LiDCO

Hemodynamic Monitoring

- Optimise your patients hemodynamic status
- Non Invasive, Minimally Invasive, Calibrated, Depth of Anesthesia
- Parameters include CO, SV, SVV, SVR, DO_2i

200+

Clinically proven with 200+ Clinical Papers

Operating Theatre, ICU, Emergency Department and Other High Risk Areas

UK Brochure

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Features

The LiDCOunity monitor is a single platform which combines both the LiDCOplus and LiDCOrapid functions. This provides a single solution to monitoring needs throughout the hospital.

- The clinician can choose which mode is most appropriate to the clinical situation.
- The LiDCOunity can be used non invasively, minimally invasively with a radial arterial line and can be calibrated with the lithium dilution technique.
- It is the only technology available that can be calibrated with a standard radial arterial line and without the need for a central line.
- The LiDCOunity uses the PulseCO™ algorithm which converts blood pressure to its constituent parts of flow (CO, SV) and resistance (SVR).
- The PulseCO™ algorithm is scaled to each patient with either the lithium dilution technique or the nomogram using age, height and weight.

LiDCOunity delivers

- 3 in 1 platform for monitoring in any clinical situation
- Quick & easy set up
- Non invasive or minimally invasive solution
- Beat to beat hemodynamic parameters (CI, SVI, SVV, PPV, SVRI)
- Continuous blood pressure monitoring (MAP, SBP, DBP)
- Clear and intuitive customisable information screens
- Ideal solution for GDFT and hemodynamic monitoring of the unstable patients

CONTACT

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Hemodynamic Monitoring for the entire patient pathway

From the ED to the OR to Critical Care and other High Care departments. LiDCOunity has the flexibility to enable continuity of measurement across patient acuity levels

Emergency Department

LiDCO is used in the emergency department to assist with the early identification of sepsis and the resuscitation of trauma patients

- Evaluate hemodynamic status
- Exclude haemorrhage
- Early hypovolemia diagnosis
- Guide fluid resuscitation
- Early identification of Sepsis
- Guide fluid titration of inotropes

Operating Room

The goal in the OR is to optimise fluid and drug therapy prior and during surgery. Successful hemodynamic monitoring in OR reduces the resources need for high-dependency (ICU)

- Switch seamlessly between Non Invasive and Minimally Invasive
- Measure Depth of Anesthesia using BIS
- Elected bowel surgery, Aortic aneurism, Vascular surgery

ICU

Recent guidelines published by a Task Force of the ESICM and by the Surviving Sepsis Campaign highlight a need for continuous advanced hemodynamic measurements to guide fluid and drug management

- Can be calibrated with an existing arterial line and peripheral venous access
- Monitoring can be started on admission
- Assess if the patient is fluid responsive
- Start appropriate drug therapy

Other High Risk Areas

LiDCO hemodynamic monitoring systems are used within other high-risk areas. The goal in other high-risk areas is to provide continuous blood pressure monitoring during high-risk procedures such as

- Emergency caesareans
- Maternity
- Cath Lab
- Burns
- Transplant
- Other high dependent areas

LiDCO unity

Minimally Invasive

- Plug and play from existing vital signs monitor
- Arterial line input without needing to change your pressure transducer
- Validated PulseCO™ algorithm reliably tracks hemodynamic changes in the presence of inotropes and vasoactive drugs
- Beat-to-beat analysis and display of hemodynamic parameters

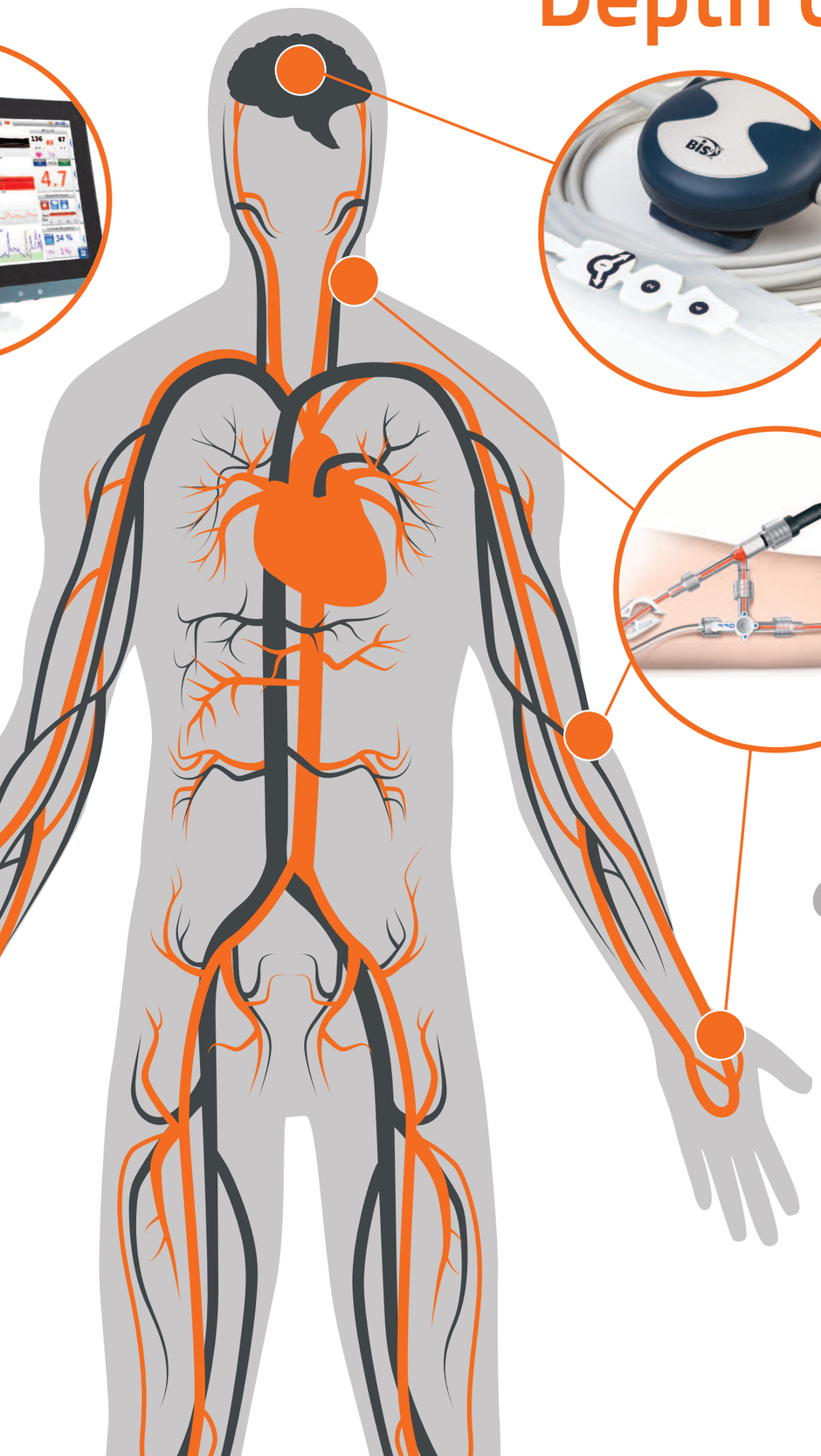
LiDCO rapid

LiDCO Hemodynamic Monitoring

Non Invasive

- Quick and easy to set-up
- Real-time continuous non invasive blood pressure (CNAP™) and hemodynamic parameters
- Proven to be as effective as an arterial line to monitor fluids when used with the PulseCO™ algorithm
- Dual finger sensor with automatic finger switching for safer non invasive use
- Ability to calibrate with a BP cuff measurement

LiDCO CNAP



Depth of Anesthesia

- Integrated into the LiDCO
- Enables clinicians to titrate anesthesia with its hemodynamic effects
- Stops over-anesthetising, nor under-anesthetising
- Stops dramatic falls in blood pressure and flow

LiDCO BIS

Calibrate

- Continuous real-time measurement with lower risk and high precision
- Calibrate using LiDCO Lithium technology or another absolute cardiac output measurement value
- Reduced infection risk with less invasive catheters with use of existing arterial lines and peripheral venous access

LiDCO plus

One Disposable

- Switch monitoring seamlessly with one disposable Smartcard
- Smartcard carries key patient information between different LiDCO Monitors to ease set-up and monitoring

Screen Guide

Designed to support your clinical decision making

Long Term Trend

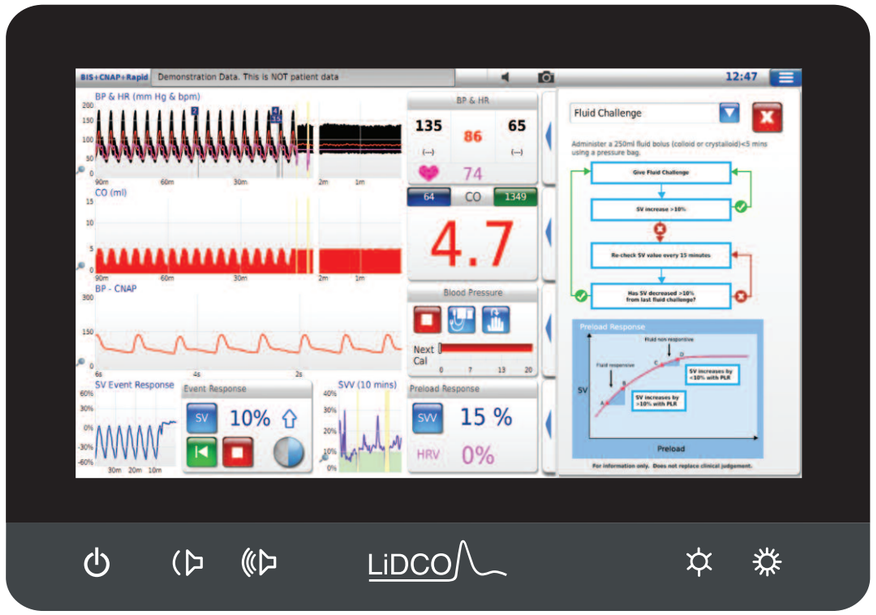
Easy interpretation of trends from the start of monitoring, which can be customised to the parameters you need

Short Term Trend

2-minute window for greater focus on the immediate response to interventions

Protocols

Decision support can be customised to individual hospitals



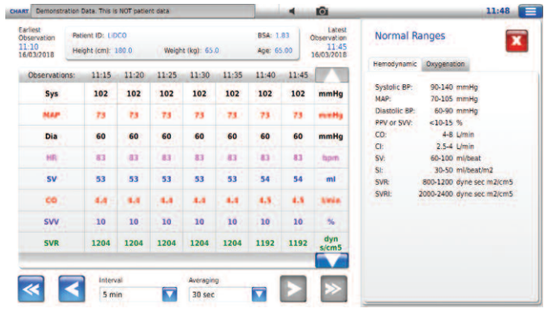
Numeric data display to assist in recording values for routine clinical charts. The chart display Long term, 2-minute short term trend, event response and preload response screens for LiDCOunity.

Event Response

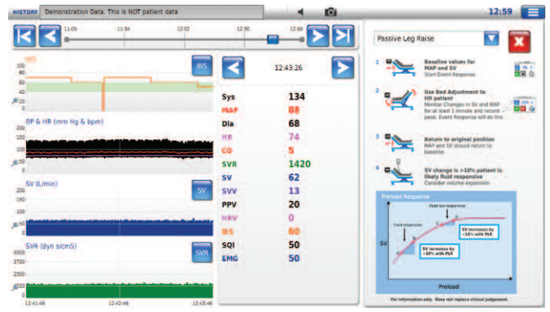
Marking and monitoring events like a fluid challenge

Preload Response

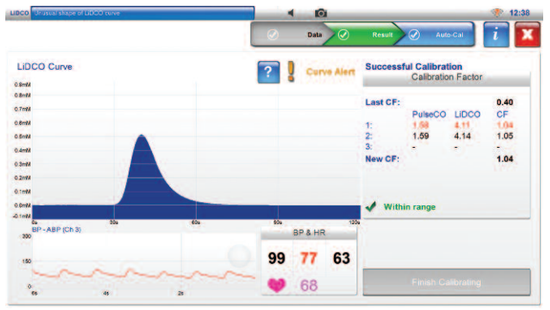
Window displays preload response values or volume status indicators of: Pulse Pressure Variation (PPV%) and Stroke Volume Variation (SVV%)



Numeric data display to assist in recording values for routine clinical charts. The chart display displays all absolute and index values

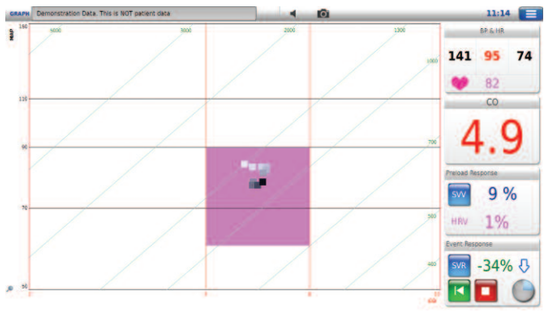


Touch on any point of the history to review hemodynamic values and review key events

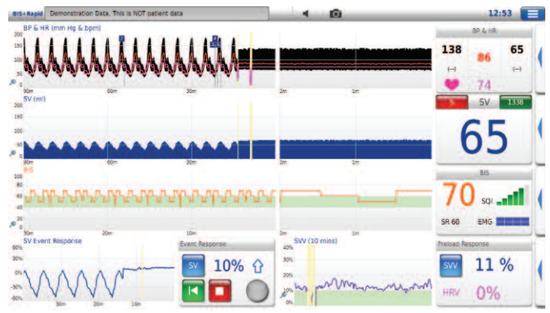


LiDCOplus successful lithium dilution calibration

LiDCOrapid key physiology targets and events screen



LiDCOrapid hemodynamic target screen, helpful for GDFT



Monitor brain activity with the BIS trend screen

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LiDCO Training Programmes

Royal College of Nursing

RCN ACCREDITED

RCN accredited until February 27th 2019 – Accreditation applies only to the educational content of the programme and not to any product

LiDCOplus Cardiac Output Monitoring - Royal College of Nursing Accredited

A Royal College of Nursing accredited study day for Cardiac Output Monitoring.

Who should attend?

- Critical Care Nurses
- Professional Development Nurses
- Junior Doctors

Topics Include:

- Anatomy and physiology of cardiac output
- Relevant clinical research
- Practical, hands-on sessions with simulators
- Competency based assessment

LiDCOunity

This one day course has been specifically designed to give our delegates the practical skills and interpretive knowledge underpinned by current theory and research to successfully utilise our monitor in the care setting. Nurses will have the practical skills, confidence, and knowledge to use the equipment along with the tools necessary to facilitate their colleagues' development. Upon successful completion, delegates will receive an RCN certificate and knowledge pack to take back to their units where they can be a great resource for the rest of the team.

Hemodynamic Parameters

Parameter	Equation	Normal Range
Normal Hemodynamic Parameters - Adult		
Arterial Blood Pressure (BP)	Systolic (SBP)	90 - 140 mmHg
	Diastolic (DBP)	60 - 90 mmHg
Mean Arterial Pressure (MAP)	SBP + (2 x DBP)/3	70 - 105 mmHg
Systolic Pressure Variation (SPV)	(SPmax-SPmin)▼	<5 mmHg unlikely to be preload responsive >5mmHg likely to be preload responsive
Pulse Pressure Variation (PPV)%	(PPmax-PPmin)/[(PPmax + PPmin)/2] x100▼	<10% unlikely to be preload responsive >13-15% likely to be preload responsive
Stroke Volume Variation (SVV)%	(SVmax-SVmin)/[(SVmax + SVmin)/2] x100▼	<10% unlikely to be preload responsive >13-15% likely to be preload responsive
	▼= averaged over 10 sec. of BP data updated every 4 beats	
Right Atrial Pressure (RAP)		2 - 6 mmHg
Right Ventricular Pressure (RVP)	Systolic (RVSP)	15 - 25 mmHg
	Diastolic (RVDP)	0 - 8 mmHg
Pulmonary Artery Pressure (PAP)	Systolic (PASP)	15 - 25 mmHg
	Diastolic (PADP)	8 - 15 mmHg
Mean Pulmonary Artery Pressure (MPAP)	[PASP + (2 x PADP)]/3	10 - 20 mmHg
Pulmonary Artery Wedge Pressure (PAWP)		6 - 12 mmHg
Left Atrial Pressure (LAP)		6 - 12 mmHg
Cardiac Output (CO)	HR x SV/1000	4.0 - 8.0 l/min
Cardiac Index (CI)	CO/BSA	2.5 - 4.0 l/min/m^2
Stroke Volume (SV)	CO/HR x 1000	60 - 100 ml/beat
Stroke Volume Index (SVI)	CI/HR x 1000	33 - 47 ml/m^2/beat
Systemic Vascular Resistance (SVR)	80 x (MAP - RAP)/CO	800 - 1200 dynes • sec/cm^5
Systemic Vascular Resistance Index (SVRI)	80 x MAP - RAP)/CI	1970 - 2390 dynes • sec/cm^5/m^2
Pulmonary Vascular Resistance (PVR)	80 x (MPAP - PAWP)/CO	<250 dynes • sec/cm^5
Pulmonary Vascular Resistance Index (PVRI)	80 x (MPAP - PAWP)/CI	255 - 285 dynes • sec/cm^5/m^2
Hemodynamic Parameters - Adult		
Left Ventricular Stroke Work (LVSW)	SV x (MAP - PAWP) x 0.0136	58 - 104 gm-m/beat
Left Ventricular Stroke Work Index (LVSWI)	SVI x (MAP - PAWP) x 0.0136	50 - 62 gm-m/m^2/beat
Right Ventricular Stroke Work (RVSW)	SV x (MPAP - RAP) x 0.0136	8 - 16 gm-m/beat
Right Ventricular Stroke Work Index (RVSWI)	SVI x (MPAP - RAP) x 0.0136	5 - 10 gm-m/m^2/beat
Coronary Artery Perfusion Pressure (CPP)	Diastolic BP - PAWP	60 - 80 mmHg
Right Ventricular End-Diastolic Volume (RVEDV)	SV/EF	100 - 160 ml
Right Ventricular End-Systolic Volume (RVESV)	EDV - SV	50 - 100 ml
Right Ventricular Ejection Fraction (RVEF)	SV/EDV	40 - 60%
Oxygenation Parameters - Adult		
Partial Pressure of Arterial Oxygen (PaO_2)		80 - 100 mmHg
Partial Pressure of Arterial CO_2 ($PaCO_2$)		35 - 45 mmHg
Bicarbonate (HCO_3)		22 - 28 mEg/l
pH		7.38 - 7.42
Arterial Oxygen Saturation (SaO_2)		95 - 100%
Mixed Venous Saturation (SvO_2)		60 - 80%
Arterial Oxygen Content (CaO_2)	(0.0138 x Hgb x SaO_2) + (0.0031 x PaO_2)	17 - 20 ml/dl
Venous Oxygen Content (CvO_2)	(0.0138 x Hgb x SvO_2) + (0.0031 x PvO_2)	12 - 15 ml/dl
A-V Oxygen Content Difference ($C(a\text{-}v)O_2$)	CaO_2 - CvO_2	4 - 6 ml/dl
Oxygen Delivery (DO_2)	CaO_2 x CO x 10	950 - 1150 ml/min
Oxygen Delivery Index (DO_2I)	CaO_2 x CI x 10	500 - 600 ml/min/m^2
Oxygen Consumption (VO_2)	$(C(a - v)O_2$ x CO x 10	200 - 250 ml/min
Oxygen Consumption Index (VO_2I)	$(C(a - v)O_2$ x CI x 10	120 - 160 ml/min/m^2
Oxygen Extraction Ratio (O_2ER)	[(CaO_2 - CvO_2)/CaO_2] x 100	22 - 30%
Oxygen Extraction Index (O_2EI)	[SaO_2 - SvO_2)/SaO_2 x 100	20 - 25%

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Meta-Analysis

15 meta-analysis confirm clinical benefit of hemodynamic monitoring

References	Reduction In	Average odd or risk ratios (confidence interval)	Number of studies
Ripollésa J, Espinosa A, Martínez-Hurtado M, et al. Intraoperative goal directed hemodynamic therapy in non-cardiac surgery: a systematic review and meta-analysis. Journal of Clinical Anesthesia 2016 Feb; 28: 105–115.	Mortality rate	0.63 (CI: 0.42-0.94)	12
Corcoran T. et al. Perioperative Fluid Management Strategies in Major Surgery: A Stratified Meta-Analysis. Anesthesia -Analgesia 2012; 114(3): 640-651.	Acute kidney injury Pneumonia	0.67 (0.46-0.98) 0.74 (0.57-0.96)	23
Gurgel ST, do Nascimento Jr. P. Maintaining Tissue Perfusion in High-Risk Surgical Patients: A Systematic Review of Randomized Clinical Trials. 2011 International Anesthesia Research Society. DOI: 10.1213/ANE.Ob013e3182055384.	Mortality Organ dysfunction	0.67 (0.55-0.82) 0.62 (0.55-0.70)	32
Aya HD, Cecconi M, Hamilton M, et al. Goal directed therapy in cardiac surgery: a systematic review and meta-analysis. British Journal of Anaesthesia, 2013 Apr;110(4):51D-7.	Postoperative complications Hospital length of stay	0.33 (CI: 0.15-0.73) -2.44 (CI: -4.03 to -0.84)	5
Phan T. Ismail H, Heriot AG, et al. Improving Perioperative Outcomes: Fluid Optimization with the Esophageal Doppler Monitor, a meta-analysis and Review. Journal of the American College of Surgeons, 2008 Dec;207(6):935-41.	Length of stay Postoperative morbidity	-2.34 (CI: -2.91 to -1.77) 0.37 (CI: 0.27-0.50)	9
Arulkumaran N, Corredor C, Hamilton MA, et al. Cardiac complications associated with goal-directed therapy in high-risk surgical patients: a meta-analysis. British Journal of Anaesthesia 2014 Apr;112(4):648-59.	Cardiovascular complications Arrythmias	0.54 (CI: 0.38-0.76) 0.54 (CI: 0.35-0.85)	22
Cecconi M, Corredor C, Arulkumaran N, et al. Clinical review: Goal-directed therapy-what is the evidence in surgical patients? The effect on different risk groups.Critical Care Medicine 2013, 17:209.	Complications	0.45 (CI: 0.34-Q.60)	32
Dalfino L, Giglio MT, Puntillo F, Marucci M, Brienza N. Haemodynamic goal-directed therapy and postoperative infections: earlier is better. A systematic review and meta-analysis. Critical Care Medicine 2011; 15(3): R154.	Surgical site infection Urinary tract infection Pneumonia	0.58 (0.46-0.74) 0.44 (0.22-0.88) 0.71 (0.55-0.92)	26
Grocott MP, Dushianthan A, Hamiltom MA. et al. Perioperative increase in global blood flow to explicit defined goals and outcomes after surgery: a Cochrane systematic review British Journal of Anaesthesia 2013;111(4):535-548.	Acute kidney injury Surgical site infection Respiratory failure Total morbidity rate	0.71 (0.57-0.90) 0.65 (0.50-0.84) 0.51 (0.28-0.93) 0.68 0.58-0.80	31
Srinivasa S, Taylor MH, Sammour T, et al. Oesophageal Doppler-guided fluid administration in colorectal surgery: critical appraisal of published clinical trials. Acta Anaesthesiologica Scandinavica 2011; 55(1): 4-13.	Tissue hypoxia	NA	5
Hamilton MA, Cecconi M, Rhodes A. A systematic review and meta-analysis on the use of preemptive hemodynamic intervention to improve postoperative outcomes in moderate and high risk surgical patients. Anesthesia -Analgesia 2011; 112: 1392-402.	Total morbidity rate	0.44 (0.35-0.55)	29
Brienza N, Giglio MT, Marucci M, et al. Does perioperative hemodynamic optimization protect renal function in surgical patients? A meta-analytic study.Critical Care Medicine 2009;37:2079-90.	Acute kidney injury	0.64 (0.50-0.83)	20
Poeze M, Willem M Greve J, Ramsay G. Meta-analysis of hemodynamic optimization: relationship to methodological quality. Critical Care 2005, 9:R771-R779.	Mortality rate	0.61 (0.46-0.81)	30
Giglio MT, Marucci M, Testini M, et al. Goal-directed haemodynamic therapy and gastrointestinal complications in major surgery: a meta-analysis of randomized controlled trials. British Journal of Anaesthesia; 2009;103(5):637-646.	Minor gastrointestinal complication Major gastrointestinal complication	0.29 (0.17-0.50) 0.42 (0.27-0.65)	16
Bundgaard-Nielsen M, Holte K, Secher NH, et al. Monitoring of peri-operative fluid administration by individualized goal-directed therapy. Acta Anaesthesiologica Scandinavica 2007 Mar;51(3):331-40.	Hospital length of stay Post-op nausea & vomiting Total morbidity rate	NA	9

What Our Customers Say...

> We have been using LiDCO products since 2010 within our trust, The device is safe, accurate and easy to use and can be set up within 5 minutes by trained staff. it has the diversity to be used on a conscious, preoperative, perioperative and postoperative patients.
>
> The support received by LiDCO is first class and our registered Nurses have benefitted from RCN accredited study day as well as ad hoc training sessions.
>
> Tameside and Glossop Integrated Care NHS Foundation Trust

> We use LiDCO plus regularly on septic patients, those with refractory hypotension or those with complex fluid balance management.
>
> We encourage the use of LiDCO to be nurse led on the unit and have invested a great deal of time in training staff on monitoring and calibration. We have received fantastic support from the LiDCO Rep who has been key in delivering training and has been particularly helpful in developing an understanding of troubleshooting. She has been very flexible and understands the fluctuating needs of the unit.
>
> I encourage the use of LiDCO at the bedside as I have found it to be helpful in guiding treatment and informing the clinical picture.
>
> Royal Marsden Hospital

> We have been using the LiDCO system on our Critical Care unit for several years now. I find it particularly helpful in managing the haemodynamics of the sickest patients we care for guiding my use of fluids and vasoactive medications. It is especially beneficial in managing patients with septic cardiomyopathy with severe LV impairment who benefit from the addition of inotropes giving me real time, operator independent, cardiac output measurement.
>
> ICCU New Cross Hospital

> The new LiDCOunity is a welcome upgrade on our past equipment. The new LiDCOunity benefits from an aesthetic overhaul and now looks like equipment one would expect to find in the 21st century ICU. The touch screen is much improved from the LiDCOplus and the overall layout is better. One great leap forward is the addition of a battery; no more lost data or calibration factors due to inadvertent power loss!
>
> The software upgrade has improved functionality and usability. It is much more intuitive to use as a beginner, and easier to navigate for the expert. The improved range and choice of waveforms and data on the main screen is a welcome addition. The calibration process is a vast improvement on the old LiDCOplus system. Information not required by the end point user has been removed, and a clever system of determining where any problems might be has been incorporated.
>
> Overall, I am pleased we are using the new LiDCOunity. We have had great support from our LiDCO representative, and we also had some input during the trial phase when LiDCO was in the testing phase for the LiDCOunity.
>
> University Hospital Southampton NHS Foundation Trust

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LiDCOunity

Contact us to arrange

- Product Evaluations
- Adoption
- Training
- Education

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