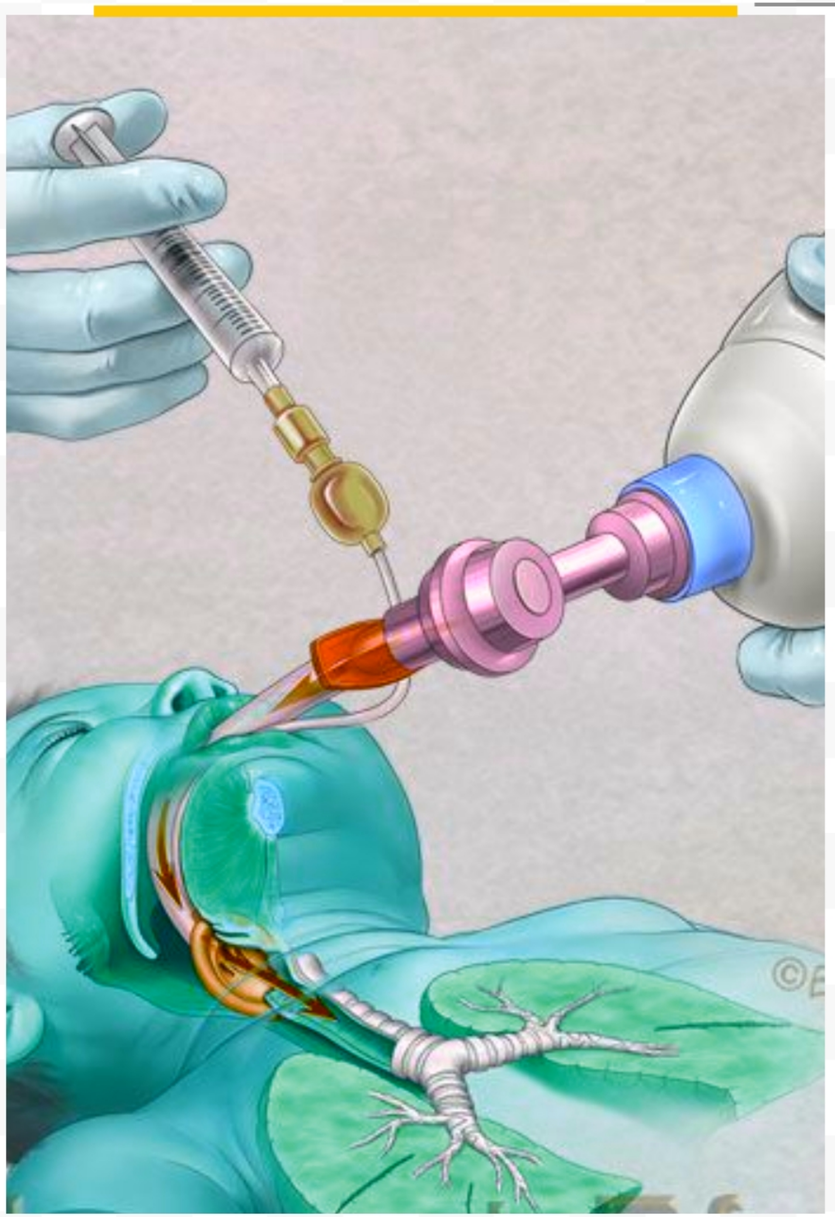


Limitations

According to a survey:

Only **12%** of respondents had ever placed a laryngeal mask

- **The most common barriers** to laryngeal mask use in neonates were **limited experience (81%)**
- **Insufficient training (59%)**
- **Preference for endotracheal tube (57%)**
- **Lack of awareness (56%)**



Training & Safety

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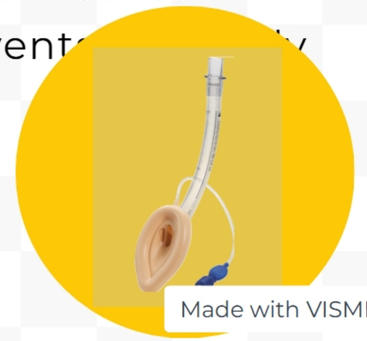

یازدهمین کنگره سلامت نوزادان ایران

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