

2. Fernando SM, Tran A, Sadeghirad B, et al. Noninvasive respiratory support following extubation in critically ill adults: a systematic review and network meta-analysis. *Intensive Care Med*. 2022;48(2):137-147. doi:10.1007/s00134-021-06581-1
3. Uchiyama A, Okazaki K, Kondo M, et al; Non-Invasive Procedure for Premature Neonates (NIPP) Study Group. Randomized controlled trial of high-flow nasal cannula in preterm infants after extubation. *Pediatrics*. 2020; 146(6):e20201101. doi:10.1542/peds.2020-1101
4. Roberts CT, Owen LS, Manley BJ, et al; HIPSTER Trial Investigators. Nasal high-flow therapy for primary respiratory support in preterm infants. *N Engl J Med*. 2016;375(12):1142-1151. doi:10.1056/NEJMoa1603694
5. Luo J, Duke T, Chisti MJ, Kepreotes E, Kalinowski V, Li J. Efficacy of high-flow nasal cannula vs standard oxygen therapy or nasal continuous positive airway pressure in children with respiratory distress: a meta-analysis. *J Pediatr*. 2019; 215:199-208. doi:10.1016/j.jpeds.2019.07.059

In Reply In their Letter, Dr Shen and colleagues incorrectly conclude that the primary finding of our FIRST-ABC trial¹ was that HFNC was associated with a similar time to liberation from respiratory support as CPAP. In our study, the median time to liberation was 50.5 hours for HFNC and 42.9 hours for CPAP, with an adjusted hazard ratio of 0.83 (95% CI, 0.70-0.99). Although our primary hypothesis was based on the noninferiority of HFNC, these results indicate that HFNC is in fact inferior to CPAP.

Shen and colleagues also highlight that the proportion of children aged 28 days or younger was higher in the HFNC group compared with the CPAP group. Based on previous trials, they suggest that the effect of HFNC may differ in this age group and propose that a subgroup analysis focusing on infants aged 28 days or younger is warranted. They also point out the higher mortality at day 60 in the HFNC group (which was statistically significant in multivariate analysis including age younger than 12 months vs 12 months or older) and suggest that an interaction analysis between HFNC and age should be performed.

Shen and colleagues cite 2 clinical trials to support their premise that the effect of HFNC differs across pediatric age groups. However, both trials were performed in preterm newborns (Uchiyama et al²: <34 weeks' gestational age; Roberts et al³: mean gestational age, 32 [SD, 2] weeks). Moreover, only the trial by Uchiyama et al² took place following extubation. The study by Roberts et al³ included newborns or children with acute respiratory distress. In addition, these trials^{2,3} used treatment failure as the primary outcome, which differed from our primary outcome of time to liberation from respiratory support. Moreover, our study¹ was a pragmatic trial of extubated children aged 0 to 16 years, and premature newborns (those <37 weeks' gestational age) were excluded. As such, we believe that it is not possible to directly compare the findings of these trials with ours.

In the FIRST-ABC trial,¹ we tested for an interaction between age (dichotomized at 12 months) and treatment allocation, which was nonsignificant ($P = .16$). Based on the request by Shen and colleagues, we have repeated this analysis with age categorized as 28 days or younger, 29 to 365 days, and older than 365 days. The interaction test remains insignificant ($P = .20$), although the point estimates (which had wide confidence intervals) were consistent with the hypothesis that time to liberation is longer in the HFNC

group for children aged 365 days or younger, and this difference increased in infants aged 28 days or younger (adjusted hazard ratio, 0.67; 95% CI, 0.46-1.07). FIRST-ABC was powered to detect an overall difference across the pediatric critical care population ranging from 0 to 16 years. To draw firm conclusions regarding the effect of HFNC in each of the age groups, trials powered to detect differences in each age group would need to be performed. We agree with Shen and colleagues that future trials should focus on clarifying the differential effect of HFNC in clinically relevant age groups.

Padmanabhan Ramnarayan, MD

Karen Thomas, MSc

Paul Mouncey, MSc

Author Affiliations: Department of Surgery and Cancer, Imperial College London, London, United Kingdom (Ramnarayan); Clinical Trials Unit, Intensive Care National Audit and Research Centre, London, United Kingdom (Thomas, Mouncey).

Corresponding Author: Padmanabhan Ramnarayan, MD, Imperial College London, Norfolk Place, Medical School Bldg, Room 508, London W2 1PB, United Kingdom (p.ramnarayan@imperial.ac.uk).

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1. Ramnarayan P, Richards-Belle A, Drikite L, et al; FIRST-ABC Step-Down RCT Investigators and the Paediatric Critical Care Society Study Group. Effect of high-flow nasal cannula therapy vs continuous positive airway pressure following extubation on liberation from respiratory support in critically ill children: a randomized clinical trial. *JAMA*. 2022;327(16):1555-1565. doi:10.1001/jama.2022.3367
2. Uchiyama A, Okazaki K, Kondo M, et al; Non-Invasive Procedure for Premature Neonates (NIPP) Study Group. Randomized controlled trial of high-flow nasal cannula in preterm infants after extubation. *Pediatrics*. 2020; 146(6):e20201101. doi:10.1542/peds.2020-1101
3. Roberts CT, Owen LS, Manley BJ, et al; HIPSTER Trial Investigators. Nasal high-flow therapy for primary respiratory support in preterm infants. *N Engl J Med*. 2016;375(12):1142-1151. doi:10.1056/NEJMoa1603694

Pricing of Drugs With Evidence Development

To the Editor A recent Viewpoint¹ by Dr Robinson that discussed the Alzheimer drug aducanumab (Aduhelm) argued that the US should adopt "pricing with evidence development." However, this approach appears to adopt some overly simplified assumptions about the nature of evidence and the definition of *value*.

In the case of aducanumab, is "value" the clinical benefit of slowing the onset of disease, maintaining capacity for continuing employment, reducing the need for long-term care and hospitalization, or a composite score of these and other possible indicators? Is it sufficient to rely on a surrogate measure, as was done by the US Food and Drug Administration when it approved aducanumab?² How much agreement among scientists is required to determine if an outcome is clinically meaningful? Are existing arrangements that rely on the pharmaceutical industry to finance and design clinical studies appropriate to ensure "evidence-based" studies? Might there be other approaches in collaboration with government or not-for-profit organizations?³

The answers to these questions will shape the evidence that is sought and analyzed. What counts as the “right” evidence, and the ways in which those who perform the studies are held accountable to the public, are politically and ethically embedded decisions. The challenge of applying the “principles of value-based drug pricing” pales in comparison to determining how to address these fundamental issues. While the proposals presented in the Viewpoint¹ might make the drug approval process more transparent, they would be strongly opposed by the lobbying power of those who currently benefit from minimal price controls, including Big Pharma and medical device manufacturers. The approach proposed by Robinson¹ reflects a strictly economic solution to a pressing policy issue. When invoking the German experience with price negotiations based on available evidence, the author ignored the societal factors and institutions that make implementation of these ideas so difficult.⁴ Abstract models and tools based solely on economic models without recognition of the role of politics, culture, and societal values conjures up proposed ideal solutions that turn out to be neat, plausible, but simplistic given the current financing and organization of the US health system.

Michael K. Gusmano, PhD
David Chinitz, PhD
Victor Rodwin, PhD, MPH

Author Affiliations: College of Health, Lehigh University, Bethlehem, Pennsylvania (Gusmano); School of Public Health, Hebrew University and Hadassah in Jerusalem, Jerusalem, Israel (Chinitz); Wagner School of Public Service, New York University, New York, New York (Rodwin).

Corresponding Author: Michael K. Gusmano, PhD, Lehigh University, 124 E Morton St, Health, Science and Technology Bldg, Room 150, Bethlehem, PA 18015 (mig321@lehigh.edu).

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1. Robinson JC. Drug pricing with evidence development. *JAMA*. 2022;327(16):1545-1546. doi:10.1001/jama.2022.5403
2. Gusmano MK, Maschke KJ. To pay or not to pay: Medicare's big Aduhelm decision. *MedPage Today*. July 22, 2021. Accessed June 3, 2022. <https://www.medpagetoday.com/opinion/second-opinions/93704>
3. Moynihan R, Bero L, Hill S, et al. Pathways to independence: towards producing and using trustworthy evidence. *BMJ*. 2019;367:l6576. doi:10.1136/bmj.l6576
4. Robinson JC, Panteli D, Ex P. *Reference Pricing in Germany: Implications for US Pharmaceutical Pricing*. Commonwealth Fund; 2019. Accessed June 3, 2022. https://www.commonwealthfund.org/sites/default/files/2019-02/Robinson_reference_pricing_germany_ib.pdf

In Reply In response to my recent Viewpoint,¹ the comments from Dr Gusmano and colleagues appear to abide by the principle that for every complex and challenging problem, there is a response that makes the problem even more complex and more challenging. Here, the challenge is that the extent of evidence of the clinical benefit of a drug often is limited at the time of initial launch and then increases and improves over time. My Viewpoint proposal was to begin with a low price of the drug at the time of market launch and then raise (or lower) the price commensurate with the evolution of the evidence. In contrast, Gusmano and colleagues suggest that before this can be done, there needs to be agreement on how to define and

measure value (suggestions include clinical indicators, effects on productivity, reductions in other forms of care, composites, indexes, and surrogates); agreement on how much agreement counts; agreement on decisions about who gets to decide, who gets to finance clinical research, how studies can be held “accountable to the public”; and, last but not least, agreement on how to take into account “societal factors and institutions.” This proposed list of required agreements is well intentioned but would ensure stasis and protect the dysfunctional status quo of pharmaceutical pricing.

James C. Robinson, PhD, MPH

Author Affiliation: School of Public Health, University of California, Berkeley.

Corresponding Author: James C. Robinson, PhD, MPH, School of Public Health, University of California, Berkeley, Berkeley, CA 94720 (james.robinson@berkeley.edu).

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1. Robinson JC. Drug pricing with evidence development. *JAMA*. 2022;327(16):1545-1546. doi:10.1001/jama.2022.5403

Review of the Diagnosis and Management of Lumbar Spinal Stenosis

To the Editor In a recent Review of the diagnosis and management of lumbar spinal stenosis,¹ the authors concluded that “[s]elected patients with continued pain and activity limitation may be candidates for decompression surgery.” However, the assumption that surgery is beneficial is based on their statement, “These trials of decompression have important limitations including the substantial crossover in SPORT [the Spine Patient Outcomes Trial].” The conclusions of the SPORT trial² favoring surgery over nonoperative care were based on the as-treated analyses, in which 40% of participants from the nonoperative group crossed over to the surgical group; the intention-to-treat analyses, however, were not clinically or statistically significant. A 2015 study³ that randomized 169 patients to decompressive surgery or nonoperative care found no between-group differences in physical function improvement or pain in the intention-to-treat or complier average causal effect analyses, concluding that “without a control group it is not possible to judge success attributable to either intervention.” The most recent Cochrane review comparing surgery with nonoperative care for lumbar spinal stenosis was published in 2016 and included 5 randomized clinical trials with a total of 643 participants.⁴ This Cochrane review concluded that existing evidence demonstrated no clear benefit of surgery compared with nonoperative treatment and that the quality of evidence was generally considered low.⁴

The lack of evidence supporting surgery for lumbar spinal stenosis extends to a lack of evidence about specific characteristics that identify patients who are more likely to benefit from surgery. Therefore, the statement that “[s]elected patients with continued pain and activity limitation may be candidates for decompression surgery” is unsupported.