ILCOR Consensus on the Science of Resuscitation With Treatment Recommendations (CoSTR) – what are we looking at next?

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Professor of Pediatrics
UT Southwestern Medical Center at Dallas
- I have nothing to disclose
- No financial relationships with industry
Greetings from Dallas, Texas
Achieving Consensus on Resuscitation Science

- Since 2000, a Neonatal Task Force has participated with the International Liaison Committee on Resuscitation (ILCOR) for complete review of newborn resuscitation science every 5 years.

- 23 questions reviewed for the 2015 Neonatal Resuscitation Guidelines
ILCOR Evaluation Process Brings New Resuscitation Science Forward for Review

- Identify and prioritize the questions that need scientific review and assign reviewers (2-3 per question)
- Minimum requirements for every search strategy are specified and done by professional librarians
  - Medline, Embase, and Cochrane Systematic Reviews
  - Hand searches
- Every reviewer rates the level and quality of evidence using a standardized evidence evaluation (GRADE system)
- Consensus for each question reached by entire Neonatal Task Force in Feb 2015
ILCOR Guidelines for Neonatal Resuscitation

- New ILCOR Consensus on Science with Treatment Recommendations (CoSTR) document available online since October 15, 2015
- CoSTR co-published in Circulation, Resuscitation and Pediatrics
- Download at: www.heart.org/cpr
Achieving Consensus on Resuscitation Science

- The various resuscitation councils then take the ILCOR CoSTR document and adapt/develop their own guidelines appropriate for their own region or country using the science in CoSTR.
  - ERC
  - AHA/AAP for the USA
  - ANZCOR
  - Brazil
  - Etc.
At all stages ask: do you need help?

Newborn Life Support

- Term gestation? Breathing or crying? Good tone?
  - NO: Maintain normal temperature, Ensure open airway, Stimulate
  - YES: Positive pressure ventilation, SpO₂ monitoring

- HR below 100?
  - NO: Laboured breathing or persistent cyanosis?
    - YES: Ensure open airway, SpO₂ monitoring, Consider CPAP
    - NO: Post-resuscitation care
      - Targeted pre-ductal SpO₂ after birth:
        - 1 min: 60-70%
        - 2 min: 65-85%
        - 3 min: 70-90%
        - 4 min: 75-90%
        - 5 min: 80-90%
        - 10 min: 85-90%

- HR below 60?
  - YES: Three chest compressions to each breath, 100% oxygen, Intubation or laryngeal mask, Venous access

- HR below 60?
  - YES: IV Adrenaline, Consider volume expansion
AHA/AAP
Neonatal Resuscitation
Guidelines

- New USA/Canadian guidelines available since October 15, 2015

Circulation

Part 13: Neonatal Resuscitation
2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care

Myra H. Wyckoff. Chair; Khalid Aziz; Marilyn B. Escobedo; Vishal S. Kapadia; John Kattwinkel; Jeffrey M. Perlman; Wendy M. Simon; Gary M. Weiner; Jeanette G. Zaichkin
Neonatal Resuscitation Program Guidelines

- AAP NRP Steering Committee uses the US guidelines to develop the educational program for neonatal resuscitation (NRP)
- 7th edition NRP available May 1, 2016
- New guidelines should be adopted in the USA by Jan. 1, 2017
Immediately Time to Start the Process Again!

- Neonatal resuscitation science is rapidly advancing
- New clinical questions arise
- Still parts of the algorithm that have not undergone rigorous scientific review
New ILCOR Neonatal Life Support (NLS) Task Force Created

- Application process with CV, ILCOR experience, letters of support (from Regional or Country Resuscitation Councils)
  - A couple of spots reserved for early career folks

- 17 official task force members selected from across the world
  - Helen Liley, MD South Brisbane, Queensland (ANZCOR)
  - Lindsay Mildenhall, MD Middlemore, Auckland (ANZCOR)
Larger Working Group of Neonatal Resuscitation Content Experts

- Pool of 60 folks involved in resuscitation research, guidelines development and educational/implementation programs that volunteer to help with the NLS systematic reviews and help debate the science

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<tr>
<th>Name</th>
<th>Institution</th>
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<tr>
<td>Jennifer Dawson</td>
<td>Royal Women’s Hospital, Melbourne</td>
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<tr>
<td>Omar Kamlin</td>
<td>Royal Women's Hospital, Victoria</td>
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<tr>
<td>Marta Thio</td>
<td>Royal Women's Hospital, Victoria</td>
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<td>Chris McKinlay</td>
<td>University of Auckland</td>
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<td>Peter Davis</td>
<td>The Royal Women's Hospital, Melbourne</td>
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<td>Georg Schmolzer</td>
<td>University of Alberta, Edmonton</td>
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<td>Arjan Te Pas</td>
<td>Leiden University Medical Medical Centre</td>
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<tr>
<td>Colm O'Donnell</td>
<td>National Maternity Hospital, Dublin</td>
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Ask An Answerable Question

- Development of clear, important questions for which to search for evidence is paramount

- PICO format
  - Patient (the exact population)
  - Intervention (usually experimental group)
  - Comparator (usually the usual practice or a placebo)
  - Outcome (impact on what)
Initial Assessment and Intervention
- Meconium suctioning of the non-vigorous infants
- Umbilical Cord Clamping for non-vigorous infants
- Umbilical Cord Milking

Supportive Therapy
- Warming Adjuncts
- Impact of Maternal Temp
- Impact of Hypothermia
- Impact of Hyperthermia

Ventilation/O₂ Strategies
- PEEP vs no PEEP
- Sustained Inflation
- O₂ use for preterms

Monitoring During and After Intubation
- Bradycardia and CO₂ monitoring
- CO₂ detection
- Respiratory Mechanics Monitors

Teaching Resuscitation
- Frequency of training
- Impact of debriefing on team performance

Circulatory Support
- Compression/Vent ratios
- Asynchrony
- 2 Thumb vs 2 Finger CPR
- O₂ use during CPR

Post-resuscitation Management
- Hypothermia (induced) in Both resourced and resource-limited areas

Withholding or Stopping Resuscitation Efforts
- Apgar score of 0 at 10 minutes
Task Force Categorization of all prior PICO\(\text{s}\) and New PICO\(\text{s}\)

- **92 NLS PICO\(\text{s}\)**
  - 29 retire
  - 41 repose
  - 15 revisit
  - 7 reassign
Goal of increased transparency and increased public engagement

- Public Comment for 2 weeks after NLS posted the plan for PICO questions
- Request with link sent to Perinatal Society of Australia and NZ and to the Australia New Zealand Neonatal Network
- www.ilcor.org

Public Endorsement

- 87% (71/82)
- 3 questions changed category based on public comment
- Several where wording was influenced
Scanning the Literature to Know When to Start a Systematic Review

Cardiac arrest OR resuscitation all Age Groups
BMJ Alerts-Resuscitation Plus

- The CEE WG in conjunction with BMJ and AHA arranged for an ILCOR environmental scan of the resuscitation and first aid science literature.

- It can be used by anyone-open to the public.

To sign up go to
https://plus.mcmaster.ca/ResusPlus or go to www.ilcor.org
<table>
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<th>Rank</th>
<th>PICOs</th>
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<tr>
<td>#10</td>
<td>LISA/INSURE Versus Mech Vent with Surf</td>
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In spontaneously breathing preterm infants with respiratory distress requiring respiratory support in the delivery room or during the stabilization shortly after birth (P), does surfactant administration avoiding prolonged ventilation via INSURE or compared with mechanical ventilation with traditional surfactant (C), change outcome?

Photo credit: Aquar et al. NeoReviews 15 (7) e275e285
Hypovolemia (risk factors for newborns)  

In newborn babies in need of resuscitation (P) what risk factors predict that volume infusion may improve outcome (O) (increase heart rate, improve survival or morbidity)?
| #8 | Oxygen for resuscitating term newborns | For term newborns receiving resuscitation (P) does increased FiO2 as a starting concentration (I) vs air (C) improve outcome (O)? |
| #7 | HiFlow NC | In spontaneously breathing infants (preterm or term) with respiratory distress requiring respiratory support in the delivery room (P), does the use of HiFlow NC or CPAP (I), compared with intubation and IPPV (C), change outcome (eg overall mortality, Bronchopulmonary dysplasia, air leak, retinopathy of prematurity, necrotizing enterocolitis, brain injury) (O)?
| Adrenaline/Epinephrine dose | Among neonates who have no detectable cardiac output or have asystole or sustained bradycardia (P), does any other dose or interval of epinephrine or alternative vasopressor (I), compared with standard dose epinephrine (C), change short or long term outcomes (O)? |

#6
TOP 10 NLS PICOs

In spontaneously breathing preterm infants with respiratory distress requiring respiratory support in the delivery room or during the stabilization shortly after birth (P), does surfactant administration avoiding prolonged ventilation via INSURE or LISA (I), compared with CPAP alone (C), change outcome?

Photo credit: Aquar et al. NeoReviews 15 (7) e275e285
TOP 10 NLS PICOs

For non-vigorous infants at birth born through meconium-stained amniotic fluid (P), does tracheal intubation for suctioning (I), compared with no tracheal intubation (C), reduce morbidities and/or mortality (O)?
TOP 10 NLS PICOs

Cord Milking

- In newborns (P) does cord milking (I) vs delayed cord clamping (C) improve short and long term outcomes (O)?

Timing of Cord Clamping

- In newborns (P) does clamping the cord after the establishment of breathing (I) vs a set time after birth (C) improve short and long term outcomes (O)?
The #1 PICO???

Oxygen concentration for resuscitating premature newborns

Among preterm newborns who receive positive pressure ventilation in the delivery room (P), does lower initial oxygen (I), compared with higher initial high oxygen (C), change improve survival (O)?
Next Steps

- Systematic Review of each priority PICO by 2-3 Neonatal Resuscitation Content Experts with help of expert systematic reviewer or information systems group depending on complexity of question

- Task Force will write consensus on science and treatment recommendation for each PICO
  - Public Comment will be sought to better understand publics values and preferences
For future Neonatal Resuscitation Guidelines, one thing will NOT change…

“Ventilation of the lungs is the single most important and most effective step in resuscitation of the compromised newborn.”
ILCOR Wants Your Input

2015 ILCOR CoSTR
http://circ.ahajournals.org/content/132/16_suppl_1/S204.full.pdf+html

2015 USA Guidelines
http://pediatrics.aappublications.org/content/136/Supplement_2/S196

ILCOR Public Comment Link
www.ilcor.org