sure that we can compare results across studies or aggregate information for larger surveillance systems.

DATA AVAILABILITY STATEMENT
Not required

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REFERENCES
1. Huroy M, Behlim T, Andersen J, et al. Stability of the Gross Motor Function Classification System over time in children with cerebral palsy. Dev Med Child Neurol 2022; 64: 1487–93.
2. Palisano R, Rosenbaum P, Walter S, Russell D, Wood E, Galuppi B. Development and reliability of a system to classify gross motor function in children with cerebral palsy. Dev Med Child Neurol 1997; 39(4): 214–23.
3. Wood E, Rosenbaum P. The Gross Motor Function Classification System for Cerebral Palsy: a study of reliability and stability over time. Dev Med Child Neurol 2000; 42(5): 292–6.
4. Benedict RE, Patz J, Maenner MJ, Arneson CL, Yeargin-Allsopp M, Doernberg NS, et al. Feasibility and reliability of classifying gross motor function among children with cerebral palsy using population-based record surveillance: Surveillance of gross motor function. Paediatr Perinat Epidemiol 2011; 25: 88–96.
5. Surveillance of Cerebral Palsy in Europe. Surveillance of cerebral palsy in Europe: a collaboration of cerebral palsy surveys and registers. Surveillance of Cerebral Palsy in Europe (SCPE). Dev Med Child Neurol 2000; 42: 816–24.

Thinking about differences in the worldwide prevalence of cerebral palsy

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A gratifying development of recent decades is the increased attention to the descriptive epidemiology of cerebral palsy (CP). Counting the frequency of health events is among the least glamorous of biomedical research activities, and yet is central to understanding the impact of different health disorders on the population, providing metrics that underly all priority setting in public health.

With other members of the Global CP Prevalence Group, McIntyre et al.1 have provided a careful and thoughtful summary of the current state of global CP prevalence. We have come a long way from the days when the only reliable population-based CP data and time trends came from Sweden2 and Denmark.3 The 10 reports by Bengt and Gudrun Hagberg and colleagues from Gothenburg, authored over a span of 35 years (1975–2010), set the standard for the creative use of CP registries, and are linked to the present report through the authorship of Dr Himmelmann, first author of the final two Gothenburg studies.4 The paper by McIntyre et al. includes data from registries from 27 countries, though not all could be mined for time trends.

The good news is that CP prevalence has decreased by about 25% over the past 20 years or so, but this is known only from data from high-income countries (HICs). The situation in low- and middle-income countries (LMICs) is not nearly so encouraging. Time trends are not available, but the best estimate of current CP prevalence in LMICs is over 3 per 1000 live births, about double the 1.6 per 1000 the authors estimate for HICs.

We must consider the slight possibility that the decline in CP prevalence in HICs may in part be a consequence of improvements in diagnostic testing in children with motor abnormalities and the clearer identification of specific genetic or metabolic conditions that may then be classified under their specific etiology and not under the broader descriptive rubric of CP. A careful study in one or more CP registries might be able to clarify this point. This minor caveat notwithstanding, two clear questions are generated by this exemplary piece of descriptive epidemiology: (1) why is CP prevalence higher in LMICs; and (2) why is prevalence declining in HICs?

This commentary is on the original article by McIntyre et al. on pages 1494–1506 of this issue.
McIntyre et al. note that infectious causes of CP, especially cerebral malaria, are more common in many LMIC settings, and that birth asphyxia is likewise more frequent. Sadly, the data from several trials in HICs showing that CP prevalence in asphyxiated infants born at term was reduced by head or body cooling immediately after birth were not replicated in a trial in India, Sri Lanka, and Bangladesh.5

Descriptive epidemiology precedes analytic epidemiology, providing the raw material for important questions of public health importance. We should not be too certain that we know just what is causing the decreasing prevalence of CP in HICs, nor assume that improvement in medical care or public health measures in LMICs will lead to declines in prevalence.

The study by McIntyre et al. could stimulate investigators to examine – in HICs – the roles, if any, of established treatments such as head/body cooling in asphyxia and MgSO4 in preterm labor in the reduction in CP prevalence, not neglecting the possibility that other factors such as permissive hypocapnia might also be operative. Better understanding of how recent advances in clinical care, improved public health measures, and social and economic changes might account for the decreased prevalence in HICs would help us to begin to address the high birth prevalence rates of CP in LMICs. At the same time, rigorous investigations in LMICs could lead to a better understanding and management of local causes of CP.

**DISCLAIMER**

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

**DATA AVAILABILITY STATEMENT**

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**REFERENCES**

1. McIntyre S, Goldsmith S, Webb A, et al. Global prevalence of cerebral palsy: a systematic analysis. Dev Med Child Neurol 2022; 64: 1494–506.
2. Hagberg B, Hagberg G, Olow I. The changing panorama of cerebral palsy in Sweden 1954–1970. I. Analysis of the general changes. Acta Paediatr Scand 1975; 64: 187–92.
3. Glenting P. Variations in the population of congenital (pre- and perinatal) cases of cerebral palsy in Danish counties east of the Little Belt during the years 1950–1969. Report from Cerebral Palsy Registry III [Article in Danish]. Ugeskr Laeger 1976; 138: 2984–91.
4. Himmelmann K, Hagberg G, Uvebrant P. The changing panorama of cerebral palsy in Sweden. X. Prevalence and origin in the birth-year period 1999–2002. Acta Paediatr 2010; 99: 1337–43.
5. Thayyil S, Pant S, Montaldo P, et al. Hypothermia for moderate or severe neonatal encephalopathy in low-income and middle-income countries (HELIX): a randomised controlled trial in India, Sri Lanka, and Bangladesh. Lancet Glob Health 2021; 9: e1273–e85.

**Prevention and treatment of pediatric pain and anxiety caused by botulinum neurotoxin A injections: Inadmissible without nitrous oxide analgesia and sedation?**

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Repeated intramuscular botulinum neurotoxin A injections cause significant anxiety and pain in children. Topical anesthesia combined with nitrous gas have long been considered the criterion standard of care in preventing and treating pain and anxiety for these very painful procedures.1

Some institutions that have not implemented nitrous gas for all their patients yet have been exploring treatment alternatives and the study by Ostojic et al. is timely in exploring whether topical anesthesia plus either distraction or biofeedback-assisted relaxation training (BART) might

**This commentary is on the original article by Ostojic et al. on pages 1507–1516 of this issue.**