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# Further innovation is required to enhance risk prediction of postoperative pulmonary complications—comment on *Anesthesiology and Perioperative Science*. 2023;1(4):34

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## Dear Editor,

I read with interest Tuna and Akgun's review article entitled "Preoperative Pulmonary Evaluation to Prevent Postoperative Pulmonary Complications" and commend the authors on their approach to a complex and persistently underrecognized area of perioperative care [1]. The authors have skillfully identified multiple knowledge gaps in preoperative identification of postoperative pulmonary complications (PPCs) and acknowledge the conundrum of their complex identification. There is growing realization of the disproportionate cost burden of PPC. This is particularly evident in an environment of increasing focus on cost containment of expensive medical interventions and where length of stay reduction continues to be a source of focus in capping healthcare expenditure. However, aggressive discharge practices in the United States may have merely pushed many of these postoperative complications to the post-discharge time period [2].

The preoperative prediction of PPC remains undoubtedly complex, as the authors have demonstrated in their review. This complexity is derived from high variation in presenting pre-morbid conditions, their interaction with surgical risk, and differences in postoperative care. First, similar to other major in-hospital problems (sepsis,

acute respiratory distress syndrome), advances have been hampered by a lack of standardized definitions applied to research in this field, although this is an area of significant interest [3]. Secondly, although a variety of validated clinical support tools exist, as reported by the authors, they remain limited both in broad clinical acceptance and widespread clinical adoption in preoperative evaluation [4]. This may be partially attributed to the sheer volume and diversity of preoperative patients presenting for evaluation.

Simple and cost-effective methods to both identify and precisely integrate patients at high-risk for PPC with appropriate perioperative vigilance are needed. This will likely derive from further advances in 1) global harmonization of definitions of PPCs; 2) integration of artificial intelligence in the electronic medical record to enhance identification of individual risk factors; 3) improved quantitative methods of individualized preoperative cardiopulmonary assessment; 4) increased adoption of protocolized postoperative PPC surveillance; 5) further refinements in PPC treatments. For example, substantial patient safety advancements were observed with the globally standardized definitions of acute respiratory distress syndrome derived from the American-European Consensus conference (1994) and the benefits of low-tidal volume strategy observed shortly thereafter [5]. Adoption of individualized cardiopulmonary assessment have shown significant promise in reducing morbidity, reducing length of stay, and healthcare cost expenditure [6]. Similarly, adaption of artificial intelligence has been observed to facilitate estimation of morbidity and

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mortality risk, bringing a potential revolution in individualizing patient risk profiles, enhanced PPC prediction, and thereby reducing burdens on overtaxed healthcare teams and systems [7, 8]. As global surgical volume continues to rise past 300 million per year, these transformational adaptations will enhance patient safety and decompress the burden on healthcare teams. Until then, comprehensive education remains the best tool perioperative clinicians have to quantify risk and provide appropriate anticipatory vigilance for high-risk patients.

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#### Declarations

#### Competing interests

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