

## Bicarbonate therapy for infants

### To the Editor:

The recent article by Berg et al<sup>1</sup> reporting their experience with sodium bicarbonate infusions in preterm infants provides further evidence with regard to the inefficacy of such therapy.<sup>2-4</sup> The authors failed to comment on why infants with a mean pH of  $7.23 \pm 0.12$  were given the sodium bicarbonate.

Although there is evidence from animal models demonstrating a reduction in myocardial function at low pH,<sup>5</sup> this is not improved by the administration of bicarbonate.<sup>6</sup> Similarly, Mathieu et al<sup>7</sup> showed no improvement in the hemodynamics of acidotic adults treated with bicarbonate. Corbets et al<sup>8</sup> controlled trial of bicarbonate in high risk neonates again showed no benefit. The relationship between metabolic acidosis and neurodevelopmental outcome is unclear. Goldstein et al<sup>9</sup> reported that the degree of acidosis was inversely related to outcome at 24 months, whereas Deshpande and Ward Platt<sup>10</sup> found no association between pH and survival to hospital discharge. Until metabolic acidosis is shown to have detrimental effects that can be corrected by bicarbonate infusion, such therapy should be seen as “basically useless therapy.”<sup>2</sup>

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## References

1. Berg CS, Barnette AR, Myers BS, Shimony MK, Barton AW, Inder TE. Sodium bicarbonate administration and outcome in preterm infants. *J Pediatr* 2010;157:684-7.
2. Aschner JL, Poland RL. Sodium bicarbonate: basically useless therapy. *Pediatrics* 2008;122:831-5.
3. Howell JH. Sodium bicarbonate in the perinatal setting – revisited. *Clin Perinatol* 1987;14:807-16.
4. Ammari AN, Schulze KF. Uses and abuses of sodium bicarbonate in the neonatal intensive care unit. *Curr Opin Pediatr* 2002;14:151-6.
5. Steenbergen C, DeLeeuw G, Rich T. Effects of acidosis and ischemia on contractility and intracellular pH of rat heart. *Circ Res* 1977;41:849-58.
6. Benjamin E, Oropello JM, Abalos AM. Effects of acid-base correction on haemodynamics, oxygen dynamics and resuscitability in severe hemorrhagic shock. *Crit Care Med* 1994;22:1616-23.
7. Mathieu D, Neviere R, Billard V, Fleyfel M, Wattel F. Effects of bicarbonate therapy on hemodynamics and tissue oxygenation in patients with lactic acidosis: a prospective, controlled clinical study. *Crit Care Med* 1991;19:1352-6.
8. Corbet AJ, Adams JM, Kenny JD, Kennedy J, Rudolph AJ. Controlled trial of bicarbonate therapy in high-risk premature newborn infants. *J Pediatr* 1977;91:771-6.
9. Goldstein RF, Thompson RJ, Ochler JM, Brazy JE. Influence of acidosis, hypoxemia and hypotension on neurodevelopmental outcome in very low birthweight infants. *Pediatrics* 1995;95:238-43.
10. Deshpande SA, Ward Platt MP. Association between blood lactate and acid-base status and mortality in ventilated babies. *Arch Dis Child* 1997;76:F15-20.

## “Lyme literacy” and physicians in Connecticut

### To the Editor:

Based on their survey results, Johnson and Feder conclude that half of the primary care physicians in Connecticut do not believe that chronic Lyme disease exists, another 48% are unsure about its existence, and only 2.1% treat chronic tick-borne illness.<sup>1</sup> We contend that these conclusions are invalid because of nonresponse bias, undercoverage bias, and question-framing bias implicit in the survey design.<sup>2,3</sup>

The questionnaire that was sent to a sample of primary care physicians in Connecticut stated that Feder was conducting a Lyme disease survey. Feder is the lead author of several articles that endorse the controversial Lyme disease management guidelines of the Infectious Diseases Society of America (IDSA).<sup>4</sup> His polemic views as an outspoken IDSA supporter and anti-chronic Lyme disease advocate are widely known, as is the fact that he has testified in malpractice cases against “Lyme-literate” physicians.<sup>5,6</sup> In addition, physicians who treat Lyme disease have been bullied and persecuted by medical boards in Connecticut and elsewhere.<sup>7</sup> Thus, physicians who do not comply with the IDSA treatment guidelines understandably would be reluctant to respond to a survey of their treatment practices. This creates a nonresponse bias that invalidates the authors’ conclusions.

The survey also suffers from undercoverage bias because it underrepresents physicians who recognize and treat chronic Lyme disease. Although simple cases of Lyme disease might be treated by the primary care physicians included in the study sample, more complicated cases typically are referred to physicians who specialize in the treatment of Lyme disease and accordingly have more experience with the disease. These physicians are commonly affiliated with the International Lyme and Associated Diseases Society (ILADS).<sup>8,9</sup> In a replay of IDSA’s initial lack of responsiveness to the needs of AIDS patients that gave rise to the competing American Academy of HIV Medicine<sup>10</sup>, it was IDSA’s lack of responsiveness to the needs of patients with Lyme disease that gave rise to ILADS.<sup>11-13</sup>

The fact that 159 of the 279 primary care respondents reported that “other physicians” had diagnosed many of their patients with Lyme disease indicates that these patients were referred to physicians who specialize in the treatment of chronic Lyme disease. Undercoverage bias is also reflected in the fact that the sole physician who treated a larger volume of patients with chronic Lyme disease was excluded as an “outlier” by the authors. The failure to specifically include these Lyme-literate physicians in the survey indicates an undercoverage bias that invalidates the authors’ conclusions.

Finally, the survey has a question-framing bias based on the fact that it asks leading questions. This bias results from the “definition” of chronic Lyme disease as persisting

despite “multiple standard courses of antibiotics.” A more appropriate question is whether respondents would retreat a patient who failed the 10- to 28-day course of antibiotics endorsed by IDSA, as previous studies have shown.<sup>14,15</sup> Question-framing bias is known to influence responses negatively and to preclude the drawing of valid conclusions.<sup>2,3</sup> In summary, the extensive bias in this survey renders the results uninterpretable and invalid.

*R.S. serves, without compensation, on the medical advisory panel for QMedRx, Inc. L.J. declares no conflicts of interest.*

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## References

1. Johnson M, Feder HM. Chronic Lyme disease: a survey of Connecticut primary care physicians. *J Pediatr* 2010;157:1025-9. e1-2.
2. Dillman D. The design and administration of mail surveys. *Annu Rev Sociol* 1991;17:225-49.
3. Fowler FJ. Survey research methods. London: Sage; 1993.
4. Johnson L, Stricker RB. The Infectious Diseases Society of America Lyme guidelines: a cautionary tale about development of clinical practice guidelines. *Philos Ethics Humanit Med* 2010;5:9.
5. Stricker RB, Johnson L, Harris N, Burrascano JJ. Inaccurate information about Lyme disease on the Internet. *Pediatr Infect Dis J* 2005;24:577-8.
6. Cameron DJ. An appraisal of “chronic Lyme disease.” *N Engl J Med* 2008;358:429-30.
7. Ballantyne C. The chronic debate over Lyme disease. *Nat Med* 2008;14:1135-9.
8. The ILADS Working Group. Evidence-based guidelines for the management of Lyme disease. *Expert Rev Anti-Infect Ther* 2004;2(Suppl):S1-13.
9. Johnson L, Stricker RB. Treatment of Lyme disease: a medicolegal assessment. *Expert Rev Anti-Infect Ther* 2004;2:533-57.
10. Appelbaum JS, Elion R, Henry K, Newman MD, Saag MS, Sax PE. Roundtable: who should be providing HIV care? *AIDS Clin Care* 2006;18:21-4.
11. Stricker RB. Counterpoint: long-term antibiotic therapy improves persistent symptoms associated with Lyme disease. *Clin Infect Dis* 2007;45:149-57.
12. Stricker RB, Johnson L. Chronic Lyme disease and the “axis of evil.” *Future Microbiol* 2008;3:621-4.
13. Cameron DJ. Proof that chronic Lyme disease exists. *Interdiscip Perspect Infect Dis* 2010;2010:876450.
14. Ziska MH, Donta ST, Demarest FC. Physician preferences in the diagnosis and treatment of Lyme disease in the United States. *Infection* 1996;24:182-6.
15. Donta ST. Tetracycline therapy of chronic Lyme disease. *Clin Infect Dis* 1997;25:S52-6.

## Reply

### To the Editor:

We thank Stricker and Johnson for their careful reading of our study. They state that “Lyme-literate” physicians—that is, those physicians who diagnose and treat patients with chronic Lyme disease—would be reluctant to respond to our survey for fear of identification and persecution by the Connecticut Medical Licensing Board. We clearly stated in

the introduction of our survey that responders and nonresponders could not be specifically identified, and that their survey answers would be anonymous. The study had the approval of the University of Connecticut Health Center’s Institutional Review Board. Also, there was no second mailing, because responders and nonresponders could not be identified. It is reasonable to believe that any Lyme-literate physicians who received this survey would have been happy to voice their points of view and be counted.

When Stricker and Johnson state that Lyme-literate physicians fear prosecution by the Connecticut Medical Licensing Board, they are referring to a case of a Connecticut physician who diagnosed two siblings from Nevada (a non-Lyme-endemic state) with chronic Lyme disease over the telephone. Without seeing or examining these children, this physician prescribed antibiotics and made them home-bound because they were too ill to attend school. It was the children’s father (who did not have custody of the children) who reported this unorthodox medical practice of diagnosing and treating patients with chronic Lyme disease over the phone to the Connecticut Medical Licensing Board. In Connecticut, Lyme-literate physicians are not being bullied, persecuted, or prosecuted by non-Lyme-literate physicians. The risk of interacting with disgruntled patients or families exists for Lyme-literate and non-Lyme-literate physicians alike.

We totally disagree that patients with more complicated Lyme disease are cared for by Lyme-literate physicians. Stricker and Johnson’s references 8 and 9 do not support this statement and can be classified as testimonials. Patients with complicated Lyme disease (eg, those with lymphocytic meningitis or third-degree heart block) frequently require initial hospitalization. These patients are often seen in the hospital by a non-Lyme-literate physician like myself, and after hospitalization are followed in the outpatient setting by the same non-Lyme-literate physician. In Connecticut, Lyme-literate physicians are mostly outpatient-based. They diagnose patients with chronic Lyme disease in the outpatient setting and may order peripherally inserted central catheter lines to administer intravenous antibiotics in the outpatient setting. It is not unusual for patients with chronic Lyme disease to be hospitalized with complications (not of the presumed chronic Lyme disease) from the prolonged antibiotic therapy or related to a peripherally inserted central catheter line, such as neutropenia, pseudocholelithiasis, cholecystitis, *Clostridium difficile* colitis, thrombophlebitis, and catheter-related bloodstream infections.<sup>1-5</sup> If Stricker and Johnson are referring to patients with complicated Lyme disease as those who have complications of prolonged oral and intravenous therapy, then we concede that Lyme-literate physicians are more experienced in this area.

Stricker and Johnson state that Lyme-literate physicians are specialists and that they would not have been included in our survey. But there is no specialty board of Lyme literacy, and thus most Lyme-literate physicians have evolved from the ranks of family physicians, internists, and pediatricians. Stricker is an internist and hematologist, but he would have been eligible for our survey as an internist.