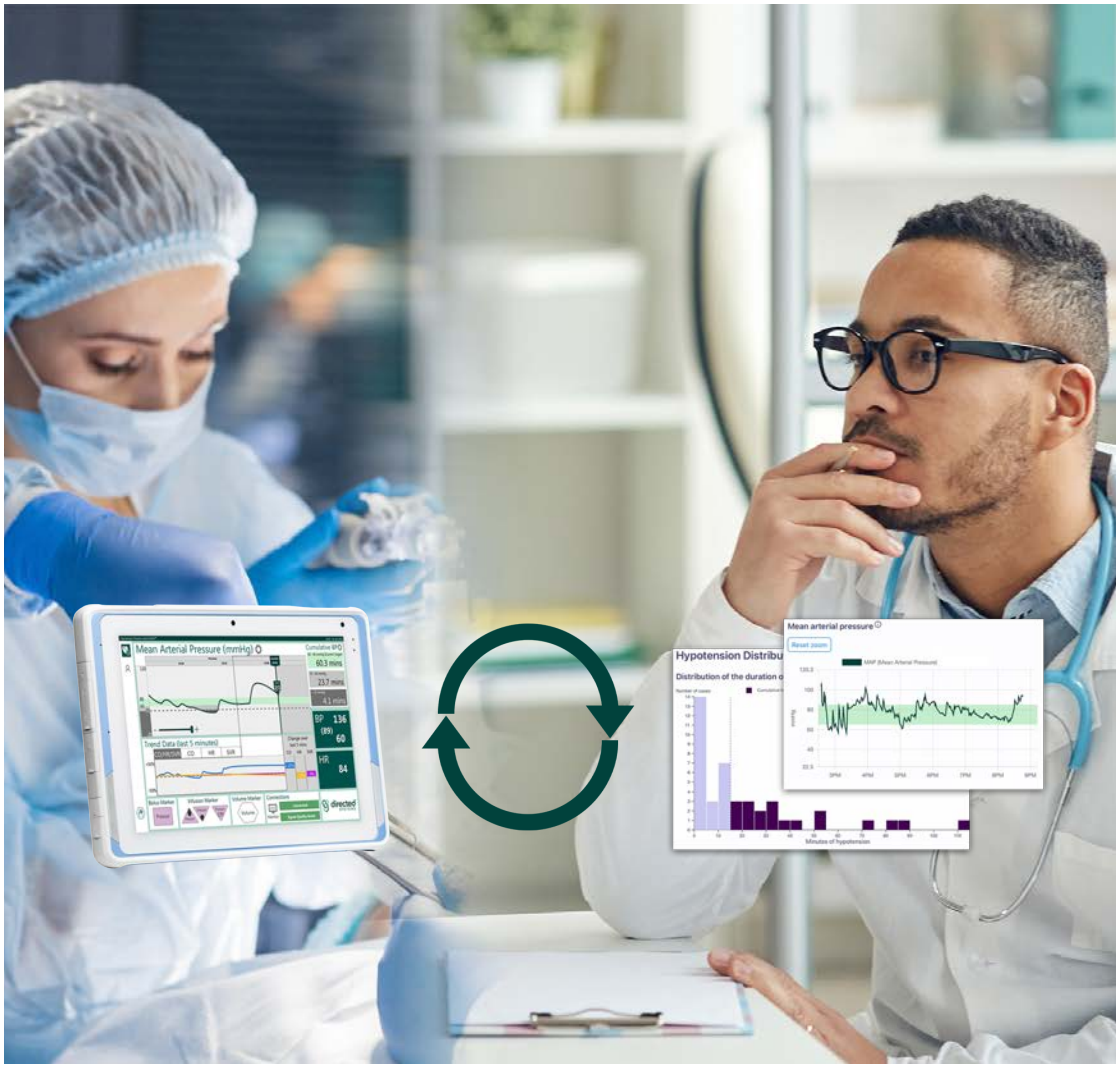
directed® SYSTEMS

Hypotension Decision Assist HDA™ point of care clinical decision support software

with integrated cloud-based DS Aware™ analytics for quality improvement & research

HDA Introductory Training for Clinicians

Blood pressure and cardiovascular management for anesthesia professionals



The Hypotension Decision Assist - HDA™ solution

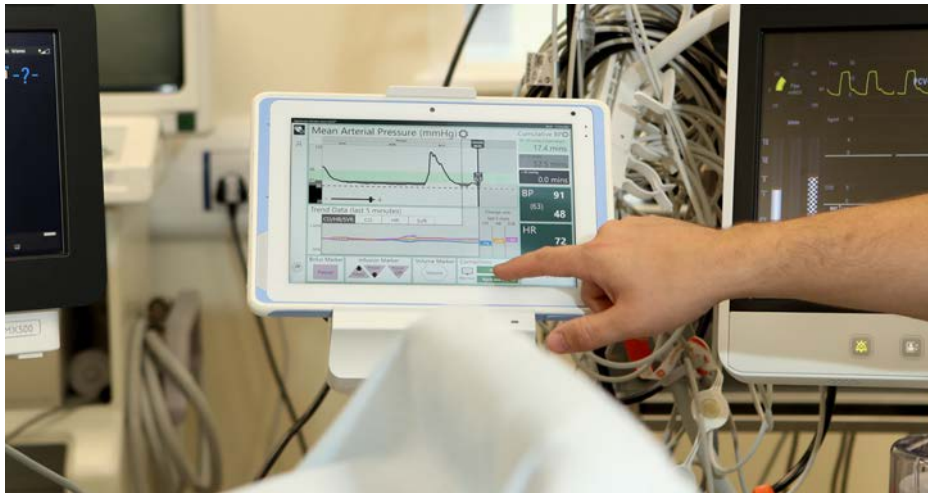
Hypotension Decision Assist HDA™ has been designed to assist anesthesia professionals manage blood pressure and the cardiovascular system during surgery where arterial blood pressure is being continuously monitored using a standard blood pressure transducer.

Features

- Runs on a lightweight medical grade 10” tablet computer
- Streams the invasive arterial blood pressure (ABP) waveform from the patient monitor via serial cable
- Trends in cardiac output (CO) and systemic vascular resistance (SVR)
- Cumulative time at different mean arterial pressure (MAP) thresholds, including hypotension
- Hypotension Case Review
  - End of surgery complete case summary
  - Visualizes hypotensive episodes and cardiovascular parameters over the entire operation.
  - Includes key metrics such as cumulative time MAP < 65 mmHg.

Expected benefits of HDA™

- Help anesthesia professionals to better manage blood pressure and the cardiovascular system including the detection and control of intraoperative hypotension (IOH) episodes and cumulative IOH during surgery within defined limits.
- No additional disposable
- Help reduce postoperative complications and length of stay



Intraoperative Hypotension

The problem of intra-operative hypotension

Intra-operative hypotension (IOH) is a common and frequent occurrence in patients undergoing general anesthesia for non-cardiac surgery[1].

Intra-operative hypotension is strongly associated with:

- Post-operative mortality[2].
- Acute kidney injury (AKI)[3,4,5]
- Myocardial injury (MI)[3,4,5]

In 2020, the Anesthesia Quality Institute (AQI) published a quality metric for hypotension[9]. This measure (IIM025: ePreop 31) evaluates the proportion of cases in which the patient's MAP is below 65 mmHg for 15 minutes or more, cumulatively over the course of the surgery.

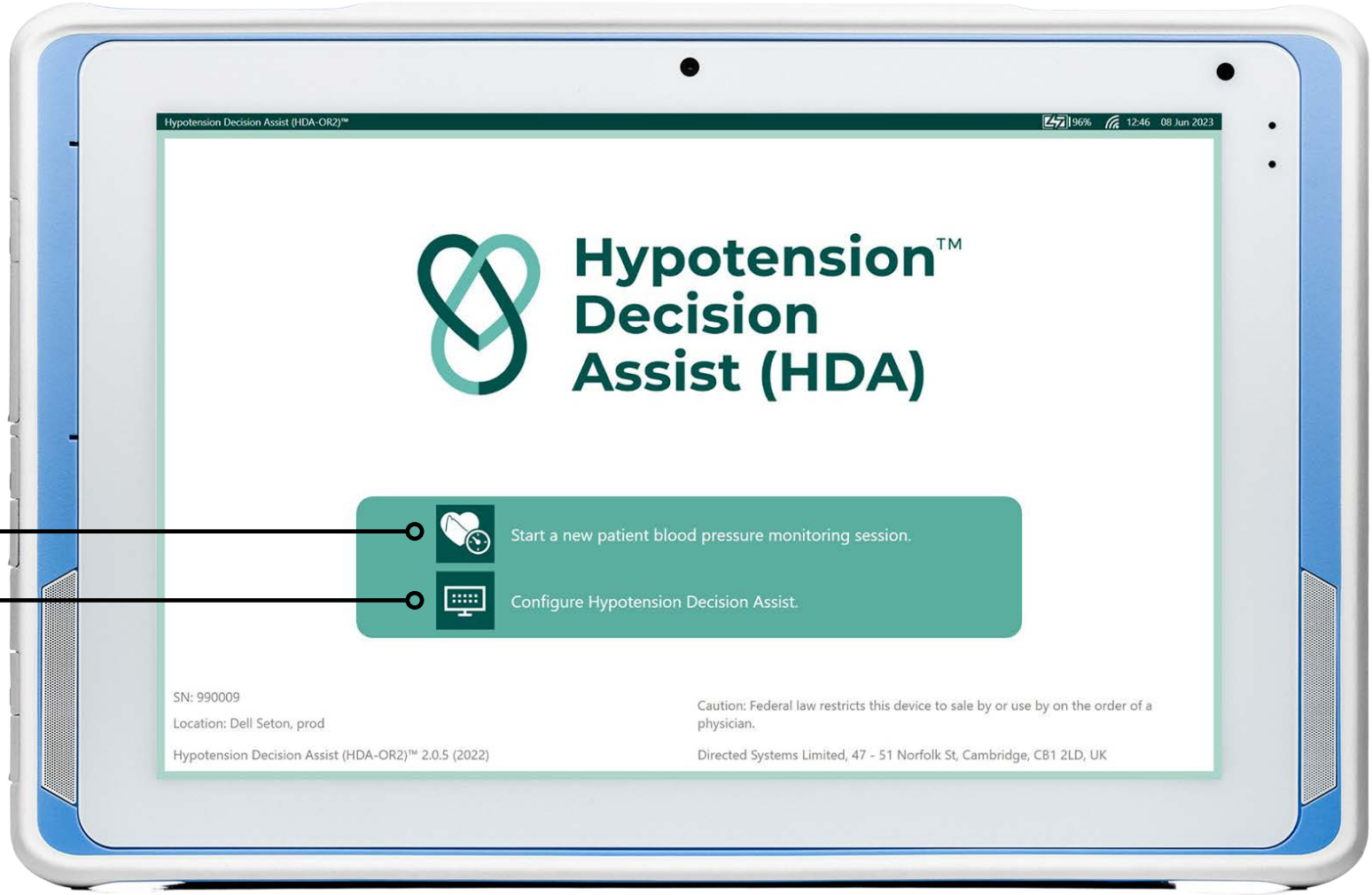
Cumulative total time of IOH matters…

- Mean arterial pressure (MAP) below 60–70 mmHg among adults is associated with increased risk of acute kidney injury (AKI), myocardial injury (MI), and mortality, and the risk is a function of both hypotension severity and duration[8].
- Patients are at increased risk of AKI when their cumulative time below a MAP of 65 mmHg reaches or exceeds 13 minutes[9].
- When patients fall even further below this threshold (for example, MAP below 55 mmHg), even short durations are associated with increased risk of AKI. A MAP of 50 mmHg can significantly increase the risk of AKI and MI even after just 1 minute[10].

Benefits of preventing intra-operative hypotension

The prevention of IOH by tailoring management of blood pressure to individual patient physiology, may improve post-operative outcomes[6].

HDA - Launch screen



Select to start new patient session

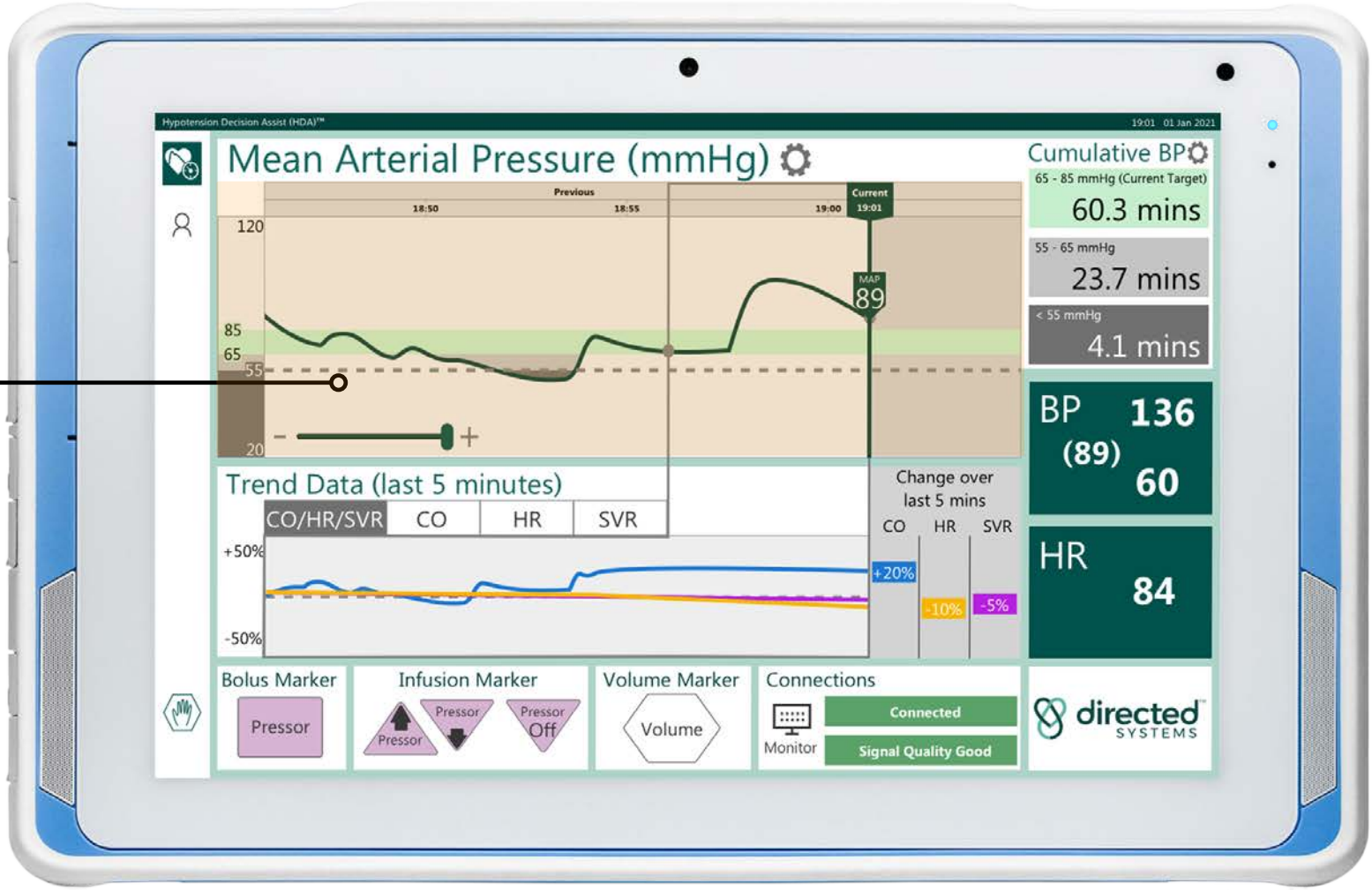
Select to configure HDA to selected patient monitor

Introduction to the HDA main screen

Main chart shows mean arterial pressure (MAP) trend and its current numeric value over 15 minutes.

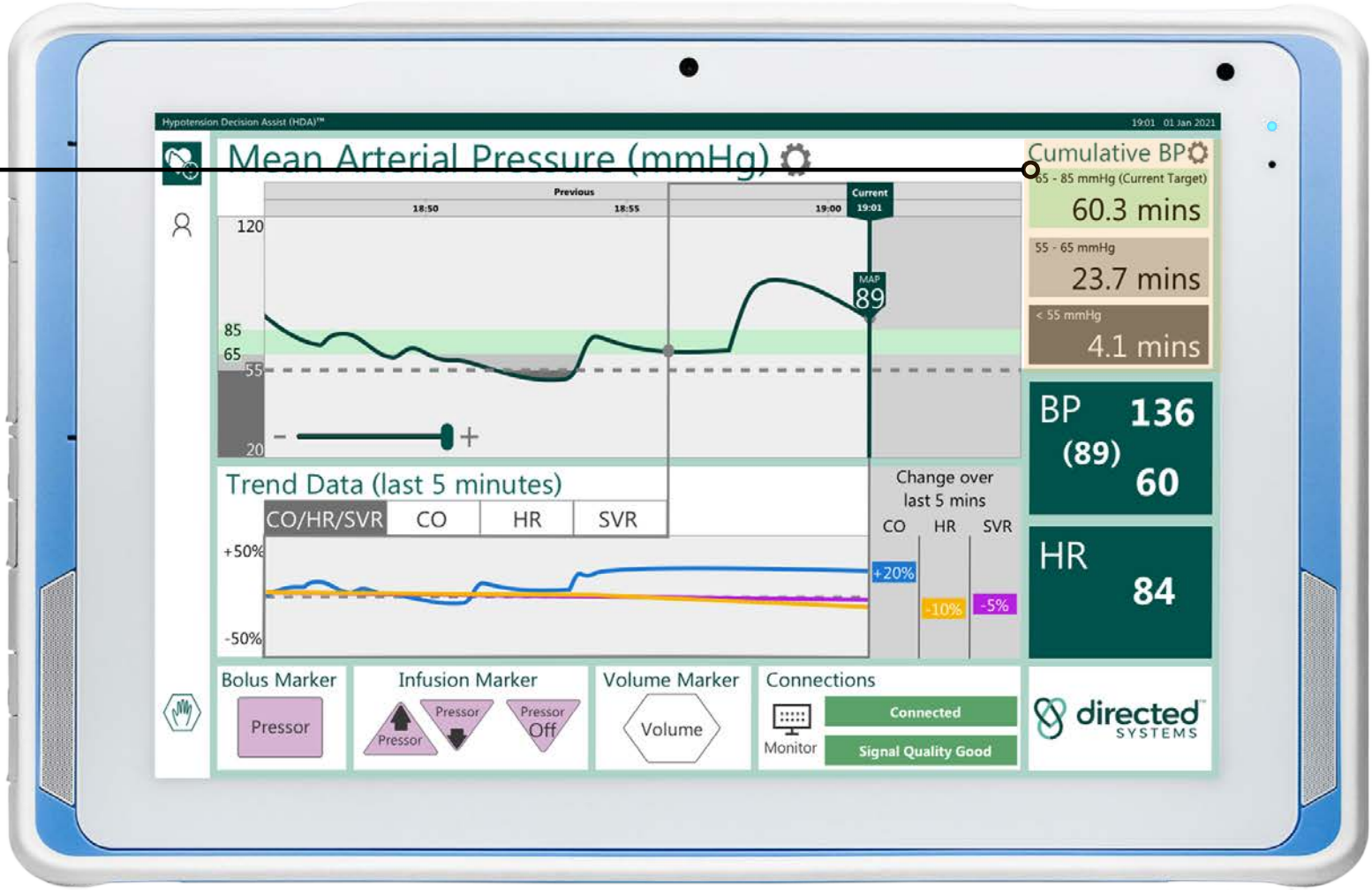
The grey shading shows moderate and severe hypotension.

This chart assists you in maintaining MAP within acceptable limits



HDA - Cumulative time of hypotension exposure

Amount of cumulative time in target MAP range and in moderate and severe hypotension ranges.

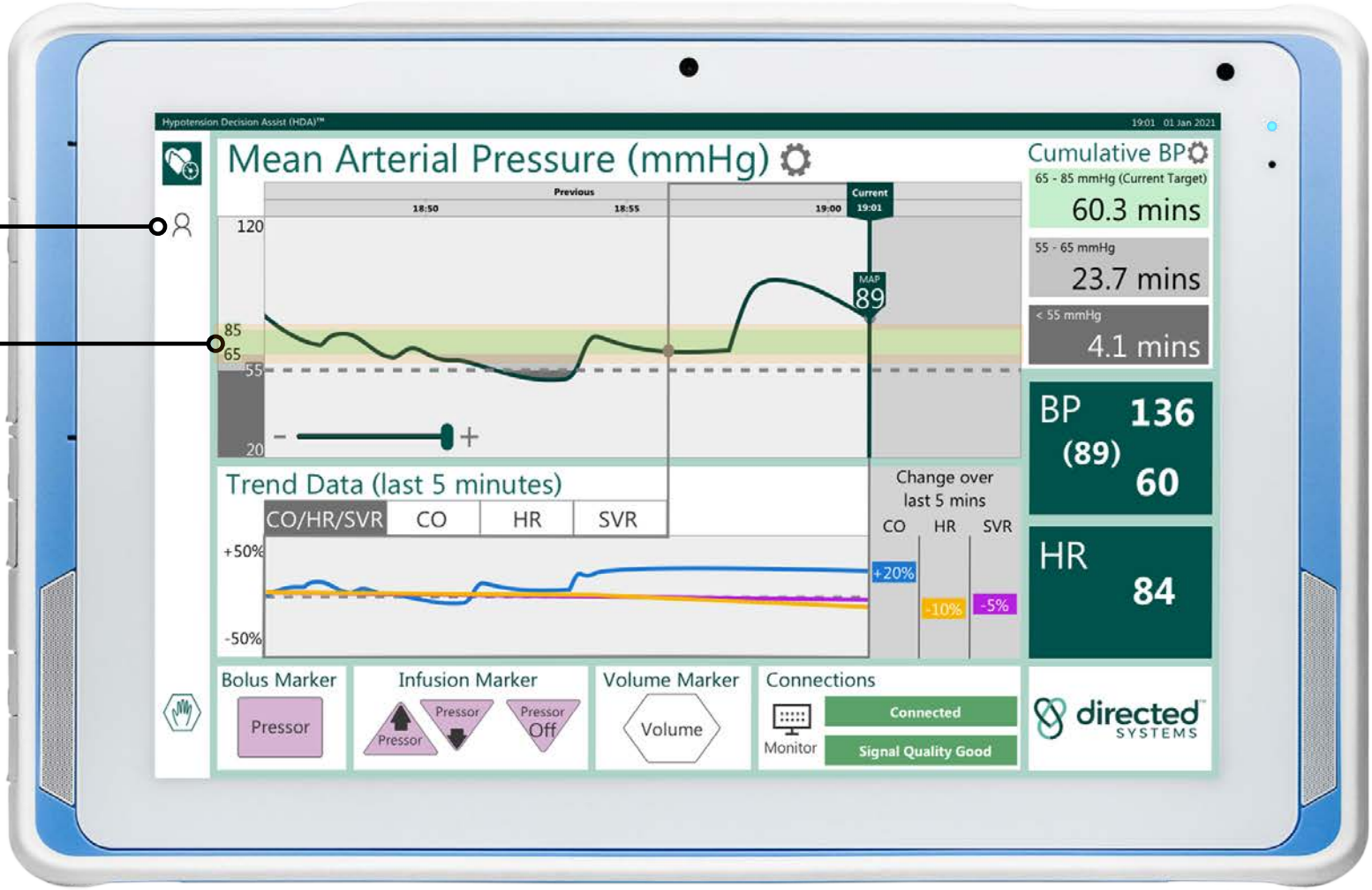


HDA - Target MAP ranges

The target range can be adjusted by pressing the patient icon

The “green zone” shows the target range for mean arterial pressure (MAP) set by you for the patient.

This allows rapid visualisation of how the MAP is changing and enables the user to decide whether intervention is needed.

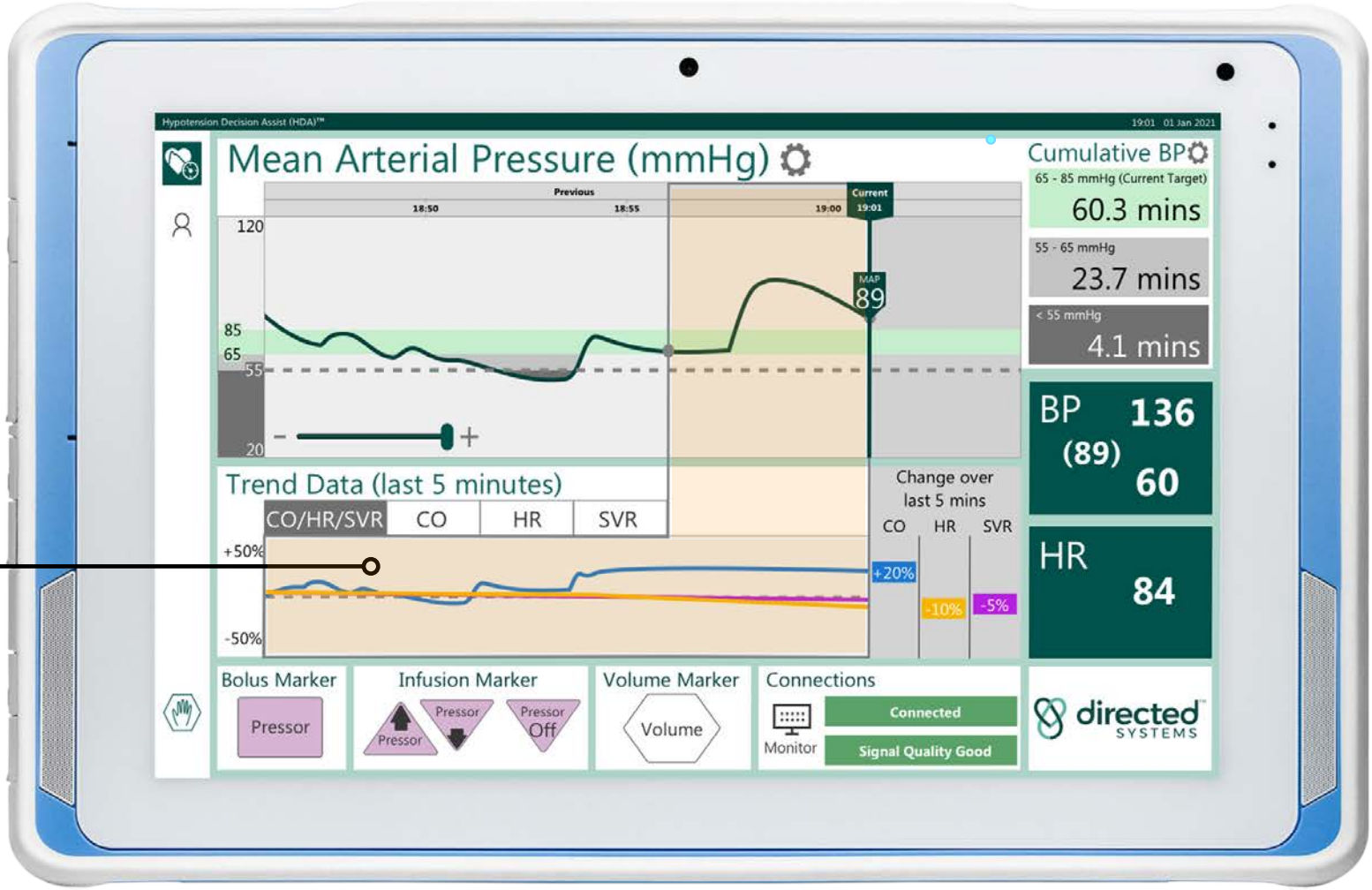


HDA - Trend data

Trend data for cardiac output (CO), heart rate (HR) and systemic vascular resistance (SVR).

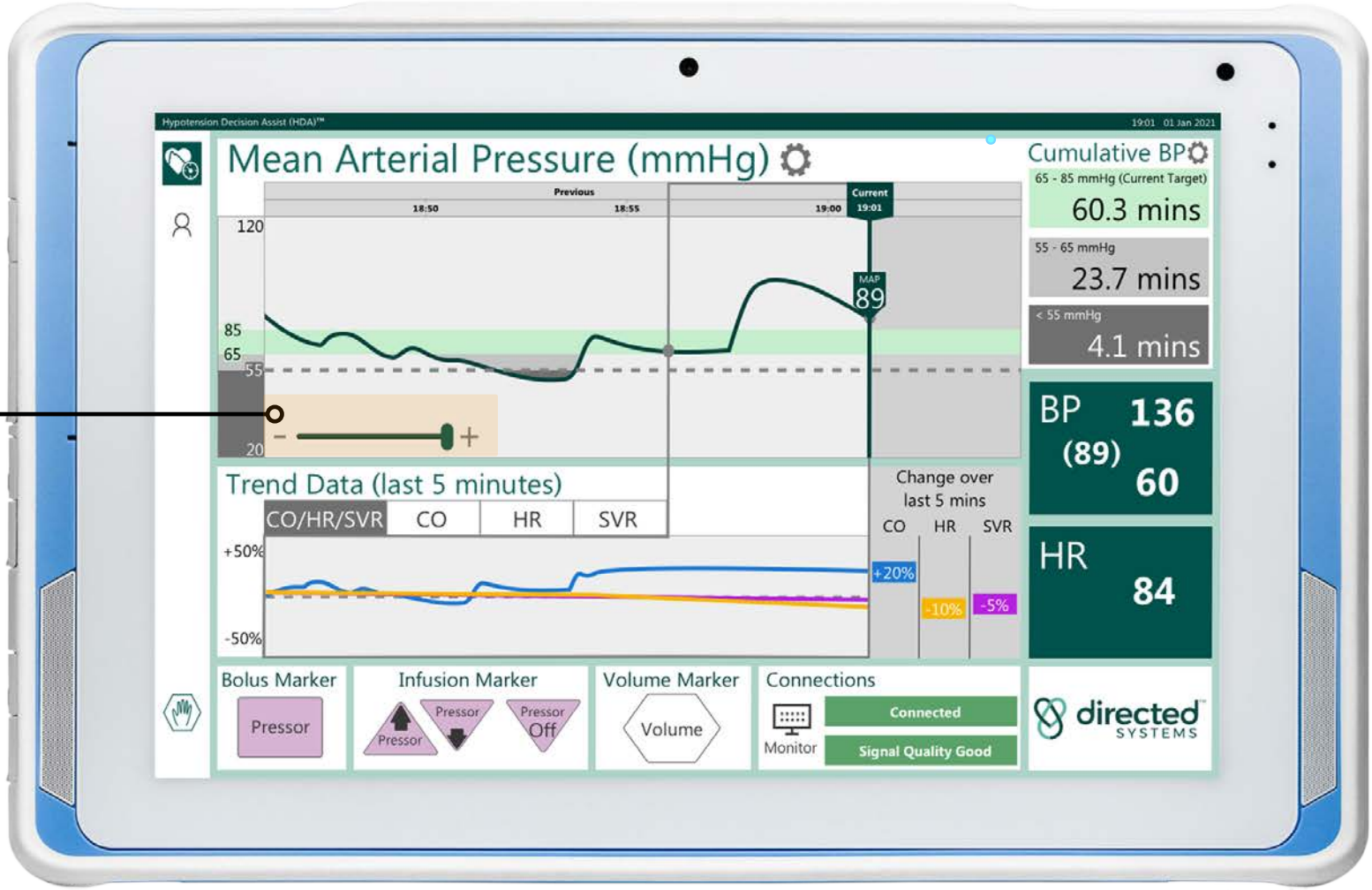
Values are calibrated using their value 5 minutes ago as baseline and expressed as % change.

The pattern of changes allows you to assess cardiovascular state and helps you decide appropriate treatment



HDA - Slider to zoom out MAP trend

Slider allows MAP timescale to be zoomed in and out so that changes over time can be seen macroscopically and in detail



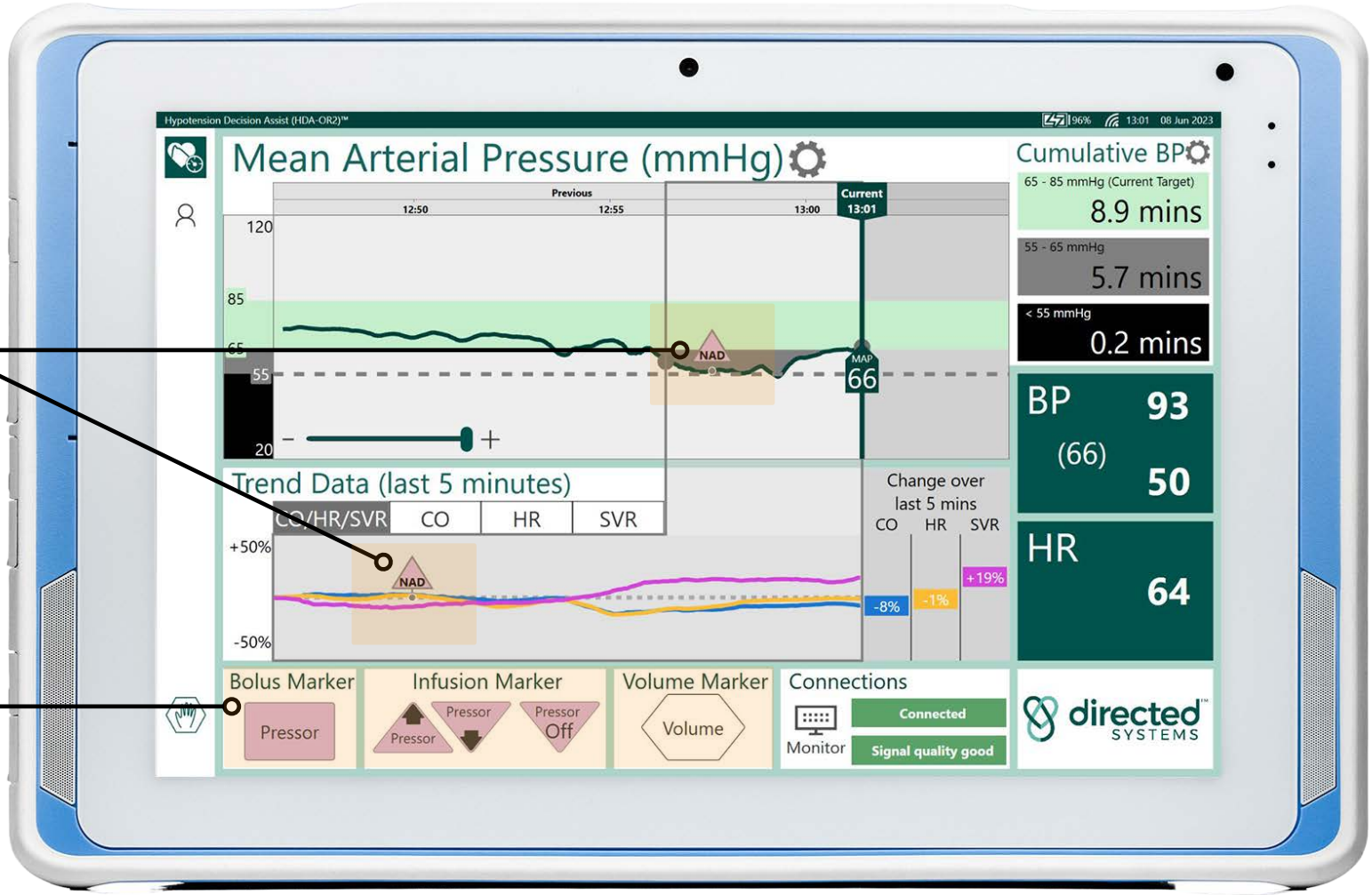
HDA - Adding treatment markers

A marker will appear on the main MAP chart and on the CO, HR and SVR trends.

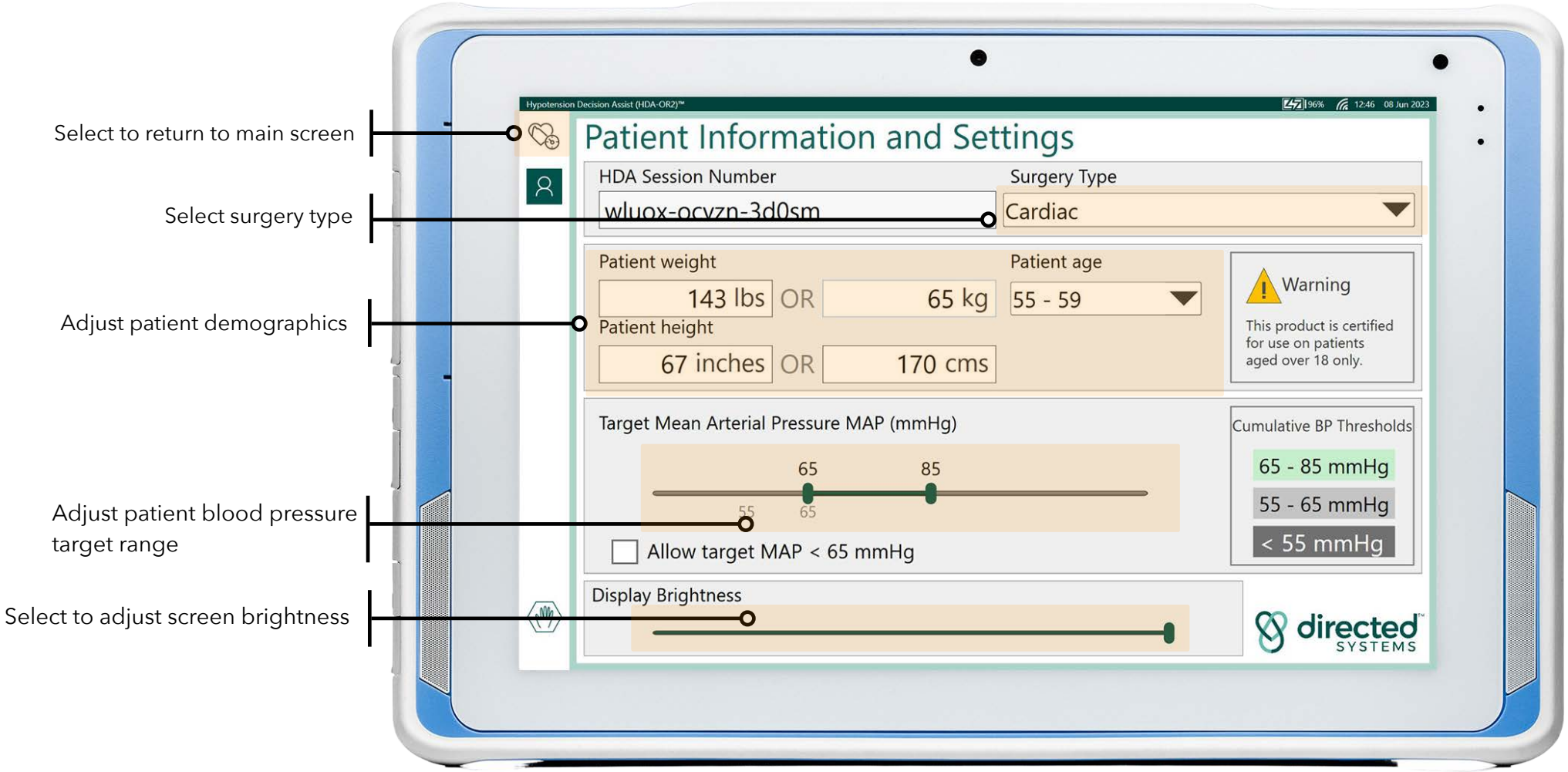
These allow the patient's responsiveness to different treatments to be assessed.

They can also act as an aide-memoire for recording on the main medication chart.

Cardiovascular treatments can be indicated by pressing these "marker" buttons.



HDA - Patient setup screen



Hypotension Case Review - HCR™

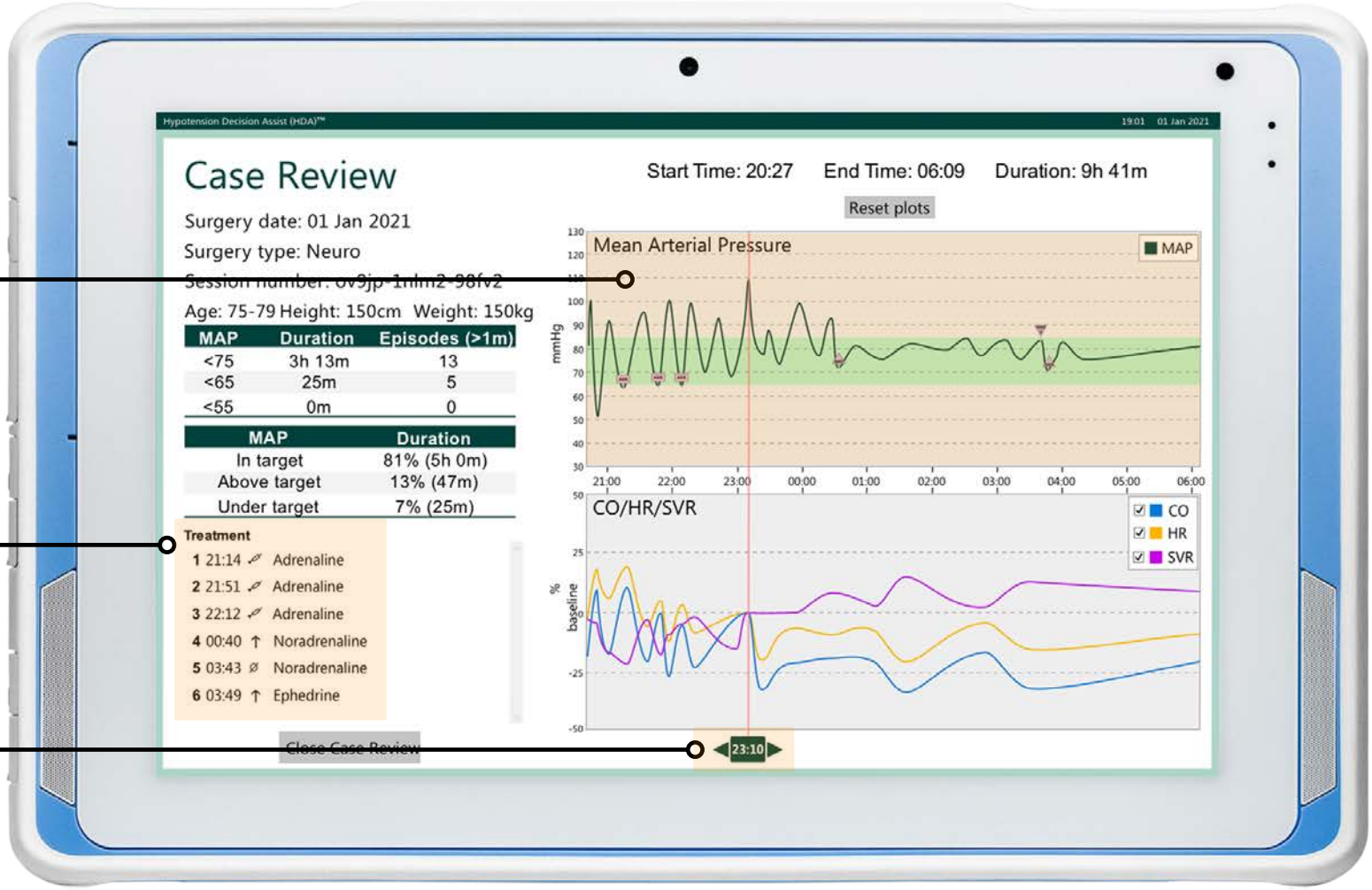
End of surgery complete case summary

MAP & CO/HR/SVR trend data screen

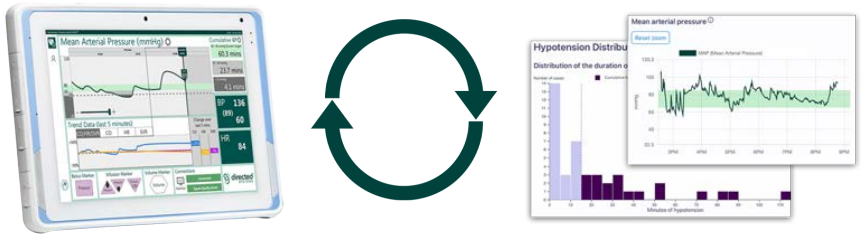
The charts can be zoomed with a pinch-zoom and scrolled

Treatment marker record showing time and type of marker placement

Baseline slider



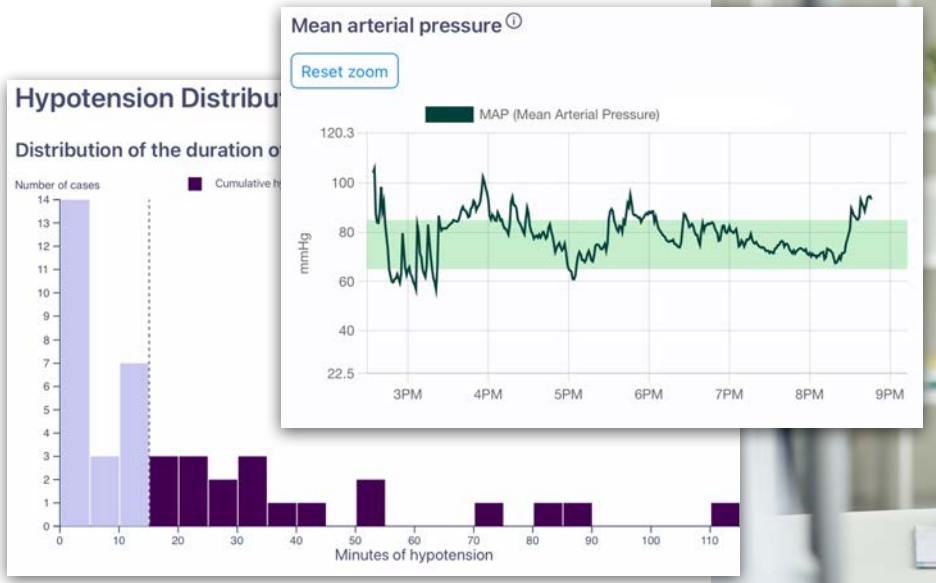
DS Aware™ secure cloud based integration for analytics and reporting



Fully integrated solution

DS Aware™ is a secure cloud based app that provides access to all the data collected by all HDAs installed at your facility.

DS Aware™ allows you to see how IOH rates are changing over time, see how IOH rates vary by type of surgery, patient age, and other demographic parameters, and to zoom in and view all the detailed high- resolution data DS Aware™ generates from every surgery it is used on when required.



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Who we are

Directed Systems is a medical software and data analytics company specialising in cardiovascular management in anesthesia and intensive care.

We develop software that incorporates smart proprietary algorithms to analyze, visualize, predict and interpret real-time physiological signals.

For further information

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