In summary, this study confirms that pneumonectomy is associated with significant mortality, although lower in this series than in most in the literature. It also highlights the importance of using both 30-day and 90-day mortality after pneumonectomy in efforts to improve patient care and as a health care quality metric. Specifically, discharge survival at after 30 days is misleading in terms of health care and inaccurate as a quality measure. Readmission after pneumonectomy confers significant risk of mortality until at least 90 days after surgery, and additional investigation is required to determine which patients are not ready for discharge (despite meeting discharge criteria) and whether failure to rescue is a result of delayed readmission (due to either medical or non-medical factors) or insufficient care after readmission. Thus, patients are not home-free until

they are home 90 days after pneumonectomy, and we are responsible for improving the decisions regarding discharge, readmission, and rescue.

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Commentary: John Snow, pneumonectomy, and complication epidemiology

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More than 150 years after John Snow used epidemiologic techniques to identify the origins of a London cholera outbreak and changed the face of modern epidemiology, little is known about the epidemiology of complications after surgery. Old adages like the “Rule of W” have predominated our thinking and teaching. Although some recent efforts have been made to try to use large data sets to study these phenomena,¹ very little is actually known about the temporal occurrence patterns, severity, and sequelae of postoperative complications. Complications seem to come in waves, one thing after another, complications seemingly leading to more complications. Yet we’ve only started to scratch the surface in our understanding and quantification

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CENTRAL MESSAGE

John Snow used epidemiology to solve a cholera outbreak in London in 1856. We need similar efforts to solve a difficult problem in 2020—that of complications after pneumonectomy.

of how individual postoperative complications are linked together.²

Jones and colleagues³ have made an effort to examine some of these phenomena in patients undergoing pneumonectomy at Memorial Sloan Kettering Cancer Center in New York. Pneumonectomy is an operation not only with high rates of complications but a specific risk profile and

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constellation of problems that can arise at varying times, with potentially disastrous outcomes if mismanaged. The authors should be commended for trying to apply the principles that John Snow demonstrated in Soho, London, in 1856 to modern surgery, and using solid statistical and epidemiologic technique, they make a strong case that a 90-day cut point is most appropriate for measuring the provision of safe and high-quality care for patients receiving pneumonectomy, rather than 30 days as has been traditionally used.

Jones and colleagues outline the decay in the rates of non-oncologic death out to 90 days and document the increase in oncologic causes of death thereafter. Of note, many of their patients who went for pneumonectomy did so after receiving neoadjuvant therapy and had reasonable morbidity and mortality rates, which argues against the long-held dogma that pneumonectomy should not be undertaken after neoadjuvant chemo- or radiation therapy—in their hands, it appears relatively safe. The findings in this paper are important, but they point to a more urgent need for granular data on complication epidemiology. What is the peak incidence for atrial fibrillation, or acute myocardial infarction? What about the timing of empyema? And the incidence and severity of pneumonia or acute respiratory distress syndrome? Once they've occurred, what happens to the patients, and what other complications come along later? Answering these questions will not only “directly impact patient care,” as the authors put it, but also allow us to interrupt these

sequences of complications that so often result in death when allowed to propagate—so-called failure-to-rescue. However, beyond examining solely readmission and mortality, what we need is to examine information on specific complications and constellations of complications. This will almost certainly require multi-institutional clinical data-collection efforts, as has been done for esophagectomy in the EsoData or the Oesophago-Gastric Anastomosis Audit,⁴ or data of the type that is being collected in quality-improvement collaboratives like the Michigan Society for Cardiovascular and Thoracic Surgeons quality collaborative.⁵ To finish what John Snow started, we need to leverage these networks to study the epidemiology of post-pneumonectomy complications and mortality, among the most difficult problems faced by the modern thoracic surgeon.

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