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Clinicians in 25 countries prefer to use lower levels of oxygen to resuscitate preterm infants at birth

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The HOLISTIC (Higher Or Lower oxygen and Infant Saturation Targeting: International Collaboration) Study Group.

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Abstract

Aim: This study determined current international clinical practice and opinions regarding initial fractional inspired oxygen (FiO₂) and pulse oximetry (SpO₂) targets for delivery room resuscitation of preterm infants of less than 29 weeks of gestation.

Methods: An online survey was disseminated to neonatal clinicians via established professional clinical networks using a web-based survey programme between 9 March and 30 June 2015.

Results: Of the 630 responses from 25 countries, 60% were from neonatologists. The majority (77%) would target SpO₂ between the 10th to 50th percentiles values for full-term infants. The median starting FiO₂ was 0.3, with Japan using the highest (0.4) and the UK using the lowest (0.21). New Zealand targeted the highest SpO₂ percentiles (median 50%). Most respondents agreed or did not disagree that a trial was required that compared the higher FiO₂ of 0.6 (83%), targeting the 50th SpO₂ percentile (60%), and the lower FiO₂ of 0.21 (80%), targeting the 10th SpO₂ percentile (78%). Most (65%) would join this trial. Many considered that evidence was lacking and further research was needed.

Conclusions: Clinicians currently favour lower SpO₂ targets for preterm resuscitation, despite acknowledging the lack of evidence for benefit or harm, and 65% would join a clinical trial.

Key notes

- This study determined current international clinical practice and opinions regarding initial fractional inspired oxygen and pulse oximetry (SpO₂) targets for delivery room resuscitation of preterm infants of less than 29 weeks of gestation.
- An online survey was disseminated to neonatal clinicians in 2015 and 630 clinicians from 25 countries replied.
- Clinicians currently favour lower SpO₂ targets for preterm resuscitation, despite lack of evidence, and 65% would join a clinical trial.

INTRODUCTION

The use of less than pure oxygen, with a fractional inspired oxygen (FiO₂) of below 1.0, for delivery room stabilisation of newborn infants, whether they are preterm or term, is a relatively new practice. The Resair studies (1,2) showed that air, an FiO₂ of 0.21, could be used to resuscitate mature hypoxic infants and that led to the first revision of the

international guidelines in 2005 (3). It was then suggested that air *could* be used instead of pure oxygen, an FiO_2 of 1.0, to initiate the delivery room resuscitation of full-term, hypoxic infants but that these babies should be given oxygen if there was an inadequate response by 90 seconds (3). The guidelines were revised again in 2010 and this version suggested that air *should* be used to initiate resuscitation of term infants. Furthermore, the 2010 guidelines advised that air or less oxygen *could* also be used to initiate resuscitation of preterm infants and that clinicians should adjust FiO_2 levels to target SpO_2 or pulse oximetry changes derived from healthy full-term and spontaneously breathing infants born at sea level (4).

Davis et al showed in the first meta-analysis of more than 1,300 infants that the practice of using air to resuscitate mature hypoxic infants led to a significantly reduced risk of death, with a relative risk (RR) of 0.76 (5). However, the evidence for starting resuscitation with lower levels of FiO_2 in preterm infants is considerably less clear. Compared with term infants, preterm infants have different physiological needs and respond differently to oxidative stress. They are more at risk of oxidative injury due to antioxidant immaturity (6) but may also need supplemental oxygen because of pulmonary immaturity. The clinical uncertainty was emphasised in a meta-analysis by Saugstad et al of >600 babies below 33 weeks of gestation, who were resuscitated with either higher (>0.5) or lower (<0.3) FiO_2 strategies. This showed that there was no statistically significant difference in death (RR missing value ?????, 95% Confidence Interval (CI) 0.62;0.37-1.04), bronchopulmonary dysplasia (1.11, 0.73-1.68) or intraventricular haemorrhage of grade three or more (0.90, 0.53-1.53) (7).

Despite this, there has been a rapid worldwide paradigm shift in clinician attitudes and practice in this area over the last few years. In 2008, a survey of Australian and New Zealand tertiary perinatal unit clinicians found that only 42% had access to oxygen blenders in the delivery suite, 64% would advocate the use of FiO_2 between 0.3 to 0.9 (mean 0.5) for preterm infant resuscitation and only 15% would start resuscitation with air (8). In 2011, another survey found that most (91%) clinicians in Australia and New Zealand would support the use of less or blended oxygen even if they had no access to oxygen blending or monitoring equipment (9). In Italy, Trevisanuto et al showed that the practice in Italian tertiary centres had changed significantly over 10 years. In 2002, 56.2% said that they would use FiO_2 1.0 for delivery room resuscitation of preterm infants but this decreased to 6.2% in 2011 (10).

Current resuscitation guidelines recommend the use of lower (0.21-0.3) and not higher (>0.65) FiO_2 to initiate resuscitation of preterm infants below 35 weeks of gestation (11). However, the expert advisory panels emphasised that there was a knowledge gap regarding long-term neurodevelopmental outcomes and optimum SpO_2 targets with regards to this practice. Clinical research priorities and the capability to undertake trials on this very important issue are unclear and difficult to conduct because of changes in clinicians' attitudes over the last few years (8-10). Understanding the range of equipoise in clinical and research communities is vital to encourage further understanding of this uncertainty. In this international survey, we therefore aimed to examine the current opinions of clinicians about the use of oxygen for delivery room stabilisation of extremely premature infants and their opinions about the most important questions for future research.

METHODS

An online survey was disseminated to neonatal clinicians via established professional clinical networks with a web-based survey programme (www.surveymonkey.com). Respondents were asked to share the link with colleagues. A Japanese translation was disseminated via the Japanese Perinatal Society. Each link was sent at least twice to capture non-responders between 9 March and 30 June 2015. Respondents were asked to state their professional background in broad terms, such as neonatologist or nurse, even though we recognised that some of these professions may be referred to differently in different countries. For example, a neonatologist could be known as a neonatal attending or a neonatal consultant.

There were a total of 10 questions (see Table 1).

Statistical analyses

Descriptive statistics are used to present the results of the survey. The Student's t-test and ANOVA test were used to determine differences between groups for continuous variables. Chi-square was used to evaluate proportions between groups. Responses were analysed according to individual respondent and to country of origin. A p value of <0.05 was considered significant.

Ethics consideration

This study was approved as a quality improvement survey by the Hunter New England Research Ethics Committee on 3 March 2015.

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Results

A total of 630 surveys were returned from 25 countries. Nearly half of the responses were from North American centres. More than 60% of the responses were from neonatal medical specialists. Table 2 provides more details and a list of countries.

Question one

The median FiO_2 used to start respiratory support was 0.3, with a range of 0.21-1.0. More than 40% of respondents would start with an FiO_2 of 0.3, only 24 (3.8%) would use an FiO_2 of 0.6 or above and only 15 (2.2%) would start on an FiO_2 of 1.0 (Fig 1). The median initial FiO_2 was not different between medical and non-medical respondents, such as respiratory therapists ($p = 0.5$). The starting FiO_2 varied significantly between countries, with Japanese clinicians starting with the highest median FiO_2 (0.4) and UK clinicians starting with the lowest (0.21) (ANOVA df 7, $p < 0.001$).

Question two

The most common SpO_2 percentile targeted by respondents after 2-3 minutes of birth, assuming the infant's heart rate remained at above 100 beat per minute, was the 50th percentile of the international (4) recommendations ($n=293$, 47%). Collectively, most (78%) respondents would target SpO_2 percentiles at or below 50%, (Figure 2). New Zealand respondents targeted the highest SpO_2 percentiles (median 55th percentile) while Europeans used the lowest (median 25th percentile). There was no difference in SpO_2 targets between doctors and nurses (median 50th percentile).

Questions three to six

More than one choice was allowed. Most respondents would agree, or not disagree, that FiO_2 0.21 ($n=500$, 80%) rather than FiO_2 0.6 ($n=379$, 60%) was appropriate as a starting FiO_2 . The majority would also agree, or not disagree, that a trial was required to compare outcomes of starting high oxygen resuscitation with FiO_2 0.6 targeting the 50th percentile SpO_2 ($n=522$, 83%) to starting low oxygen resuscitation on FiO_2 0.21 targeting the 10th percentile SpO_2 ($n = 494$, 78%).

Other questions

Opinions were sought regarding whether respondents would join a study to examine low and high oxygenation during resuscitation of preterm infants below 29 weeks gestation

and their long-term outcomes. Most (n=406, 65%) would agree to join. Medical staff (n=318, 61%) were less likely to consider joining than non-medical staff (n=88, 81%) with an odds ratio (OR) of 0.4 and 95% CI of 0.2-0.6 (p<0.001). Less than 40% of respondents in Japan would join because of language barriers, compared to almost 80% of UK, 100% of European and more than 60% of Australian and Asian respondents (Figure 3).

Comments from respondents

Generally, the comments were supportive of the need for more research. However, most comments supported starting with a lower FiO₂ and targeting lower SpO₂ trajectories because of the risk of oxidative stress. Some respondents questioned their own current practices, saying that they realised that there was little evidence to support what has now been accepted to be the norm.

DISCUSSION

Our survey was designed to test current opinions of practicing clinicians about the use of oxygen for preterm resuscitation and for research in this area. The results show that the majority of clinicians favour using lower FiO₂, at or below 0.3, to initiate resuscitation and most would target lower SpO₂ trajectories of the 50th percentile or below that are derived from guidance for full-term, healthy infants (12,13). However, our survey also showed that many clinicians acknowledge that the evidence for this current practice or opinion is sketchy and that further evidence is urgently needed. In fact, 65% of clinicians would join a study designed to examine this conundrum, which highlights clinical uncertainty about this very important step in the stabilisation of critically ill newborn preterm infants.

Despite the overwhelming preference towards lower oxygen targeting, there is currently no evidence that this practice is beneficial for extremely preterm infants, either in short or long-term. Saugstad et al (1,2) first showed that air could be used instead of pure oxygen to resuscitate hypoxic mature infants. Also, evidence over the next few years showed that using lower FiO₂ emulated the slow rise in SpO₂ over seven to eight minutes of healthy full-term infants (12,13). It also showed that using pure oxygen increased SpO₂ rapidly and that there was biochemical evidence of oxidative injury to important organs (14,15) in both term and preterm infants. However, preterm infants are physiologically very different to term, especially term, hypoxic infants, and the consequences of aiming for lower SpO₂ levels are unknown.

Several studies have now shown that using lower FiO_2 to start preterm resuscitation is feasible (15-26) and also reduces biochemical evidence of oxidative stress (15). The European experience was reflected in two randomised controlled blinded trials of a total of 240 patients of 24 to 30 weeks of gestation, who were split into two equal groups and initially ventilated with 30% versus 65% FiO_2 . These two studies did not find any difference in mortality or other common neonatal morbidities, including bronchopulmonary dysplasia (22,23). The Targeted Oxygenation in Resuscitation of Preterm Infants and their Developmental Outcomes study was closed because it could not recruit infants to the FiO_2 1.0 arm. This study included 292 out of a target sample of 1,976 infants below 32 weeks of gestation and compared two-year outcomes after delivery room resuscitation with either FiO_2 0.21 or 1.0. Short-term results showed that there was a statistically significant increase in in-hospital mortality rates in infants below 28 weeks gestation after resuscitation with FiO_2 0.21 (10/46, 22%) compared to FiO_2 1.0 (4/54, 6%) ($p=0.03$, OR 0.2, 95% CI 0.05-0.8) but analyses for the two-year outcomes are awaited (17). Nevertheless, Saugstad et al showed that there was no difference in major outcomes whether low (0.21-0.3) or high (0.6-1.0) FiO_2 was used and also emphasised that there was limited outcome data for infants resuscitated with any FiO_2 levels between 0.3 and 0.5 (7), which were the levels used by >90% of the respondents to our survey.

We wished to obtain opinions from clinicians from as many countries as possible to highlight differences in practice between different types of clinicians and different countries. We noted that nurses and non-medical staff, such as respiratory therapists, were more likely to agree to participate in the proposed study compared to medical staff. In addition, most Japanese clinicians were reluctant to join the study because they considered language barriers to be too difficult to overcome when participating in studies originally designed in English. These differences need to be investigated further, as the majority of countries base their local resuscitation recommendations on either the American Academy of Pediatrics (AAP) (11) or the International Liaison Committee on Resuscitation (ILCOR) (27) guidelines. Regardless of that, we note that these two bodies are very different in their recommendation for use of FiO_2 . The ILCOR makes no recommendation about starting FiO_2 levels or SpO_2 targeting (27), while the AAP is more prescriptive, recommending an FiO_2 of 0.21-0.3 and not higher than 0.65-1.0 and providing set ranges for SpO_2 targets (11).

CONCLUSION

We acknowledge that our sampled population of clinicians may not be representative of the global community of neonatal healthcare professionals. Contact details are difficult to obtain from certain countries and this has to be acknowledged as one of the limitations of our study. Nevertheless, our survey results highlight great variations in practice in this very contentious but important practice. We have showed that most clinicians favour the use of lower oxygen strategies - FiO₂ levels of 0.3-0.4 and SpO₂ targets at or below the 50th percentiles for term infants - when they are conducting delivery room resuscitation of extremely preterm infants. This study also highlights another important issue, that clinicians acknowledge the lack of evidence behind this practice and the need to conduct an urgent trial that is well-designed and large enough to resolve this issue.

ABBREVIATIONS

AAP: American Academy of Pediatrics

ILCOR: International Liaison Committee on Resuscitation

FiO₂: fractional inspired oxygen

SpO₂: pulse oximetry

UK: United Kingdom

RR: relative risk

CI: confidence interval

CONFLICT OF INTEREST

The authors declare no known conflicts of interest

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References

1. Ramji S, Ahuja S, Thirupuram S, Rootwelt T, Rooth G, Saugstad OD. Resuscitation of asphyxic newborn infants with room air or 100% oxygen. *Pediatr Res* 1993;34:809-12
2. Saugstad OD, Rootwelt T, Aalen O. Resuscitation of asphyxiated newborn infants with room air or oxygen: an international controlled trial: the Resair 2 study.

- Pediatrics* 1998;102(1):e1.
3. International Liaison Committee on Resuscitation. The International Liaison Committee on Resuscitation (ILCOR) consensus on science with treatment recommendations for pediatric and neonatal patients: neonatal resuscitation. *Pediatrics* 2006;117(5):e978-88.
 4. Perlman JM, Wyllie J, Kattwinkel J, Atkins DL, Chameides L, Goldsmith JP et al. Part 11: Neonatal resuscitation: 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. *Circulation* 2010;122(16 Suppl 2):S516-38.
 5. Davis PG, Tan A, O'Donnell CP, Schulze A. Resuscitation of newborn infants with 100% oxygen or air: a systematic review and meta-analysis. *Lancet* 2004;364(9442):1329-33.
 6. Frank L, Price LT, Whitney PL. Possible mechanism for late gestational development of the antioxidant enzymes in the fetal rat lung. *Biol Neonate* 1996;70(2):116-126
 7. Saugstad OD, Aune D, Aguar M, Kapadia V, Finer N, Vento M. Systematic review and meta-analysis of optimal initial fraction of oxygen levels in the delivery room at ≤ 32 weeks. *Acta Paediatr* 2014;103(7):744-51.
 8. Clark RL, Lui K, Oei JL. Use of oxygen in the resuscitation of preterm infants: current opinion and practice in Australia and New Zealand. *J Paediatr Child Health* 2009;45(1-2):31-5
 9. Bhola K, Lui K, Oei JL. Use of oxygen for delivery room neonatal resuscitation in non-tertiary Australian and New Zealand hospitals: a survey of current practices, opinions and equipment. *J Paediatr Child Health* 2012;48(9):828-32.
 10. Trevisanuto D, Satariano I, Doglioni N, Criscoli G, Cavallin F, Gizzi C et al. Changes over time in delivery room management of extremely low birth weight infants in Italy. *Resuscitation* 2014 Aug;85(8):1072-6
 11. Perlman JM, Wyllie J, Kattwinkel J, Wyckoff MH, Aziz K, Guinsburg R et al. Part 7: Neonatal Resuscitation: 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. *Pediatrics* 2015;136(Suppl 2):S120-66
 12. Mariani G, Dik PB, Ezquer A, Aguirre A, Esteban ML, Perez C et al. Pre-ductal and post-ductal O₂ saturation in healthy term neonates after birth. *J Pediatr* 2007;150(4):418-21
 13. Dawson JA, Kamlin CO, Vento M, Wong C, Cole TJ, Donath SM et al. Defining the

- reference range for oxygen saturation for infants after birth. *Pediatrics* 2010;125(6):e1340-7.
14. Vento M, Sastre J, Asensi MA, Viña J. Room-air resuscitation causes less damage to heart and kidney than 100% oxygen. *Am J Respir Crit Care Med* 2005;172(11):1393-8.
 15. Vento M, Moro M, Escrig R, Arruza L, Villar G, Izquierdo I et al. Preterm resuscitation with low oxygen causes less oxidative stress, inflammation, and chronic lung disease. *Pediatrics* 2009;124(3):e439-49.
 16. Lundström KE, Pryds O, Greisen G. Oxygen at birth and prolonged cerebral vasoconstriction in preterm infants. *Arch Dis Childhood* 1995;73:F81-F86.
 17. Oei J, Lui K, Wright IM, Smyth JP, Tarnow Mordt WO. Targeted Oxygen in the Resuscitation of Preterm Infants and their Developmental Outcomes – the TO2RPIDO study. *J Paed Child Health* 2015;51:17-35 (A102)
 18. Wang CL, Anderson C, Leone TA, Rich W, Govindaswami B, Finer NN. Resuscitation of preterm neonates by using room air or 100% oxygen. *Pediatrics* 2008;121:1083-9.
 19. Escrig R, Arruza L, Izquierdo I, Villar G, Sáenz P, Gimeno A et al. Achievement of targeted saturation values in extremely low gestational age neonates resuscitated with low or high oxygen concentrations: a prospective, randomized trial. *Pediatrics* 2008;121:875-81.
 20. Rabi Y, Singhal N, Nettel-Aguirre A. Room-air versus oxygen administration for resuscitation of preterm infants: the ROAR study. *Pediatrics* 2011;128:e374-81.
 21. Kapadia VS, Chalak LF, Sparks JE, Allen JR, Savani RC, Wyckoff MH. Resuscitation of preterm neonates with limited versus high oxygen strategy. *Pediatrics* 2013;132:e1488-96
 22. Vento-Torres M, Aguar M, Izquierdo M, Brugada M, Iriondo M, Escobar J et al. Higher (60%) VS. lower (30%) initial oxygen inspiratory fraction for ventilation of preterm infants in the delivery room: a randomized, double blinded, pilot study. *Abstracts of the 54th Annual Meeting of the European Society for Paediatric Research*, 2013. (Available from: http://www.espr.info/templates/espr/images/pdf/9349_abstract_book_-_25sett13-it-it.pdf)).
 23. Rook D, Schierbeek H, Vento M, Vlaardingerbroek H, van der Eijk AC, Longini M et al. Resuscitation of preterm infants with different inspired oxygen fractions. *J Pediatr* 2014;164:1322-6.e3

24. Kumar VH, Wynn K, Ryan RM, Nielsen L, Reynolds AM, Carrion V. Randomized trial of varying levels of oxygen (21%, 40% and 100%) at resuscitation in premature infants < 32 weeks GA. *Abstracts of the Pediatric Academic Societies Meeting*. 2012:4525.352.
25. Ezaki S, Suzuki K, Kurishima C, Miura M, Weilin W, Hoshi R et al. Resuscitation of preterm infants with reduced oxygen results in less oxidative stress than resuscitation with 100% oxygen. *J Clin Biochem Nutr* 2009;44:111-8.
26. Harling AE, Beresford MW, Vince GS, Bates M, Yoxall CW. Does the use of 50% oxygen at birth in preterm infants reduce lung injuryArch Dis Child Fetal Neonatal Ed 2005;90:F401-5.
27. Wyllie J, Perlman JM, Kattwinkel J, Wyckoff MH, Aziz K, Guinsburg R et al. Part 7: Neonatal resuscitation: 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Resuscitation* 2015;95:e169-201

Table 1: Questions in survey

1. Which initial FiO ₂ is closest to what you normally use for a <29 week infant in the delivery room?
2. Which SpO ₂ target centile is closest to what you use for a <29 week infant from 2-3 minutes after birth until admission to the NICU, if the heart rate remains >100 bpm?
3. For Questions 3 to 6, consider a randomised trial in <29 week infants to determine if higher or lower oxygenation in the delivery room improves survival and disability. a. Is it acceptable for the higher group to start with FiO ₂ 0.6? b. Is it acceptable for the lower group to start with FiO ₂ 0.21 (air)?
4. In the HIGHER oxygenation group, starting with FiO ₂ of 0.6, is it acceptable to target SpO ₂ values AT OR BELOW the 50th centile for healthy term infants, as shown below, if the infant's heart rate remains >100 bpm? 3 minutes - SpO ₂ 82% 5 minutes - SpO ₂ 93% 7 minutes - SpO ₂ 95% 9 minutes - SpO ₂ 95% 10 minutes - SpO ₂ 95%
5. In the LOWER oxygenation group starting with FiO ₂ of 0.21, is it acceptable to target SpO ₂ values at about the 10th centile for healthy term infants, as shown below, if the infant's heart rate remains >100 bpm? 3 minutes - SpO ₂ 55% 5 minutes - SpO ₂ 75% 7 minutes - SpO ₂ 85% 9 minutes - SpO ₂ 90% 10 minutes - SpO ₂ 90%

6. Would you be willing to join this study to find out if higher or lower oxygenation in the delivery room improves disability-free survival in <29 week infants?
7. Where is your primary place of work?
8. What is your role?

Table 2: Respondents' characteristics (Total 630)

	Characteristics
Country	<p>Australia: 135 (21.4%)</p> <p>Asia and Middle East: 68 (10.8%)</p> <p>Europe and others: 27 (4.9%)</p> <p>Japan: 36 (5.7%)</p> <p>New Zealand: 42 (6.7%)</p> <p>North America: 301 (47.8%)</p> <p>UK: 17 (2.7%)</p>

Full list of countries:	<p>Australia</p> <p>Canada</p> <p>China</p> <p>Egypt</p> <p>Hong Kong</p> <p>India</p> <p>Indonesia</p> <p>Italy</p> <p>Malaysia</p> <p>Mexico</p> <p>New Zealand</p> <p>Norway</p> <p>Not stated</p> <p>Phillipines</p> <p>Qatar</p> <p>Saudi Arabia</p> <p>Singapore</p> <p>United Kingdom</p> <p>Spain</p> <p>Switzerland</p> <p>Thailand</p> <p>USA</p>
Profession	<p>Neonatal director: 177 (28.1%)</p> <p>Neonatologist: 274 (43.5%)</p> <p>Neonatology, junior staff: 70 (11.1%)</p> <p>Nursing staff: 85 (13.5%)</p> <p>Others: 24 (3.8%)</p>

Figure 1: Initial FiO₂ used by respondents to initiate preterm infant resuscitation

Figure 2: SpO₂ targets used by respondents during resuscitation of preterm infants

Figure 3: Percentage of respondents from each region who would consider/not consider joining a study to examine low or high oxygenation in preterm delivery room resuscitation.

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