

Value of a collaborative cardiologist-intensivist CICU staffing model

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To the editor:

We read with great interest the American Heart Association (AHA) Scientific Statement entitled, “Prevention of Complications in the Cardiac Intensive Care Unit”.¹ We value the authors’ thoughtful approach for how to optimize and improve care delivery in the cardiovascular intensive care unit (CICU). We agree that a dual-trained cardiologist-intensivist is ideal for staffing the CICU to provide the highest quality care. However, most CICUs in the US are not staffed by dual-trained cardiologist-intensivists,² let alone have access to critical care consultants. Despite the existence of 473 dual-boarded cardiologist-intensivists as of 2015, less than a half of a percent of all Medicare CICU admissions were treated by one, highlighting the gross mismatch between what is needed to realize this optimal staffing model and what can actually be provided.² Because few CICUs have dual-trained clinicians, intensivist involvement is a feasible and necessary approach to ensure the best patient outcomes. Unfortunately, a national survey of CICUs conducted by the AHA demonstrated that in 46% of CICUs, an intensivist consult was only sometimes utilized.³

The experience at the University of Maryland Medical Center (UMMC) CICU demonstrated the overall value of a collaborative cardiologist and intensivist model. A mandatory intensivist consult, as compared to no intensivist involvement, resulted in a decreased ICU length of stay (7.4 ± 0.59 days vs 9.6 ± 0.94 days; $p = 0.04$), APACHE II-adjusted mortality (odds ratio: 0.40; 95% confidence interval: 0.24 to 0.65; $p < 0.001$), and ICU and overall hospital cost.⁴ Furthermore, the collaborative model facilitated the use of an analgo-sedation protocol in mechanically ventilated patients, which decreased the per-patient dose and mean daily cost of fentanyl, lorazepam, and propofol.⁵ This protocol, in addition to the collaborative model,

translated into fewer days on the ventilator and significant cost savings (~\$13,000 savings in CICU mean aggregate charges per patient).⁴ The UMMC CICU experience highlights that intensivist involvement fosters patient safety in the CICU and helps prevent the very complications detailed in the authors' Scientific Statement. We believe intensivist involvement, whether in the preferred form of the rare dual-trained cardiologist-intensivist, or the more common general intensivist, should be the standard approach to CICU staffing.

References:

1. Fordyce CB, Katz JN, Alviar CL, et al. Prevention of Complications in the Cardiac Intensive Care Unit: A Scientific Statement From the American Heart Association. *Circulation* 2020;CIR0000000000000909. DOI: 10.1161/CIR.0000000000000909.
2. Blumenthal DM, Mikhael B, Lawler PR, Yeh RW, Metlay JP, Dudzinski DM. Personal and Professional Characteristics of U.S. Dual-Boarded Critical Care Cardiologists in 2015. *Crit Care Med* 2017;45(12):e1292-e1296. DOI: 10.1097/CCM.0000000000002766.
3. O'Malley RG, Olenchock B, Bohula-May E, et al. Organization and staffing practices in US cardiac intensive care units: a survey on behalf of the American Heart Association Writing Group on the Evolution of Critical Care Cardiology. *Eur Heart J Acute Cardiovasc Care* 2013;2(1):3-8. DOI: 10.1177/2048872612472063.
4. Kapoor K, Verceles AC, Netzer G, et al. A Collaborative Cardiologist-Intensivist Management Model Improves Cardiac Intensive Care Unit Outcomes. *J Am Coll Cardiol* 2017;70(11):1422-1423. DOI: 10.1016/j.jacc.2017.07.739.
5. Devabhakthuni S, Kapoor K, Verceles AC, et al. Financial impact of an analgo-sedation protocol for mechanically ventilated patients in a cardiovascular intensive care unit. *Am J Health Syst Pharm* 2020;77(1):14-21. DOI: 10.1093/ajhp/zxz265.

**Response to Letter Regarding Article, "Prevention of Complications in the Cardiac Intensive Care Unit:
A Scientific Statement From the American Heart Association"**

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We appreciate the letter by Ludmir et al. describing the apparent gap between recommendations for high-intensity cardiac intensive care unit (CICU) staffing and historical lack of cardiac intensivist-led care in the United States (U.S.). They propose that routine, general intensivist consultation for CICUs may be a collaborative solution. Specifically, they highlight their single center experience demonstrating that general intensivist care consultation for ventilator and sedation management was associated with decreased length of stay and mortality¹ compared to usual care with a general cardiologist.

The writing group certainly supports collaborative care in the CICU. As highlighted in the current Scientific Statement, as both the complexity of patients and number of advanced care options increase in the modern CICU, there is increasing recognition that dual-trained cardiologists may be best suited to navigate both cardiovascular and critical care issues, along with the organizational, communication, and palliative aspects in this patient population². In fact, a recent AHA committee-led survey of U.S. CICUs found significant heterogeneity in staffing models, including the fact that less than 15% of CICUs staff cardiac intensivists³. Furthermore, another survey of dual-certified cardiologists reported that their additional critical care experience was felt to be necessary in their practice to effectively deliver care in the modern CICU⁴.

It is therefore reasonable for some CICUs to routinely involve general intensivists through consultation, depending on the skill level and expertise of individual cardiologists, existing critical care sedation protocols within their CICUs, and patient-related factors. This may be particularly helpful for those units with cardiac-intensivist coverage gaps or those staffed by physicians who have less in managing non-cardiovascular illness. In contrast, some non-dual trained cardiologists are very adept in the management of critically-ill cardiac patients and a collaborative model may be less effective. As such, the ideal model should be individualized to the local environment.

These intermediary steps, however, belie the fact that the modern CICU should move forward with the goal of centralizing the care of CICU patients with the ongoing global growth in dual-trained, cardiac intensivists. Evidence would also suggest that a closed, cardiac-intensivist model is associated with improved outcomes versus usual care⁵. As such, while a collaborative care model can improve outcomes for some CICUs, medical educators should continue to grow and support training pathways for cardiac intensivists, and hospital systems should ultimately plan to staff their CICUs with dedicated cardiac-intensivists.

References

1. Kapoor K, Verceles AC, Netzer G, Chaudhry A, Bolgiano M, Devabhakthuni S, Ludmir J, Pollock JS, Ramani GV and McCurdy MT. A Collaborative Cardiologist-Intensivist Management Model Improves Cardiac Intensive Care Unit Outcomes. *J Am Coll Cardiol*. 2017;70:1422-1423.
2. Fordyce CB, Katz JN, Alviar CL, Arslanian-Engoren C, Bohula EA, Geller BJ, Hollenberg SM, Jentzer JC, Sims DB, Washam JB and van Diepen S. Prevention of Complications in the Cardiac Intensive Care Unit: A Scientific Statement From the American Heart Association. *Circulation*. 2020;142:e379-e406.
3. van Diepen S, Fordyce CB, Wegermann ZK, Granger CB, Stebbins A, Morrow DA, Solomon MA, Soble J, Henry TD, Gilchrist IC, Katz JN, Cohen MG and Newby LK. Organizational Structure, Staffing, Resources, and Educational Initiatives in Cardiac Intensive Care Units in the United States: An American Heart Association Acute Cardiac Care Committee and American College of Cardiology Critical Care Cardiology Working Group Cross-Sectional Survey. *Circ Cardiovasc Qual Outcomes*. 2017;10:e003864.
4. Brusca SB, Barnett C, Barnhart BJ, Weng W, Morrow DA, Soble JS, Katz JN, Wiley BM, van Diepen S, Gomez AD and Solomon MA. Role of Critical Care Medicine Training in the Cardiovascular Intensive Care Unit: Survey Responses From Dual Certified Critical Care Cardiologists. *J Am Heart Assoc*. 2019;8:e011721.
5. Na SJ, Chung CR, Jeon K, Park CM, Suh GY, Ahn JH, Carriere KC, Song YB, Choi JO, Hahn JY, Choi JH, Choi SH, On YK, Gwon HC, Jeon ES, Kim DK and Yang JH. Association Between Presence of a Cardiac Intensivist and Mortality in an Adult Cardiac Care Unit. *J Am Coll Cardiol*. 2016;68:2637-2648.