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## EDITORIAL

# Improving reporting of ICU outcome data

Clinical studies reporting outcomes after intensive care admissions are often published, including in this journal.<sup>1</sup> This is a field with much research activity, and with widespread clinical interest. For observational cohort studies, it is strongly recommended that authors form their reports using guidelines presented by the STROBE (Strengthening the reporting of observational studies in epidemiology) group,<sup>2</sup> and these recommendations are designed to strengthen the report based on their observations. This guideline reminds authors what to include in the different parts of the manuscript, focusing on key elements. However, STROBE does not describe in detail **what** to report from the clinical settings and what variables that is **necessary** in order to interpret the results in a correct manner. Such more detailed guidelines for clinical studies are emerging now for some specific categories of patients.<sup>3</sup> Such detailed guidelines will obviously also be important for journals, editors, and reviewers in their assessment of manuscripts. An obvious question follows: how rigorously do authors and peer-reviewers use these detailed guidelines? While it is relatively simple to state that one or another reporting recommendations or study design recommendations were followed, how rigorously are the recommendations actually followed is another matter. The STROBE recommendations do not specify (for example) which variables- outcomes, exposures, predictors, confounders or effect modifiers- to include for a specific study question. Nor is it specified exactly what authors should do to address potential sources of bias. But these critical elements need to be present if the report is going to be able to answer the study question as best it can. This is true for observational studies in intensive care medicine, as well.

Why is it important to raise awareness of the content, or critical elements, of outcome studies from intensive care? Broadly, such outcome studies can be divided into 2 types: one with reporting of objective data as survival, length of stay, duration of mechanical ventilation for example, and the second with studies analysing patient-reported outcomes like quality of Life. This editorial note will focus on the first type.

The quality and hence impact of many studies on ICU outcomes are often modest, usually because the findings are not including important clinical data either on outcome, or more commonly they lack factors needed to understand why outcomes become as they are reported. As a part of the quality process for reporting such analyses, it is required that a minimal data set is studied and described properly. This can be difficult in retrospective studies, since the investigators often have only limited access to the data which often also are missing. Such data can

be a description of the severity of illness, which is extremely important if the study reports outcomes for mortality or survival. Luckily, in most Nordic ICUs collection of such data is mandatory for reporting to national ICU process registries in Finland, Sweden, Denmark, and Norway. However, not all ICUs contribute to such registries, and certainly not elsewhere in Europe. Therefore, a retrospective study on objective outcomes without any severity data will be difficult to compare to similar studies using the same cohorts. Also, case-mix is important. Far too often, all kinds of ICU admissions are added in one large “melting pot” of a cohort. This lack of refinement of cohorts can be misleading. A good example is planned vs unplanned ICU admission. Most often, planned admissions are composed of patients after elective surgery. Such patients have the “luxury” to have had a thorough

**TABLE 1** Required and optional descriptors required in manuscripts based on observational studies with ICU outcomes

Descriptors (variables)	Required	Optional
Patients	Total number admitted <sup>a</sup>	Number in subgroups
Age	Yes (median)	Age groups
Gender	Yes	
Length of stay	ICU <sup>a</sup> and Hospital	30 day/other fixed interval
Admission groups	Planned/ Unplanned	More details of unplanned
Diagnosis	No	Diagnostic groups
Severity of disease	SAPS/APACHE/MPM	Organ dysfunction score
ICU procedures	Ventilation (number of pts)	Other ICU procedures
Duration of procedures	No	Yes (in hours)
Withholding/ withdrawal	No	Yes (number in each group)
Frailty/Comorbidity etc	No	Yes
Survival/Mortality	Yes (ICU and one month)	Long term (> 1 month)

Note: Abbreviation: APACHE, Acute Physiologic Assessment and Chronic Health Evaluation; MPM, Mortality Prediction Models.

<sup>a</sup>Do not exclude patients < 24 hours admission, will unable comparisons.


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pre-operative evaluation, hence also a pre-ICU examination, which may lead to pre-operative interventions and optimization, resulting in patients who in general can be in physiologically better shape after surgery. The result is that mortality in such groups is often much less than in unplanned admissions.<sup>4</sup> Hence, the number of planned vs unplanned admissions is critical to address and adjust for in mortality analysis. Studies with a case-mix including planned admissions should report mortality of both groups separately. Most severity of disease scores often includes a case-mix description in the score like the Simplified Acute Physiology Score (SAPS II) with acute medical, acute and planned surgical admission, and assign different weights to these groups.

A last important issue is not to exclude patients who apparently were admitted only for a very short period in the ICU. For unclear reasons this is often done, even though this will not allow a complete analysis of the ICU cohort. Scandinavian ICU's in particular have a short length of stay (LOS). In these cases, to exclude patients admitted < 24 hours will exclude more than 50% of all ICU deaths in some age-cohorts. This has been documented in a study from Norway, Sweden, and Finland where the median LOS of non-ICU survivors in the age group  $\geq 80$  years are < 24 hours.<sup>5</sup>

As a reminder for authors submitting results from observational studies after ICU admissions to this journal, we have created a checklist (Table 1) we hope can be of help. Some of the variables we perceive as required and some are optional pending on the scope of the study. This checklist is the authors opinion as editors and reviewers in this journal, and as investigator in outcome studies of ICU patients. A natural extension would be a consensus-based list of necessary variables in epidemiological studies in intensive care. We are convinced that this will increase the quality and hence the impact of such studies published in Acta Anaesthesiologica Scandinavica.

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