

## **Hospital Cost Analysis:** The Economic Significance of Implementing Cardiotronic® Non-invasive Hemodynamic Monitoring in the Intensive Care Unit.

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### **KEY ADVANTAGES** of Cardiotronic® EC™ monitor implementation:

- § Potential hospital savings of **\$352,320** annually in the Adult ICU, plus the possibility of further savings in the PICU and NICU.
- § A staggering **91%** and **81%** reduction in hemodynamic monitoring costs when replacing PAC and Vigileo® procedures, respectively.
- § Eliminates all risks associated with invasive and minimally-invasive hemodynamic monitoring procedures.
- § A savings of over 350 hours of medical staff time annually



Continuous cardiac output (CO) and hemodynamic monitoring has created much interest as a mainstay in the critical care setting, giving physicians a tool for managing fluid, titrations, and most importantly patient recovery.<sup>1</sup> When used in conjunction with goal-directed fluid administration, measures of CO have been shown to reduce morbidity, reduce length of hospital stay, and improve overall patient outcome.<sup>2</sup> Traditionally, an invasive catheter (PAC) inserted in the pulmonary artery had been required to obtain CO, but not without the associated risks and complications as normally seen with invasive procedures. As technology advances, physicians prefer to move away from the complications related to invasive methods, to more minimally or non-invasive techniques that provide simpler and safer care.

With the frequent reduction of funding and cost-cutting by U.S. hospitals, it has become increasingly important to analyze cost comparisons in the ICU – one of the most expensive departments of hospitals. Three different methods of monitoring CO are analyzed: the invasive **PAC (Pulmonary Artery Catheter)**, minimally-invasive Edwards Lifesciences® **Vigileo®/Flo-trac®**, and the completely non-invasive **ICON®/AESCULON®** using Electrical Cardiometry™ (EC™) technology from Cardiotronic, Inc.®.

### **Cost Analysis per 48 Hours of Continuous Hemodynamic Monitoring**

	<b>PAC</b>	<b>Vigileo®/Flo-Trac®</b>	<b>ICON®/AESCULON® (EC™)</b>
<b>Method</b>	Invasive	Minimally Invasive	Non-invasive
<b>Materials*</b>	\$261	\$125	\$20
<b>Labor and Facility**</b>	\$196	\$98	\$22
<b>Fluoroscopy / X-ray</b>	\$25 <sup>3</sup>	\$0	\$0
<b>Total procedure cost per patient</b>	\$482	\$223	\$42
<b>Annualized cost per 800 patients</b>	\$385,600	\$178,400	\$33,280

**Table 1:** \*Represents required disposables purchased from manufacturer. \*\*Based on hourly clinical ICU cost of \$392/hr<sup>4</sup>

### Total Annual Savings by percentage of PAC procedures replaced by EC™

No. PAC procedures per month	25%	50%	75%
10	\$13,212	\$26,424	\$39,636
25	\$33,030	\$66,060	\$99,090
50	\$66,060	\$132,120	\$198,180
75	\$99,090	\$198,180	\$297,270

**Table 2: A 100% replacement of PAC procedures per 800 patients results in an annual savings of \$352,320.**

### Total Annual Savings by percentage of Vigileo® procedures replaced by EC™

No. Vigileo® procedures per month	25%	50%	75%
10	\$5,442	\$10,884	\$16,326
25	\$13,605	\$27,210	\$40,815
50	\$27,210	\$54,420	\$81,630
75	\$40,815	\$81,630	\$122,445

**Table 3: A 100% replacement of Vigileo® procedures per 800 patients results in an annual savings of \$145,120.**

Due mostly in part to the minimal staff time and minimal cost of disposables required for the Cardiotronic® EC™ monitors, an annualized hospital savings per 800 patients when compared to PAC and Vigileo® would be **\$352,320** and **\$145,120**, respectively. Measurement using EC™ monitors requires only four surface electrodes, and does not require highly skilled staff for the application. Staff time required for the application of EC™ monitors would take no more than 3-5 minutes, resulting in an annual reduction of more than **350 hours** of staff time when compared to PAC procedures.

Furthermore, Cardiotronic® EC™ monitors are FDA approved for all patient populations, and hospital cost savings may also apply to the Pediatric ICU and Neonatal ICU in addition to the Adult ICU. By implementing Cardiotronic® EC™ monitors in the ICU, hospital administration will gain considerable economical and operational benefits including reductions in costs, procedural risks, and medical staff time.

<sup>1</sup> J. Brombacher, I. Hodzovic, S. Ridgway, T. Mian & J. Mecklenburgh : An observational study of cardiac output changes during regional anaesthesia in patients with fractured neck of femur.. *The Internet Journal of Anesthesiology*. 2009 Volume 21 Number 1

<sup>2</sup> Gan TJ, et al. Goal-directed intraoperative Fluid administration Reduces Length of Hospital Stay after Major Surgery.. *Anesthesiology* 2002, 97:820-826

<sup>3</sup> Silver M, et al. Evaluation of Impedance Cardiography as an Alternative to Pulmonary Artery Catheterization in Critically Ill Patients. *Congestive Heart Failure* March/April 2004, Supplement 2:17-21

<sup>4</sup> Squara P. The Clinical & Economic Value of Implementing Noninvasive Hemodynamic Monitoring in Critical Care Settings. *Economic and Efficiency Consideration in the ICU White Paper*, 2009