Clinical Profile:
Trauma (traw má) [Gr. trauma, wound]. 1. A physical injury or wound caused by external force or violence. 2. An emotional or psychological shock that may produce disordered feelings or behavior.1

Traumatized patients with bodily injury or illness require expedient, thorough and advanced critical healthcare. Essential, therefore, is the vital accuracy in hemodynamic measurement of preload to optimize cardiac output and oxygen delivery.2 Such assessment has historically been performed using filling pressures [central venous pressure (CVP) and pulmonary artery wedge pressure (PAWP)], due to an assumed correlation with end diastolic volume.3 A new generation of volumetric measurements, right ventricular ejection fraction (RVEF) and right ventricular end diastolic volume (RVEDV), however, offers another method of assessment, which is evaluated herein.

Correlations:
• Correlation #1: RVEDVI and SI / CI
Following volume administration over 30 minutes, changes in SI have been shown not to correlate with RAP or PAWP but did correlate with RVEDVI. In patients with RVEDVI greater than 140 ml/m², the fluid challenge increased RAP and PAWP, and decreased LVSWI.4 Discrepancies between PAWP and RVEDVI occurred in more than 50% of patients studied and demonstrated that RVEDVI more accurately predicted preload recruitable increases in CO. In a study conducted by Karen Saftsak, R.N., et al., it was surmised that the RVEDVI (rather than pulmonary artery occlusion pressure [PAOP]) better correlates with CI in assessing the ventricular preload of surgical, trauma, post shock volume-resuscitated and respiratory failure patients, making RVEDVI “the new gold standard in the assessment of ventricular preload”.5 Studies have confirmed the superiority of RVEDVI over RAP as an indicator of RV preload.6

• Correlation #2: RVEF and trauma survival
In trauma patients, survival has been shown to depend upon right ventricular function. In a study of 17 trauma patients, patients demonstrated a decrease in RVEF. In survivors, RVEF improved over 8-12 hours; in non-survivors, RV function continued to deteriorate.7

• Correlation #3: RVEDVI and trauma survival, intestinal perfusion and resuscitation
The results of a resuscitation study by Dr. Michael Cheatham, et al., demonstrated that optimal oxygen delivery and tissue perfusion, regardless of ventricular function, is a more individualized (per patient) method for resuscitation, than utilizing RVEDVI, CVP, or PAOP measurements alone for volume resuscitation.8 Trauma patients resuscitated to an RVEDVI of 120 ml/m² have significantly better visceral perfusion than those patients resuscitated to 90 to 100 ml/m² with inotropic augmentation of blood pressure as needed.9

Outcome:
It has been recognized that a new catheter, combining SvO2 with RVEF, RVEDV measurements and continuous thermodilution cardiac output (CTCO), will yield not only information regarding oxygen consumption and delivery, but will also permit a better understanding of hemodynamics. Loren D. Nelson, M.D. concluded in his report that the combination of intravascular pressure measurements and continuous cardiac output (CCO) also allows calculation of left ventricular (LV) and right ventricular (RV) stroke work that, “under conditions of steady state preload and afterload, reflect the contractile function of the heart as a determinant of cardiac performance.” On a near continuous basis, the critical care team will thus be provided with complete hemodynamics and oxygen transport values.10
The quotes and information referenced in this brochure were selected from independent third party publications and are not intended to suggest that such third parties have reviewed and/or endorsed Edwards’ products.

References:
1. Taber, CW (1977); Taber’s Cyclopedic Medical Dictionary (13th edition): Philadelphia: FA Davis Company
6. Edwards JD., "Time for a Reappraisal of the Use of the Right Ventricular Ejection Frac
Thermodynamic Catheters?", Critical Care Medicine, 1994;26:1769-1770.