difference between invasive and noninvasive ventilation. Whether the difference can be solely attributed to disease severity or explained by other factors, such as hospital characteristics, remains to be elucidated. ■

Author disclosures are available with the text of this letter at www.atsjournals.org.

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Reply to Soo Hoo and Esquinas

From the Authors:

As has been demonstrated in both randomized trials and through causal inference methods applied to real-world data, the application of noninvasive ventilation can reduce the risk of mortality compared with usual care by approximately 50% among patients hospitalized for severe exacerbation of chronic obstructive pulmonary disease (COPD) (1). In fact, noninvasive ventilation is the only therapy we offer to patients in the inpatient setting that has been shown to have a mortality benefit. It is thus encouraging to note that the use

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of noninvasive ventilation has increased steadily in recent years, eclipsing invasive ventilation as the initial strategy of choice in the management of acute respiratory failure (2).

Our recent study focused on exploring the dynamic nature of the risk of readmission and death in the year after a hospitalization for COPD (3). Our key finding was that the risk of adverse events remains high for an extended period after hospitalization and that the time required for the risk of *readmission* to fall by 50% and ultimately plateau is far longer in both absolute and relative terms compared with the risk of *death*. Moreover, in comparison with elderly Medicare beneficiaries without a history of hospitalization for COPD, the risk of admission and death remains many times higher than that observed in age-matched control subjects even 1 year after discharge. Our analysis highlighted the short- and long-term vulnerability of patients after hospitalization for COPD, particularly among those treated with mechanical ventilation—both invasive *and* noninvasive—and suggested that care management interventions limited to a brief period after discharge may be insufficient to improve long-term outcomes.

Importantly, our analysis was limited to patients who were discharged alive from the hospital. As Dr. Soo Hoo and Dr. Esquinas note, among patients who survived to discharge, mortality at 1 year was 45.7% in those treated with invasive ventilation as compared with 41.8% in those treated with noninvasive ventilation (an 8.5% relative difference). Conversely, readmission was actually *more* common among those treated with noninvasive ventilation than among those treated with invasive ventilation. Although these differences were not negligible, the magnitude of the mortality benefit was greatly attenuated compared with estimates derived from studies that included inpatient outcomes. Finally, the figures we created were intended to reveal the daily risk of death and readmission; in this context, the trajectories were nearly indistinguishable, especially with increased time after discharge. ■

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eHealth in Cystic Fibrosis: Promising, but Proof of Concept Is Still Needed

To the Editor:

Our monthly Twitter-based University of Toronto Respiriology and Sleep Journal Club (@respandsleepjc #rsjc) recently discussed the eICE (Early Intervention in Cystic Fibrosis Exacerbation) study by Lechtzin and colleagues on the use of eHealth for earlier identification and treatment of cystic fibrosis pulmonary exacerbations (1).

In this multicenter randomized clinical trial, electronic transmission of home spirometry and symptom diary was compared with usual care. The study results would have been more robust had there been an attempt at blinding. However, the audience agreed that it is likely unethical to design a control group in which participant data that should trigger an acute medical visit would be ignored (2). Furthermore, it is important to note that the study participants had relatively preserved lung function: more than 60% had FEV₁ ≥ 75% predicted.

Pulmonary exacerbations were identified earlier in the intervention group; however, this did not result in less lung function decline as measured by FEV₁ after 1 year (primary outcome). The audience identified elements in study design and implementation that may have biased toward a negative result.

One major drawback of the study is that adherence with data transmission using the eHealth device was low. Only 50% of participants used the device at least once per week on greater than 80% of their follow-up weeks, and only 19% of patients adhered to twice-weekly transmission, which would bias results toward the null. Including descriptive data of participants who were more likely to be adherent would have been informative.

Furthermore, 68% of alarms were triggered as a result of a decline in FEV₁ without a concomitant change in symptoms. Thus, changes in FEV₁ may have been secondary to poor spirometry technique, rather than pulmonary exacerbation. It was discussed that it would have been more rigorous to perform quality control to measure whether home spirometry met American Thoracic Society criteria (3).

There was a significant and differential loss to follow-up: 24% in the early intervention and 16% in the usual care group. The study authors specified in the online supplement that imputation for missing data was not attempted. This implies that the last observation was carried forward, which does not fit the definition of a true intention-to-treat analysis.

More data regarding cointerventions would have informed whether both study groups were treated equally, aside from the experimental intervention. A higher proportion of exacerbations in the early intervention group were treated with oral antibiotics, and conversely, a higher proportion was treated with intravenous antibiotics in the usual care group. Additional data to include would have been choice and duration of antibiotics, compliance with chest physiotherapy, standard-of-care therapies, and dietary interventions (4, 5). The abovementioned differences in therapy could account for the trend observed in body mass index and respiratory symptom improvement.

In summary, this was a timely trial measuring the effect of health technology on outcomes in the relatively young, and presumably tech-savvy, cystic fibrosis population. In theory, one would expect positive results from eHealth; however, it is important to rigorously study these interventions before adopting them (6). Although the study was well conducted overall, the methodological elements outlined here may have biased this trial toward a negative result. ■

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4. @thelungdr. #rsjc There is no mention of concomitant treatments- or std therapies- over 50% of pt have PsA – no mention of rest in supplement [posted 2017 Nov 16]. Available from: <https://twitter.com/thelungdr/status/931320436914241536>.