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# Defining the characteristics and expectations of fluid bolus therapy: A worldwide perspective☆,☆☆,★,★★,☆☆☆

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ABSTRACT

*Purpose:* The purpose of the study is to understand what clinicians believe defines fluid bolus therapy (FBT) and the expected response to such intervention.
*Methods:* We asked intensive care specialists in 30 countries to participate in an electronic questionnaire of their practice, definition, and expectations of FBT.
*Results:* We obtained 3138 responses. Despite much variation, more than 80% of respondents felt that more than 250 mL of either colloid or crystalloid fluid given over less than 30 minutes defined FBT, with crystalloids most acceptable. The most acceptable crystalloid and colloid for use as FBT were 0.9% saline and 4% albumin solution, respectively. Most respondents believed that one or more of the following physiological changes indicates a response to FBT: a mean arterial pressure increase greater than 10 mm Hg, a heart rate decrease greater than 10 beats per minute, an increase in urinary output by more than 10 mL/h, an increase in central venous oxygen saturation greater than 4%, or a lactate decrease greater than 1 mmol/L.
*Conclusions:* Despite wide variability between individuals and countries, clear majority views emerged to describe practice, define FBT, and identify a response to it. Further investigation is now required to describe actual FBT practice and to identify the magnitude and duration of the physiological response to FBT and its relationship to patient-centered outcomes.



## 1. Introduction

Fluid bolus therapy (FBT) is one of the most common interventions in intensive care. However, uncertainty exists regarding the strength of the evidence associating FBT with an independent improvement in patient centered outcomes and doubt about the magnitude and duration of its physiological effects [1–4].

Recently, 3 large, multicenter, randomized controlled trials of the management of severe sepsis demonstrated significant differences in the volume of fluid administered over the first 6 hours of the management of sepsis in critically ill patients [5–7]. In addition, other studies have demonstrated little consistency in regional definitions of FBT [8,9]. Furthermore, definitions and clinicians' expectations of the physiological effects of FBT have been shown to vary significantly within a single country [10], whereas the use of hydroxyethyl starch solutions (HES) has become controversial due to reported evidence of harm [11]. However, at an international level, there is little information on self-reported FBT practice, on what defines an FBT, and on the expected physiological effects that would confirm a response to FBT for clinicians. Moreover, substantial difference between stated and recorded practice would indicate a significant degree of cognitive dissonance among intensivists providing this essential medical therapy.

Accordingly, we conducted an international survey of intensive care specialists. Our objectives were to determine their current self-reported practice, their views of what defined FBT, and their assessment of what would constitute a response to FBT.

## 2. Methods

### 2.1. Ethics approval

This study was approved by both our local hospital (HREC no. LNR/14/Austin/197) and the Monash University Research Ethics Committee (project no. CF14/2539-2014001354). Completion of the survey questionnaire was deemed to imply consent.

### 2.2. Survey design and pilot phase

We used an established electronic survey delivered via a commercial Web-based survey instrument (www.SurveyMonkey.net, Palo Alto, CA). We designed a simple questionnaire that could be answered in less than 10 minutes while still providing comprehensive information about the volume, the rate of administration, and the types of fluids used for FBT as well as the expected physiological changes that would define a response to such therapy. This survey was originally piloted in an Australian metropolitan, tertiary referral university hospital and revised before being distributed to Australian and New Zealand intensivists and emergency physicians in a wider pilot project which has since been published [10]. No changes were made as a result of this second pilot phase. The survey is included in the electronic supplemental material (ESM). The survey was in English only.