



Medical Direction and Practices Board

White Paper

Maine EMS 2023 Protocol Update – Clinical Update on Maintaining Warmth of Newborns

In the 2023 protocol updates to the Childbirth Protocol, the MDPB received feedback from receiving hospital and from the Maine EMS-C Committee. Providers at these receiving hospitals, including emergency department physicians, obstetricians, pediatricians, and neonatologists, commented that they had noticed neonates born in the pre-hospital setting arriving hypothermic after EMS transport. For the purposes of this paper, the MDPB utilizes the World Health Organization (WHO) definition of neonatal hypothermia of any temperature below 36.5°C (97.7°F). The terms neonate and newborn are used interchangeably in this white paper, both referring to the infant delivered in the pre-hospital setting regardless of known or presumed gestational age.

Neonatal hypothermia has been associated with increased morbidity and mortality in numerous studies. This detrimental effect can be even more pronounced in low-birth weight newborns, and pre-term neonates. As a result of this research, most hospitals in the United States have active rewarming protocols for new borns. The WHO also has recommendations to ensure appropriate delivery room temperature and infant warming procedures. The EMS clinician is already familiar with many of these techniques such as rapidly drying the newborn, utilizing skin-to-skin with the mother, and covering the neonate in cloth or aluminum foil blankets and a cap. While there is a plethora of research on techniques and devices for neonatal warming in the hospital, there is a paucity of such data on pre-hospital deliveries. The MDPB therefore has extrapolated the protocol changes to employ plastic wrapping on research for in-hospital prevention of neonatal hypothermia, often in resource poor settings that mimic the pre-hospital environment.

The strongest recommendation for the use of plastic wrapping or a plastic bag to maintain neonatal warmth comes from Part 5: Neonatal Resuscitation: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care: “When babies are born in out-of-hospital, resource-limited, or remote settings, it may be reasonable to prevent hypothermia by using a clean food-grade plastic bag as an alternative to skin-to-skin contact.” This recommendation derives from a 2013 article from *Pediatrics*, which found that “Placement in a plastic bag at birth reduced the incidence of hypothermia at 1 hour after birth,



in term neonates born in a resource-poor setting, but most neonates remained hypothermic.” Additionally, a meta-analysis published in *Journal of Perinatology* in 2016 found “Two studies confirmed the high prevalence of hypothermia even in term neonates and reported a 24 to 58% reduction with the use of plastic wraps.” But even these studies failed to show a change in reduction of morbidity or mortality. The authors discussed that “lack of evidence does not equate to lack of effect, as these analyses were not powered for these outcomes.”

Recognizing that additional challenges occur in the pre-hospital setting, the MDPB wishes to emphasize that special care must be taken to protect and maintain the newborn’s airway. Plastic wrapping can present an obvious occlusive danger to the airway. This is why the protocol specifically calls for the wrapping to include the torso and the extremities, leaving the neck and head unwrapped. The EMS clinician is already aware that many neonatal resuscitations relate to airway and breathing issues and must be especially attuned to prevent precipitating such an event. For this reason, the EMS clinician is to use the plastic wrap with caution and continually monitor the airway for patency before and during the transport to the hospital.

References

- 1) Weiner GM, ed: Textbook of Neonatal Resuscitation, ed. 8. Itasca, American Academy of Pediatrics, 2021.
- 2) Khalid Aziz, et al, Part 5: Neonatal Resuscitation: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, Originally published 21 Oct 2020, *Circulation*. 2020;142:S524–S550, <https://doi.org/10.1161/CIR.0000000000000902>
- 3) McCall EM, et al. Interventions to prevent hypothermia at birth in preterm and/or low birth weight infants. *Cochrane Database of Systematic Reviews* 2018, Issue 2. Art. No.: CD004210. DOI: 10.1002/14651858.CD004210.pub5.
- 4) Oatley HK, Blencowe H, Lawn JE: The effect of coverings, including plastic bags and wraps, on mortality and morbidity in preterm and full-term neonates. *J Perinatol* 36(Suppl 1):S82–S88, 2016. doi: 10.1038/jp.2016.35
- 5) Yitayew YA, et al. Neonatal Hypothermia and Associated Factors among Newborns Admitted in the Neonatal Intensive Care Unit of Dessie Referral Hospital, Amhara Region, Northeast Ethiopia. *Int J Pediatr*. 2020 Sep 14;2020:3013427. doi: 10.1155/2020/3013427. PMID: 33014077; PMCID: PMC7519202.