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# Evolution of Hemodynamic Guidance Systems

**Dr Geoffrey Parkin**

**Medical Director & Chief Scientific Officer,  
Applied Physiology**

**Date:** Saturday, 31 October, 2009

**Time:** 7.00 am – 8:15 am

**Venue:** Meeting Room 6, Level 2,  
Perth Convention & Exhibition Centre

**RVSP:** by 26 October

**Cost:** no charge (breakfast provided)  
places are limited so please RSVP early

**Registration Via Fax (+61 2 9439 2157) or Email to**  
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# Evolution of Hemodynamic Guidance Systems

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## **Presentation Synopsis:**

Despite major improvement in hardware quality and software utility, the information content of acute care bedside monitor outputs has undergone but modest change in the last quarter century.

If the reason for having a monitor is to respond to changing numerical outputs, why not formalize the relationship between monitored data and therapeutic response? This is an aim of the next generation of acute care monitoring, continuous therapeutic guidance.

Each cardiovascular dynamic signal (MAP, CO etc.) has volumetric, resistive and cardioactive content. The clinician or machine guidance task is to evaluate the present and desired values of these therapeutic states continuously from the data together with circulatory flow and pressure targets. The definition of state and the targets themselves may be controversial.

Atrial, ventricular and pulmonary vascular pressures and volumes are some of a plethora of preload measures that have been used as uncertain proxies for the volume state. They attest to the difficulties that beset this area. The notion of volume responsiveness is a revisited pragmatic approach to the volume question but presently requires positive pressure ventilation and a stable heart rate, limiting its general applicability.

There is, separately, the question of how one continuously evaluates the performance of the heart, to guide inotropic use for example.

Approaches to the solution of these difficult clinical issues vary widely. At one extreme the task can be seen as a black box problem with therapeutic inputs and data outputs and some form of optimization approach to their stable association.

At the other, the solution appears to yield to physiological insight and new ways of thinking about circulation control.

There is no question that thinking deeply about how to autonomously guide the circulation enriches learning and experience to the improvement of clinical performance.