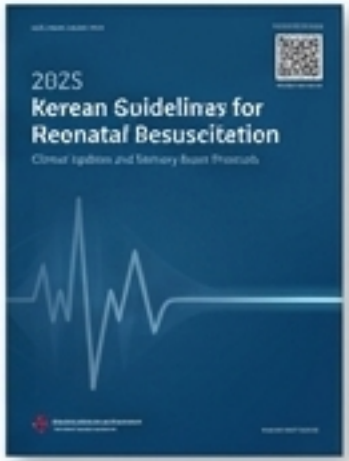


2025 Korean Guidelines for Neonatal Resuscitation

Clinical Updates and
Delivery Room Protocols

Based on the updated consensus by the
Korean Association of Cardiopulmonary Resuscitation



Target Population & Clinical Scope

The Patient Window



Target Population

Applicable during the entire neonatal period (0 to 28 days post-birth).

The Clinical Trigger



Clinical Trigger

Cardiovascular compromise primarily due to gas-exchange failure.



Exception: For primary cardiac arrests (e.g., post-cardiac surgery, arrhythmias), pediatric CPR guidelines apply instead.

The 2025 Delta: Executive Summary of Key Practice Shifts

Cord Management

Protocol

2020:
Insufficient
evidence

2025:
Deferred Cord
Clamping (≥ 60 s) for
vigorous infants; Intact
Umbilical Cord Milking
(I-UCM) for nonvigorous.

Airway

Protocol

2020:
Direct
laryngoscopy
standard

2025:
Video Laryngoscopy
conditionally recommended;
Supraglottic Airways
(SGA) endorsed as face
mask alternative.

Oxygen

Protocol

2020:
100% O₂ not
recommended

2025:
21% O₂ for ≥ 35 weeks;
 $\geq 30\%$ O₂ for < 32 weeks.
(100% harm rule
withdrawn).

Drugs & Care

Protocol

2020:
Not explicitly
addressed

2025:
Sodium Bicarbonate
explicitly banned.
Discontinuation threshold
moved to 20 minutes.

Phase 1: Preparation & Pre-Flight Checklist

1. Risk Prediction



Assess perinatal risk factors to determine required team size and expertise level.

2. Team Briefing



Designate a team leader. Share clinical info, assign specific roles, and provide anticipatory guidance.

3. Equipment Readiness



Standardize layout for human factors. Use cognitive aids and checklists to prevent malfunction delays.

T-Minus

0s

30s

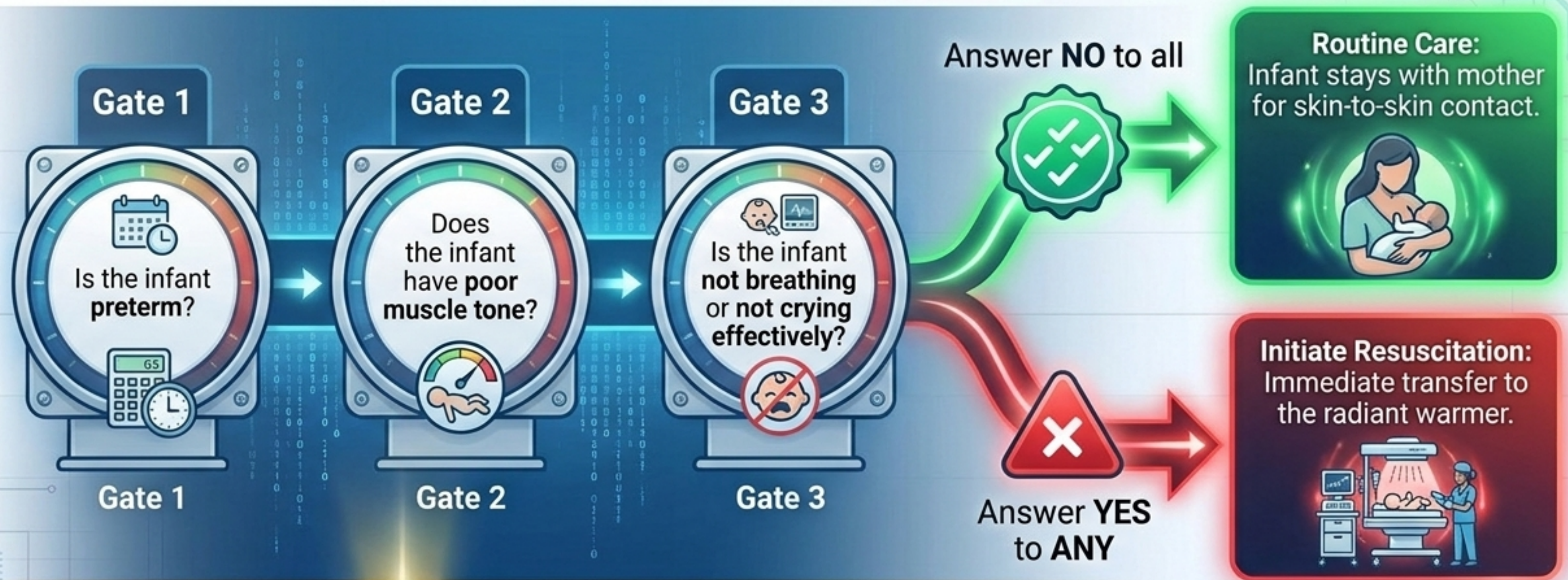
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20 mins

The Golden Timeline

Moment of Birth: The 3 Rapid Assessment Gates



Moment of Birth

0s

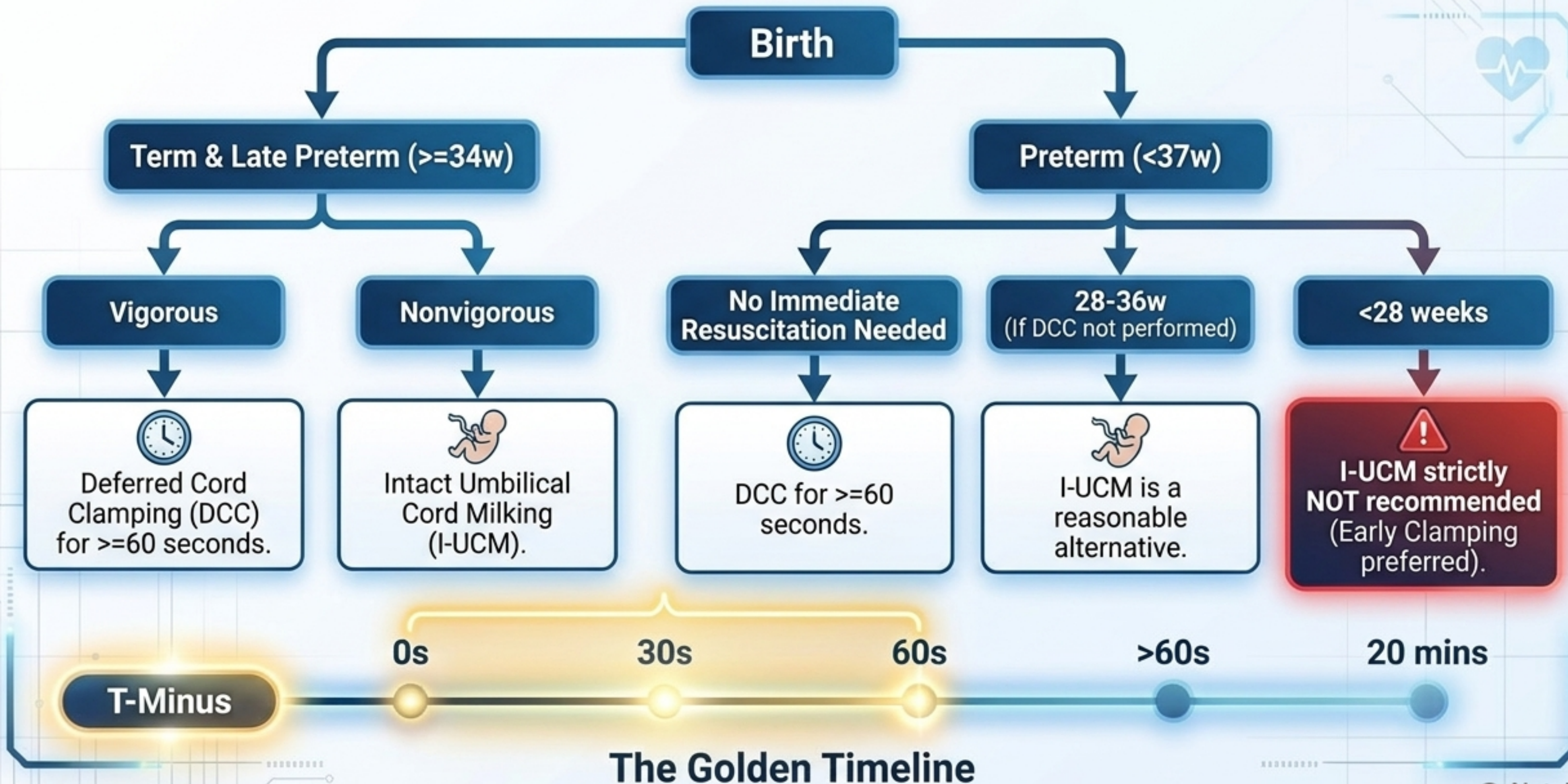
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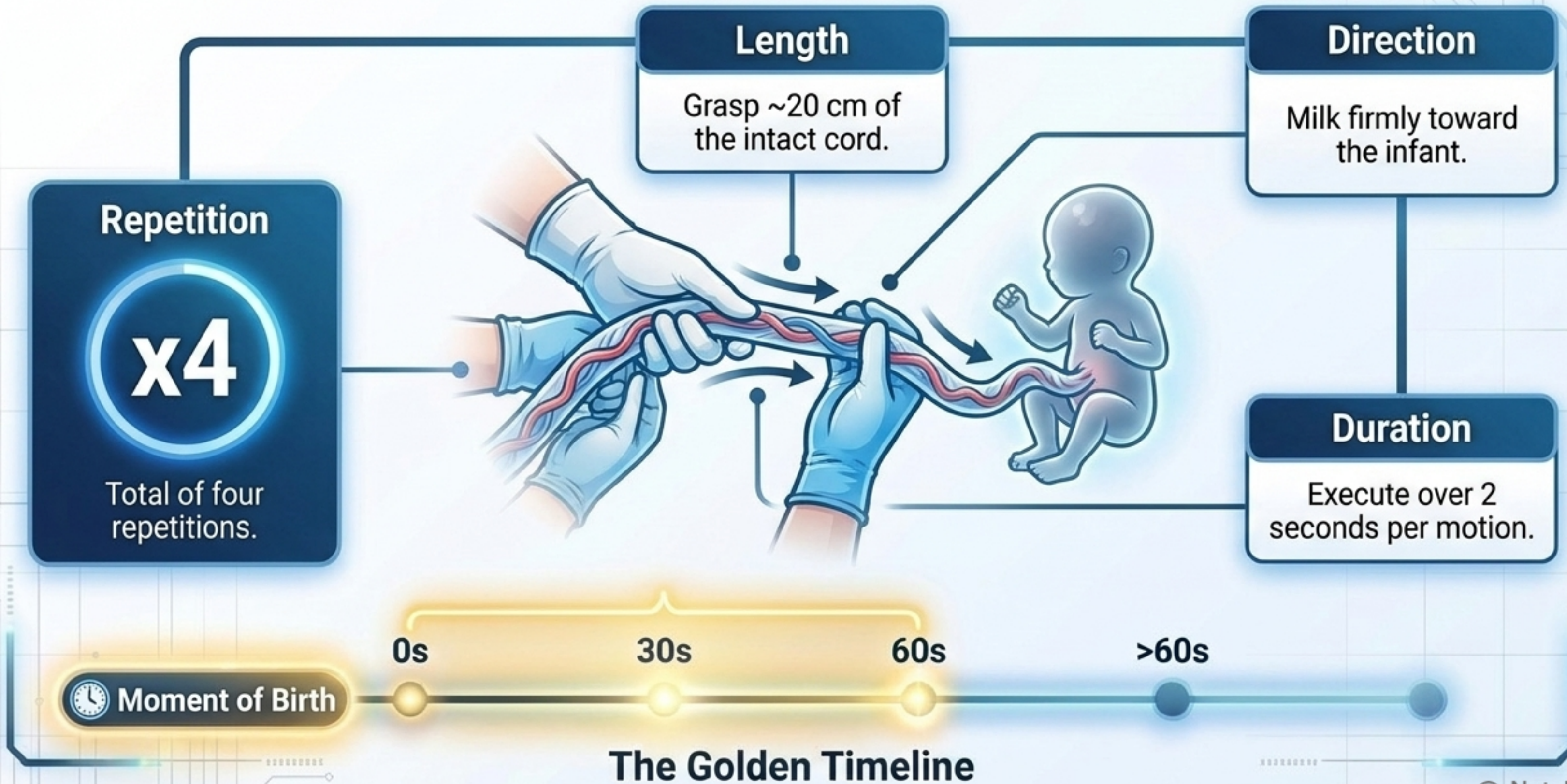
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The Golden Timeline

Umbilical Cord Management Rules



Technique: Intact Umbilical Cord Milking (I-UCM)



The Golden Minute: Initial Steps



The Golden Timeline

Thermal Management Strategies



Term / Late Preterm ($\geq 34w$)

Delivery room maintained at ~ 23 C.

Use radiant warmer if resuscitating.

Initiate skin-to-skin contact if stable.



Preterm ($< 34w$)

High risk of hypothermia.
Requires combined strategies.

Delivery room ≥ 23 C.

Apply plastic bag/wrap + hat immediately.

Consider thermal mattress.



WARNING: Rewarming of unintended hypothermia requires continuous monitoring and serial blood glucose checks, regardless of the rewarming rate.

0s

30s

60s

$>60s$

The Golden Timeline

Hierarchy of Heart Rate Assessment Tools



The Golden Timeline

The 60-Second Threshold: Positive Pressure Ventilation

TRIGGER MET IF:

Heart Rate is $< 100/\text{min}$

OR

Infant is apneic or gasping at 60 seconds.

Initiate Positive Pressure Ventilation (PPV) immediately.

Rate

30 to 60 breaths per minute.

Initial Inflation

0.5 to 1.0 second.

PIP

20 to 30 cm H₂O
(adjust for chest movement).



WARNING: Avoid excessive peak inspiratory pressures to prevent overdistension and lung injury.

0s

30s

60s

>60s

The Golden Timeline

Oxygen Titration: The Target SpO₂ Staircase

Starting Parameters (Time 0)

>=35 weeks:
Start at 21% O₂.

<32 weeks:
Start at >=30% O₂.

32-34 weeks: Titrate 21-30%
based on response.



0s

30s

60s

>60s

The Golden Timeline

Indications for CPAP versus PPV

**Spontaneous Breathing
+ Respiratory Distress**

Preterm Infants: CPAP is preferred over intubation and PPV as initial support.

Term / Late Preterm ($\geq 34w$): Routine CPAP is NOT suggested in the delivery room.

**Ineffective Breathing OR
Heart Rate $< 100/\text{min}$**

All Ages: PPV is immediately required.

PEEP: ≥ 5 cm H₂O suggested for preterm infants (insufficient evidence for term).

Sustained Inflation: ($\geq 5s$) is NOT recommended for preterm infants.

0s

30s

60s

$>60s$

The Golden Timeline

Airway Device Comparison Matrix

Device	Indication	Key 2025 Notes
T-Piece Resuscitator	Preferred over self-inflating bags for providing PPV (ensures consistent PEEP).	A backup self-inflating bag must always be present.
Supraglottic Airway (SGA)	Indicated for ≥ 34 w infants as an alternative to a face mask or failed intubation.	Reasonable to use during chest compressions if intubation fails.
Endotracheal Intubation	Required if Heart Rate remains < 60 /min after 30 seconds of effective PPV.	Required for advanced resuscitation preparation.



2025 Guideline Shift: Endotracheal Intubation



Video Laryngoscopy

2025 Preference. Recommended over direct laryngoscopy when resources permit, especially for less experienced providers. Supported by high certainty of evidence.



Direct Laryngoscopy

Conventional option. Reasonable, but requires higher operator experience. Must remain available as a backup device.

0s

30s

60s

>60s

The Golden Timeline

Triggering Advanced Resuscitation

THE CRITICAL TRIGGER

Heart Rate remains $< 60/\text{min}$ after at least 30 seconds of effective PPV.

1. Perform Endotracheal Intubation.

2. Increase Oxygen to 100%.

3. Initiate Chest Compressions.

4. Consider emergency Umbilical Venous Catheter (UVC).

0s

30s

60s

HR < 60

$> 60\text{s}$

The Golden Timeline

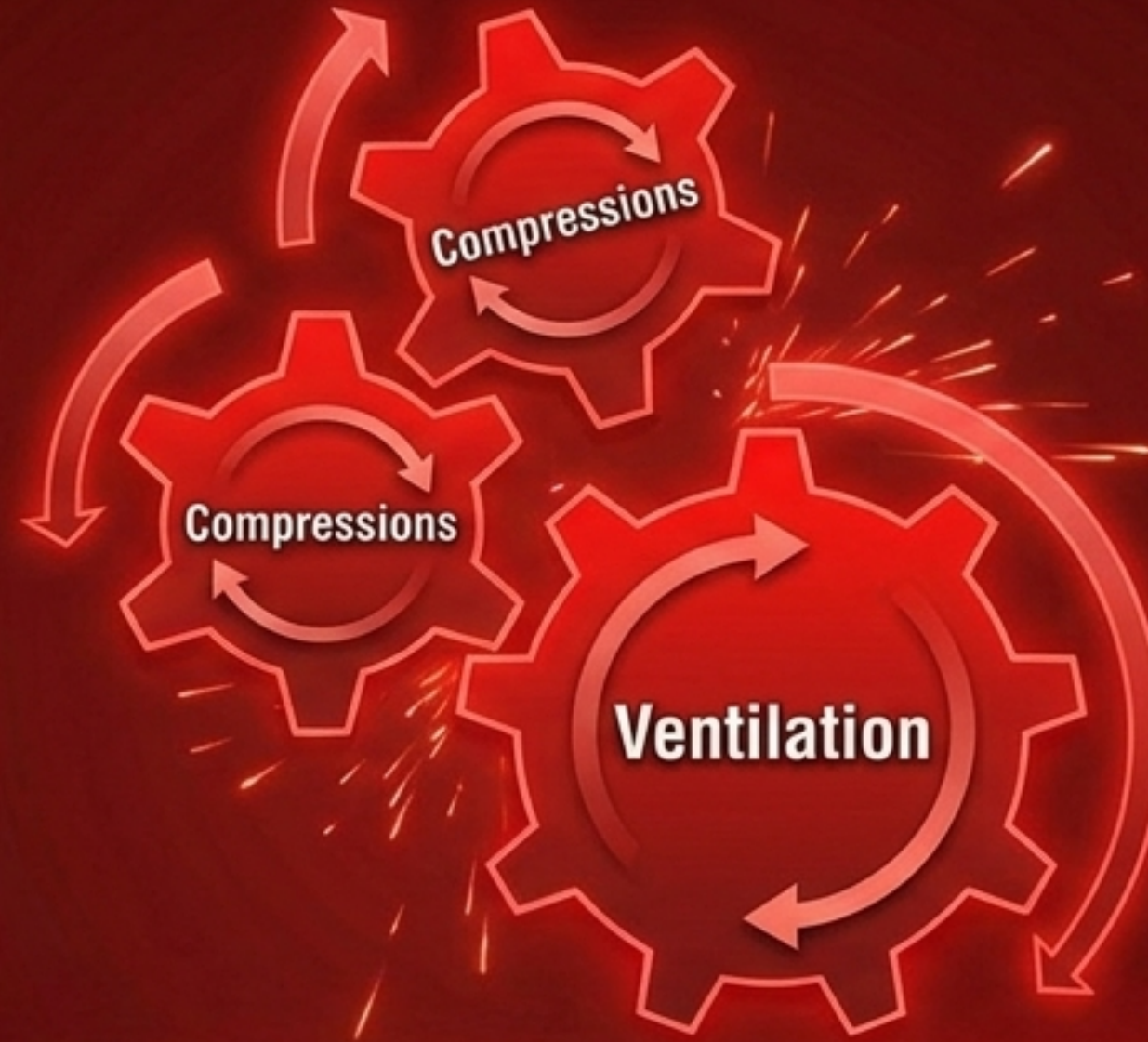
Mechanics of CPR: The 3:1 Compression Engine

Ratio

3 Compressions to
1 Ventilation.

Technique

2-thumb encircling hands
preferred over 2-finger
method (yields better
depth and less fatigue).



Pace

90 compressions and
30 ventilations per minute
(120 events/min).

Depth

~1/3 of the AP diameter
of the chest. Ensure full
chest wall recoil.

HR < 60

0s

30s

60s

>60s

The Golden Timeline

Establishing Emergency Vascular Access

Primary Route: UVC



Umbilical Venous Catheter (UVC).

First-line method in the delivery room for rapid intravascular access during advanced resuscitation.

Secondary Route: IO



Intraosseous (IO) Access.

Recommended alternative if UVC is difficult or fails. Note: Outside the delivery room, UVC and IO are considered equally viable.

HR < 60

0s

30s

60s

>60s

The Golden Timeline

Pharmacological Dashboard: Epinephrine

DRUG: EPINEPHRINE (1:10,000)

Intravascular (IV/IO) Dose

0.01 to 0.03 mg/kg.
Repeat every 3-5 minutes.

Endotracheal (ET) Dose

0.05 to 0.1 mg/kg.
Note: Only use while awaiting IV access.
Administer IV dose as soon as access is gained, regardless of the previous ET interval.



CRITICAL ACTION: EVERY IV/IO dose of Epinephrine must be followed immediately by a 3-mL normal saline flush.

0s

30s

60s

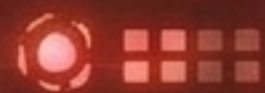
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HR < 60

The Golden Timeline

Volume Expansion & The Bicarbonate Ban

Volume Expansion



Administer crystalloid or packed RBCs at 10 to 20 mL/kg.

Indicated for suspected or confirmed blood loss. Consider a trial of volume expansion in unresponsive infants even without apparent blood loss (to treat occult blood loss).



Sodium Bicarbonate

Not recommended during brief or prolonged CPR, even when adequate ventilation has been established and there is no response to other therapies.

0s

30s

60s

>60s

HR < 60

The Golden Timeline

Phase 5: Post-Resuscitation Care

Blood Glucose Management



Both hypoglycemia and hyperglycemia increase brain injury risk.

Action: Measure ASAP post-resuscitation.

High-Risk Groups: Preterm, CPR recipients, Epinephrine recipients, HIE patients.

Therapeutic Hypothermia



Indicated for infants ≥ 36 weeks with moderate to severe Hypoxic-Ischemic Encephalopathy (HIE).

Action: Initiate according to strict protocols; requires transfer to centers capable of multi-disciplinary care.

0s

30s

60s

>60s

Post-Care

HR > 100

The Golden Timeline