How Research has changed my practice in the Past five years

Ganesh Srinivasan MD DM FAAP
Director, Neonatal-Perinatal Medicine Residency Program
University of Manitoba
No Conflicts to Disclose: “Truth is God” - M.K Gandhi
• Edge of Viability
• Delayed cord clamping
• Oxygen- Resuscitation
• Oxygen during NICU stay – low or high
• CPAP vs Intubation and surfactant
• Caffeine
• Antibiotic use and abuse
• Retinopathy of Prematurity
• PDA ligation ( Not!)
• Hypothermia for HIE
• Neuromonitoring

Less is More
Between-Hospital Variation in Treatment and Outcomes in Extremely Preterm Infants

Rates of Active Treatment by Gestational Age at Birth
Hospital Rates of Risk-Adjusted Outcomes and Active Treatment by Gestational Age at Birth

Differences in hospital practices regarding the initiation of active treatment in infants born at 22, 23, or 24 weeks of gestation explain some of the between-hospital variation in survival and survival without impairment among such patients.
Gestational age specific mortality or significant morbidity (six morbidities)

<table>
<thead>
<tr>
<th>GA</th>
<th>Number of neonates</th>
<th>Number survived (%)</th>
<th>Number of neonates discharged home directly from network sites</th>
<th>Number (%) without any of the six morbidities</th>
<th>Number (%) with any one morbidity prior to discharge</th>
<th>Number (%) with any two morbidities prior to discharge</th>
<th>Number (%) with any three morbidities prior to discharge</th>
<th>Number (%) with any four morbidities prior to discharge</th>
<th>Number (%) with any five morbidities prior to discharge</th>
<th>Number (%) with all six morbidities prior to discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;24</td>
<td>92</td>
<td>43 (47)</td>
<td>16</td>
<td>1 (6)</td>
<td>4 (25)</td>
<td>4 (25)</td>
<td>3 (19)</td>
<td>2 (13)</td>
<td>2 (13)</td>
<td>0</td>
</tr>
<tr>
<td>24</td>
<td>197</td>
<td>133 (68)</td>
<td>56</td>
<td>7 (13)</td>
<td>19 (34)</td>
<td>17 (30)</td>
<td>10 (18)</td>
<td>3 (5)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>25</td>
<td>247</td>
<td>195 (79)</td>
<td>76</td>
<td>15 (20)</td>
<td>26 (34)</td>
<td>18 (24)</td>
<td>13 (17)</td>
<td>4 (5)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>26</td>
<td>267</td>
<td>228 (85)</td>
<td>92</td>
<td>29 (32)</td>
<td>37 (40)</td>
<td>17 (18)</td>
<td>9 (10)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Morbidity were counted as score of one for each of the following:

i. IVH grade 3 or 4 or PVL
ii. Stage 3 or higher ROP
iii. Oxygen use at 36 weeks or at discharge if earlier
iv. Culture proven early onset or late onset sepsis
v. Stage 2 or 3 NEC
vi. PDA requiring surgical ligation
In Winnipeg

<table>
<thead>
<tr>
<th>Site</th>
<th>FY11-12</th>
<th>FY12-13</th>
<th>FY13-14</th>
<th>FY14-15</th>
<th>FY15-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSC</td>
<td>1/10 (10%)</td>
<td>0/4</td>
<td>0/8</td>
<td>0/7</td>
<td>-</td>
</tr>
<tr>
<td>23 weeks</td>
<td>1/5 (20%)</td>
<td>2/5 (40%)</td>
<td>2/6 (33%)</td>
<td>1/3 (33%)</td>
<td>3/4 (75%)</td>
</tr>
<tr>
<td>24 weeks</td>
<td>2/2</td>
<td>1/2 (50%)</td>
<td>0</td>
<td>1/1</td>
<td>3/5 (60%)</td>
</tr>
<tr>
<td>St. B</td>
<td>23 weeks</td>
<td>0</td>
<td>1/2 (50%)</td>
<td>1/3 (66%)</td>
<td>2/4 (50%)</td>
</tr>
<tr>
<td>24 weeks</td>
<td>0</td>
<td>1/2 (50%)</td>
<td>1/3 (66%)</td>
<td>2/4 (50%)</td>
<td>3/5 (60%)</td>
</tr>
</tbody>
</table>
Deciding to Forgo LST

Very clearly futile

Unclear

Very clearly beneficial

Do not Provide, even if parents request

Parental discretion

Morally obligatory to provide, even if parents refuse

Warady and Lantos 2013
Meet Mac

One of the youngest babies ever born at St. Boniface Hospital

Mac Gross, nine weeks old, cuddles with his mom, Tiffany Gross.

BY HOLLI MONCRIEFF
Winnipeg Health Region
Wave, May / June 2015

Tiffany Gross lies back on her anti-gravity chair and gently wraps her arms around the tiny infant lying on her chest.

Her son, Mac, was prematurely born on February 9 at 22 weeks and six days gestation - about four months before term. Weighing in at just 630 grams (21 ounces), Mac is the youngest surviving premature baby born at St. Boniface Hospital.
'Nathan was born at 23 weeks. If I'd known then what I do now, I'd have wanted him to die in my arms'

Alexia Pearce adores her 'gorgeous' three-year-old son, yet she is aware that his life - a life blighted by cerebral palsy and chronic lung disease - is unlikely to last long into his teens. In this moving account, she asks: are we always right to save premature babies?
Canadian pediatricians recommend letting 22-week-old preemies die. Should doctors try to save the tiny newborns?
Effects of placental transfusion in extremely low birthweight infants: meta-analysis of long- and short-term outcomes

Sarvin Ghavam,1 Dushyant Batra,2 Judith Mercer,3,4 Amir Kugelman,5 Shigeharu Hosono,6 William Oh4, Heike Rabe,7 and Haresh Kirpalani1,8
**TABLE 1. Short-term outcomes of umbilical transfusion strategies**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number of infants</th>
<th>Mean difference</th>
<th>95% CI</th>
<th>p value for overall effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb on admission</td>
<td>137</td>
<td>3.42</td>
<td>3.11 to 3.74</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>RBC transfusion requirement</td>
<td>149</td>
<td>-2.22</td>
<td>-2.52 to -1.92</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Admission blood pressure</td>
<td>113</td>
<td>4.9</td>
<td>4.22 to 5.58</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Days of mechanical ventilation</td>
<td>136</td>
<td>-3.92</td>
<td>-9.75 to 1.92</td>
<td>0.15</td>
</tr>
<tr>
<td>IVH</td>
<td>OR</td>
<td>0.56</td>
<td>0.29 to 1.29</td>
<td>0.08</td>
</tr>
<tr>
<td>Episodes of late onset sepsis</td>
<td>154</td>
<td>0.39</td>
<td>0.18 to 0.81</td>
<td>0.01</td>
</tr>
</tbody>
</table>

**Short Term Outcomes**

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Total</th>
<th>Weighted mean difference</th>
<th>Weighted mean difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ICC</td>
<td>DUCC</td>
<td>IV, Fixed (95% CI)</td>
</tr>
<tr>
<td>Number of blood transfusion</td>
<td>79</td>
<td>70</td>
<td>2.22 (2.52, 1.92)</td>
</tr>
<tr>
<td>Hb on admission</td>
<td>70</td>
<td>67</td>
<td>3.43 (3.11, 3.74)</td>
</tr>
<tr>
<td>Number of days on ventilator</td>
<td>72</td>
<td>64</td>
<td>3.92 (-1.92, 9.75)</td>
</tr>
</tbody>
</table>
### Neurodevelopmental Outcomes

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>DUCC Events</th>
<th>DUCC Total</th>
<th>ICC Events</th>
<th>ICC Total</th>
<th>Weight (%)</th>
<th>OR M-H, Fixed (95% CI)</th>
<th>OR M-H, Fixed (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDI&lt;70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mercer 2010&lt;sup&gt;22&lt;/sup&gt;</td>
<td>1</td>
<td>27</td>
<td>5</td>
<td>27</td>
<td>76.2</td>
<td>0.17 (0.02, 1.56)</td>
<td></td>
</tr>
<tr>
<td>Oh 2011&lt;sup&gt;24&lt;/sup&gt;</td>
<td>4</td>
<td>8</td>
<td>3</td>
<td>8</td>
<td>23.8</td>
<td>1.67 (0.23, 12.22)</td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>5</td>
<td>35</td>
<td>35</td>
<td>100</td>
<td></td>
<td>0.52 (0.14, 1.98)</td>
<td></td>
</tr>
<tr>
<td>Total Events</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Chi^2=2.29 P=0.13 I^2=56%
Test for overall effect: Z=0.95 (p=0.34)

<table>
<thead>
<tr>
<th>Tumor-In magnesium</th>
<th>UCM Events</th>
<th>UCM Total</th>
<th>UCC Events</th>
<th>UCC Total</th>
<th>Weight (%)</th>
<th>OR M-H, Fixed (95% CI)</th>
<th>OR M-H, Fixed (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hosono 2008&lt;sup&gt;7&lt;/sup&gt;</td>
<td>3</td>
<td>13</td>
<td>4</td>
<td>13</td>
<td>100</td>
<td>0.68 (0.12, 3.87)</td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>100</td>
<td></td>
<td>0.68 (0.12, 3.87)</td>
<td></td>
</tr>
</tbody>
</table>

Test for overall effect Z=0.44 (P=0.66)
2012 WHO guidelines on basic newborn resuscitation

• In newly born term or preterm babies who do not require positive-pressure ventilation, the cord should not be clamped earlier than 1 min after birth (*strong recommendation*).

• When newly born term or preterm babies require positive-pressure ventilation, the cord should be clamped and cut to allow effective ventilation to be performed (*conditional recommendation*).

• Newly born babies who do not breathe spontaneously after thorough drying should be stimulated by rubbing the back 2–3 times before clamping the cord and initiating positive-pressure ventilation (*conditional recommendation*).
Effect of Delayed Cord Clamping on Neurodevelopment at 4 Years of Age: A Randomized Clinical Trial

Ola Andersson, MD, PhD1; Barbro Lindquist, PhD2; Magnus Lindgren, PhD3; Karin Stjernqvist, PhD3; Magnus Domellöf, MD, PhD4; Lena Hellström-Westas, MD, PhD2

Oxygen in the Delivery room

“Oxygen is a dangerous drug” - Dr. S F Irani (1994 KEM, Mumbai, NICU rounds)
Resuscitation 95 (2015) 249–263

Resuscitation

European Resuscitation Council Guidelines for Resuscitation 2015
Section 7. Resuscitation and support of transition of babies at birth

Jonathan Wyllie a,*, Jos Bruinenberg b, Charles Christoph Roehr a,*, Mario Rüdiger c,
Daniele Trevisanuto d, Berndt Urlesberger e

a Department of Resuscitation, Ulster Civil Trust Hospital, Aldergrove, UK
b Department of Pediatrics, St. Elisabeth Hospital, Tilburg, The Netherlands
c Department of Women and Children’s Health, Turku University, Aueran Hospital of Finland, Turku, Finland
d Department of Anesthesiology, Charité-Universitätsmedizin, Berlin, Germany

e Department of Anesthesia, John Radcliffe Hospital, Oxford University Hospitals, Oxford, UK
f Department of Anesthesiology, Multidisciplinary Unit of Fatou Cisse Gane, FC Division, Conakry, Guinea

corresponding author.

Resuscitation 95 (2015) 249–263

Part 7: Neonatal resuscitation
2015 International Consensus on Cardiopulmonary Resuscitation and
Emergency Cardiovascular Care Science with Treatment
Recommendations a,b,c

Jonathan Wyllie (Co-Chair) a,b, Jeffrey M. Perlman (Co-Chair) a,c, John Kattwinkel a,c,
Myra H. Wyckoff a,c, Khalid Aziz a,c, Ruth Guinsburg a,c, Han-Suk Kim a,c, Helen G. Liley a,c,
Lindsay Mildenhall a,c, Wendy M. Simon a,c, Edgardo Szyld a,c, Masanori Tamura a,c,
Sithembiso Velaphi a,c, on behalf of the Neonatal Resuscitation Chapter Collaborators a,c

Resuscitate Full term neonates with Room air FiO2 0.21 and
Preterm <35 wks 0.21 to 0.30
Optimal Oxygenation of Extremely Low Birth Weight Infants: A Meta-Analysis and Systematic Review of the Oxygen Saturation Target Studies

Ola Didrik Saugstad\textsuperscript{a}  Dagfinn Aune\textsuperscript{b,c}

\textsuperscript{a}Department of Pediatric Research, Oslo University Hospital, University of Oslo, Oslo, and \textsuperscript{b}Department of Public Health and General Practice, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway; \textsuperscript{c}Department of Epidemiology and Biostatistics, School of Public Health, Imperial College, London, UK
Mortality

![Mortality Study Results](image)

<table>
<thead>
<tr>
<th>Study</th>
<th>Relative risk (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOOST (UK)</td>
<td>1.41 (1.07, 1.86)</td>
</tr>
<tr>
<td>BOOST (AU)</td>
<td>1.56 (1.00, 2.43)</td>
</tr>
<tr>
<td>COT</td>
<td>1.23 (0.75, 2.01)</td>
</tr>
<tr>
<td>Overall</td>
<td>1.41 (1.14, 1.74)</td>
</tr>
</tbody>
</table>
Retinopathy of Prematurity
Use of NCPAP in delivery room and Non Invasive Ventilation
Study overview

• In this part of a randomized, 2-by-2 factorial trial involving extremely preterm infants, use of intubation and surfactant treatment (within 1 hour after birth) was compared with initiation of continuous positive airway pressure (CPAP) in the delivery room and subsequent use of a protocol-driven limited ventilation strategy.

• The rate of death or bronchopulmonary dysplasia (the primary outcome) did not differ significantly between the groups; the CPAP group required intubation less frequently and for fewer days than did the surfactant group.

• These results support consideration of CPAP as an alternative to intubation and surfactant in preterm infants.
3546 infants were assessed for eligibility (1127 pregnancies)

2230 Were excluded
255 Did not meet eligibility criteria
125 Did not have personnel or equipment available
699 Were eligible, but consent was not sought
344 Were excluded because parent or guardian was unavailable
748 Had consent denied by parent or guardian
11 Had other reasons
68 Had consent provided but did not undergo randomization

1316 Underwent randomization

654 Were assigned to target oxygen saturation of 85 - 89%

376 Were assigned to receive early CPAP
54 Died
282 Survived to 36 wk postmenstrual age
103 Had BPD

179 Did not have BPD

318 Were assigned to receive early surfactant
60 Died
258 Survived to 36 wk postmenstrual age
102 Had BPD
156 Did not have BPD

662 Were assigned to target oxygen saturation of 91 - 95%

327 Were assigned to receive early CPAP
40 Died
287 Survived to 36 wk postmenstrual age
120 Had BPD
167 Did not have BPD

117 Had BPD

335 Were assigned to receive early surfactant
34 Died
281 Survived to 36 wk postmenstrual age
117 Had BPD
164 Did not have BPD

102 Had BPD
156 Did not have BPD
120 Had BPD
167 Did not have BPD
117 Had BPD
164 Did not have BPD
<table>
<thead>
<tr>
<th>Outcome</th>
<th>CPAP (N=663)</th>
<th>Surfactant (N=653)</th>
<th>Relative Risk with CPAP (95% CI)</th>
<th>Difference in Means (95% CI)</th>
<th>Adjusted P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPD or death by 36 wk of postmenstrual age — no. (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physiological definition of BPD†</td>
<td>317 (47.8)</td>
<td>333 (51.0)</td>
<td>0.95 (0.83 to 1.05)</td>
<td>0.03 (0.93 to 1.00)</td>
<td>0.30</td>
</tr>
<tr>
<td>BPD defined by need for supplemental oxygen</td>
<td>323 (48.7)</td>
<td>353 (53.1)</td>
<td>0.91 (0.83 to 1.01)</td>
<td></td>
<td>0.07</td>
</tr>
<tr>
<td>BPD by 36 wk of postmenstrual age — no./total no. (%)</td>
<td>223/569 (39.2)</td>
<td>219/539 (40.5)</td>
<td>0.99 (0.87 to 1.14)</td>
<td></td>
<td>0.92</td>
</tr>
<tr>
<td>Physiological definition of BPD†</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BPD defined by need for supplemental oxygen</td>
<td>229/569 (40.2)</td>
<td>239/539 (44.3)</td>
<td>0.94 (0.82 to 1.06)</td>
<td></td>
<td>0.32</td>
</tr>
<tr>
<td>Death by 36 wk of postmenstrual age — no. (%)</td>
<td>94 (14.2)</td>
<td>114 (17.5)</td>
<td>0.81 (0.63 to 1.03)</td>
<td></td>
<td>0.09</td>
</tr>
<tr>
<td>Need for supplemental oxygen — no. of days†</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted mean</td>
<td>62.2±1.6</td>
<td>65.3±1.6</td>
<td>-3.1 (-7.1 to 0.8)</td>
<td></td>
<td>0.12</td>
</tr>
<tr>
<td>Unadjusted median</td>
<td>52</td>
<td>56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interquartile range</td>
<td>20 to 86</td>
<td>27 to 91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Need for mechanical ventilation — no. of days†</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted mean</td>
<td>24.8±1.0</td>
<td>27.7±1.1</td>
<td>-3.0 (-5.6 to -0.3)</td>
<td></td>
<td>0.03</td>
</tr>
<tr>
<td>Unadjusted median</td>
<td>10</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interquartile range</td>
<td>2 to 32</td>
<td>2 to 36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Survival without need for high-frequency or conventional ventilation at 7 days — no./total no. (%)</td>
<td>362/655 (55.3)</td>
<td>318/652 (48.8)</td>
<td>1.14 (1.03 to 1.25)</td>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td>Any leak in first 14 days — no. (%)</td>
<td>45 (6.8)</td>
<td>48 (7.4)</td>
<td>0.89 (0.6 to 1.2)</td>
<td></td>
<td>0.56</td>
</tr>
<tr>
<td>Necrotizing enterocolitis requiring medical or surgical treatment — no./total no. (%)</td>
<td>83/654 (12.7)</td>
<td>63/636 (9.9)</td>
<td>1.25 (0.92 to 1.71)</td>
<td></td>
<td>0.15</td>
</tr>
<tr>
<td>Intraventricular hemorrhage grade 3 or 4 — no./total no. (%)</td>
<td>92/642 (14.3)</td>
<td>72/628 (11.5)</td>
<td>1.26 (0.94 to 1.68)</td>
<td></td>
<td>0.12</td>
</tr>
<tr>
<td>Postnatal corticosteroid therapy for BPD — no./total no. (%)</td>
<td>47/649 (7.2)</td>
<td>83/631 (13.2)</td>
<td>0.57 (0.41 to 0.78)</td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Severe retinopathy of prematurity among survivors — no./total no. (%)</td>
<td>67/511 (13.1)</td>
<td>65/473 (13.7)</td>
<td>0.94 (0.69 to 1.28)</td>
<td></td>
<td>0.71</td>
</tr>
</tbody>
</table>

*Plus-minus values are means ± SD. BPD denotes bronchopulmonary dysplasia, CI confidence interval, and CPAP continuous positive airway pressure.† The physiological definition of BPD includes, as a criterion, the receipt of more than 10% supplemental oxygen at 36 weeks, the need for positive-pressure support, or in the case of infants requiring less than 35% oxygen, the need for any supplemental oxygen at 36 weeks after an attempt at withdrawal of supplemental oxygen.‡ Data are for 1028 infants who survived to discharge, transfer, or 120 days; the maximum follow-up was 120 days.§ This variable includes high-frequency ventilation and conventional ventilation.¶ There are four grades of intraventricular hemorrhage; higher grades indicate more severe bleeding.
Respiratory Outcomes of the Surfactant Positive Pressure and Oximetry Randomized Trial

Timothy P. Stevens, MD MPH, Neil N. Finer, MD, Waldemar A. Carlo, MD, Peter G. Szilagyi, MD, Dale L. Phelps, MD, Michele C. Walsh, MD MS, Marie G. Gantz, PhD, Abbot R. Laptook, MD, Bradley A. Yoder, MD, Roger G. Faix, MD, Jamie E. Newman, PhD, MPH, Abhik Das, PhD, Barbara T. Do, MSPH, Kurt Schibler, MD, Wade Rich, RRT, Nancy S. Newman, RN, Richard A. Ehrenkranz, MD, Myriam Peralta-Carcelen, MD MPH, Betty R. Vohr, MD, Deanne E. Wilson-Costello, MD, Kimberly Yolton, PhD, Roy J. Heyne, MD, Patricia W. Evans, MD, Yvonne E. Vaucher, MD MPH, Ira Adams-Chapman, MD, Elisabeth C. McGowan, MD, Anna Bodnar, MD, Athina Pappas, MD, Susan R. Hintz, MD MS, Michael J. Acarregui, MD, Janell Fuller, MD, Ricki F. Goldstein, MD, Charles R. Bauer, MD, T. Michael O'Shea, MD MPH, Gary J. Myers, MD, and Rosemary D. Higgins, MD on behalf of the SUPPORT Study Group of the Eunice Kennedy Shriver National Institute of Child Health and Human Development Neonatal Research Network.
Antibiotic Overuse in the NICU
Forty-fold variation in NICU antibiotic prescribing practice across 127 NICUs with similar burdens of proven infection, NEC, surgical volume, and mortality!
Range of AUR values and distribution of AUR values by level of care.

Scientists have warned that a new superbug, called New Delhi-Metallo-1, which is resistant to antibiotics, has reached Britain and could spread worldwide as nothing is being developed to combat it.

Antibiotic resistance now 'a public health problem of global proportions,' researcher warns

Antibiotic progress on superbugs called 'alarmingly slow'
Prolongation of Empiric Antibiotic Course and later sepsis

<table>
<thead>
<tr>
<th>Study (number of patients)</th>
<th>Group 1</th>
<th>Group 2</th>
<th>RR for LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shah et al 2013 (216)</td>
<td>≥4 days</td>
<td>&lt;4 days</td>
<td>2.1 (1.2-3.7)</td>
</tr>
<tr>
<td>Ghany et al 2012 (207)a</td>
<td>≥5 days</td>
<td>&lt;5 days</td>
<td>1.27 (1.12-1.44)b</td>
</tr>
<tr>
<td>Kuppala et al 2011 (365)</td>
<td>≥5 days</td>
<td>&lt;5 days</td>
<td>2.45 (1.28-4.67)</td>
</tr>
<tr>
<td>Cotton et al 2009 (4039)</td>
<td>≥4 days</td>
<td>&lt;4 days</td>
<td>1.21 (1.03–1.42)</td>
</tr>
</tbody>
</table>

a received ampicillin and gentamicin
b risk per day of antibiotic
Comparison of time to detection of pretreatment (□) positive blood cultures and posttreatment (○) positive blood culture results.

Prolonged Empiric Antibiotics in Culture Negative Infants < 29 weeks (>48 hours)

Numbers above bar represent number of septic workups

P=0.047
Retinopathy of Prematurity

• Screening: Identify the at-risk population
  ‣ birth weight $< 1500g$
  ‣ gestational age $< 31/40$
Retinopathy of Prematurity

Efficacy of Intravitreal Bevacizumab for Stage 3+
Retinopathy of Prematurity

Helen A. Mintz-Hittner, M.D., Kathleen A. Kennedy, M.D., M.P.H., and Alice Z. Chuang, Ph.D.,
for the BEAT-ROP Cooperative Group

The NEW ENGLAND JOURNAL of MEDICINE
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N ENGL J MED 364:7 NEJM.ORG FEBRUARY 17, 2011
Fundus Photographs and Fluorescein Angiograms of Retinas in Study Infants with Stage 3+ Retinopathy of Prematurity in Zone I, before and after Treatment.

Research translates to Practice ever so slowly
Therapeutic Hypothermia for HIE

Cooling for newborns with hypoxic ischaemic encephalopathy.
Jacobs SE1, Berg M, Hunt R, Tarnow-Mordi WO, Inder TE, Davis PG.

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Hypothermia n/N</th>
<th>Standard care n/N</th>
<th>Risk Ratio M-H,Fixed, 95% CI</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Selective head cooling with mild systemic hypothermia</td>
<td>7/18</td>
<td>4/18</td>
<td>1.1</td>
<td>1.26 [0.46, 3.44]</td>
</tr>
<tr>
<td>2 Whole body cooling</td>
<td>14/27</td>
<td>21/25</td>
<td>5.3</td>
<td>0.62 [0.41, 0.92]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>225</td>
<td>217</td>
<td>30.3%</td>
<td>0.77 [0.64, 0.92]</td>
</tr>
</tbody>
</table>

Total events: 75 (Hypothermia), 123 (Standard care)
Heterogeneity: CH² = 2.44, df = 7 (P = 0.92), I² = 16%
Test for overall effect: Z = 2.74 (P = 0.0064)

Total (95% CI) | 678 | 666 | 100.0% | 0.75 [0.68, 0.83] |
Figure 1: NIRS in HIE

**A**
- Time postnatal (h)
- Mean rSO₂ (%)

**B**
- Time postnatal (h)
- Mean dFTOE
Is near-infrared spectroscopy clinically useful in the preterm infant?

Cristine Sortica da Costa,¹ Gorm Greisen,² Topun Austin¹

Review

Near-infrared spectroscopy: Applications in neonates

Beena G. Sood a,b,*, Kathleen McLaughlin b, Josef Cortez c

¹ Division of Neonatal–Perinatal Medicine, Department of Pediatrics, Wayne State University, Children’s Hospital of Michigan, Detroit, MI, USA
² Hutzel Women's Hospital, Detroit, MI, USA
³ Division of Neonatology, Department of Pediatrics, University of Florida Health Jacksonville, Jacksonville, FL, USA
Burden of hypoxia and hyperoxia by treatment group. SafeBoos.

Simon Hyttel-Sorensen et al. BMJ 2015;350:bmj.g7635

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How has research changed your practice?

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