REMOTE MONITORING AND CLINICIAN NOTIFICATION SYSTEM

MASIMO

Patient SafetyNet™ System

Accurate, actionable patient alarms delivered directly to qualified caregivers help you keep patients safe on the general ward – and any care area where your patients need continuous surveillance

When You Leave the Room, You'll Still Be There.™

Masimo

PATIENT SAFETY CHALLENGES ON THE GENERAL WARD

The last thing you expect when otherwise healthy patients are admitted for routine procedures is that they won't go home due to a sentinel event.

Unfortunately, the combination of patient-controlled analgesia and lower staff-to-patient ratios on the general ward makes it less likely that a clinician will be there to observe an avoidable adverse event.

According to the Anesthesia Patient Safety Foundation (APSF), post-operative patients on the general ward should be monitored for ventilation and oxygenation, however:

- "All patients should have oxygenation monitored by continuous pulse oximetry"
- "Capnography or other modalities that measure the adequacy of ventilation and airflow is indicated when supplemental oxygen is needed…"
- "Monitoring continuous oxygenation and ventilation from a central location …is desirable…information needs to be reliably transmitted to the healthcare professional caring for the patient at the bedside."[2]

"The literature and each of our clinical experiences have examples of physicians on rounds, or nurses coming in to check patients who have been dead for hours." [1]

[1] Abenstein JP et al. *Anesthesiology.* 2010;112(2).

[2] Anesthesia Patient Safety Foundation 2011

Patient SafetyNet* Connects Patients and Caregivers Quickly, Easily, and Accurately

Masimo Patient SafetyNet remote monitoring and clinician notification system combines the gold-standard performance of Masimo SET® pulse oximetry with respiration rate monitoring and wireless clinician notification via pager or 3rd party gateway to IP phones. Patient SafetyNet provides an unmatched level of patient safety on the general ward in a system that can either be integrated into your existing IT infrastructure or operate as a standalone system.

Patient SafetyNet facilitates appropriate early clinical response, preemptions of sentinel events, and avoidance of unnecessary transfers while helping you meet Joint Commission, APSF, and ASA guidelines

> Easily admit patients, monitor all patients at a glance, and investigate patient alarms and trends.

> Masimo bedside devices continuously and noninvasively monitor SpO_2, pulse rate, respiration rate, as well as other clinically valuable measurements.

> Patient SafetyNet sends alarms to qualified clinicians for review and immediate bedside intervention, with automatic escalation to additional clinicians.

> No matter what level of clinical response is needed, Patient SafetyNet facilitates appropriate clinical response, preemption of sentinel events, and avoidance of unnecessary ICU transfers.[1]

*The use of the trademarks PATIENT SAFETYNET and PSN is under license from University HealthSystem Consortium.

[1] Taenzer AH et al. *Anesthesiology.* 2010;112(2):282-287.

ENABLING TECHNOLOGY: MASIMO SET PULSE OXIMETRY

The accuracy and reliability of Masimo SET significantly reduces false alarms and makes reliable clinician notification on the general ward possible

Unacceptably high false alarm rates with conventional pulse oximetry (often as high as 70%) can make it inappropriate for continuous monitoring on the general ward. Masimo SET is the best pulse oximetry choice for patient safety, clinical efficiency, and cost effectiveness.

- Superior true alarm detection and false alarm prevention[1]
- Clinically proven in more than 100 independent and objective studies[1]

95%
FALSE ALARM REDUCTION

97%
TRUE ALARM DETECTION

Advanced Alarm Performance

EVIDENCE-BASED ALARM MANAGEMENT

- Earlier alarm notification without extending averaging during challenging conditions
- Evidence-based alarm settings to avoid nuisance alarms while enabling notification of actionable alarms
- Configurable alarm rules at bedside and system levels provide maximum clinical flexibility

ADAPTIVE THRESHOLD ALARM™*

- Adjusts audible alarm threshold to the patient's baseline SpO_2 value
- Reduces nuisance alarms while maintaining traditional visual alarm threshold settings

ADVANCED PREDICTIVE ALARMS

- Detect multiple transient desaturation events that may predict respiratory failure with 3D Desat Index Alarm™
- Detect critical changes in peripheral perfusion with 3D Perfusion Index Alarm™

- These elements work together to significantly reduce false alarms and nuisance alarms without delaying actionable alarms, freeing clinicians to focus on patient care.

[1] Shah N et al. *Anesthesiology.* 2006;105:A929.
* Pending US 510(k) Clearance

PROVEN TO HELP CLINICIANS IMPROVE OUTCOMES WITHOUT ADDING STAFF[2]

Rapid response systems make clinical expertise available at the bedside when a life-threatening change occurs

An eleven month evaluation by a team of clinicians at a large academic medical center covering 2,841 patients showed that Patient SafetyNet provides early identification of analgesia-induced respiratory depression and cardiac abnormalities identified by high and low pulse rate, poor heart rate control, and bradycardia. The study showed the following results on a single 36-bed general ward post-surgical floor:[2]

65%
REDUCTION IN DISTRESS CODES AND RESCUE ACTIVATIONS

48%
REDUCTION IN ICU TRANSFERS

135
ICU DAYS SAVED ANNUALLY

"In my opinion as Quality and Safety Officer, our study results strongly demonstrate that continuous patient surveillance with Masimo SET and Masimo Patient SafetyNet increases healthcare value by significantly improving clinical outcomes while reducing costs."

GEORGE T. BLIKE, MD
Medical Director, Patient Safety,
Dartmouth-Hitchcock Medical Center

[2] Taenzer AH et al. *Anesthesiology.* 2010;112(2):282-287.

LEVERAGE BREAKTHROUGH PARAMETERS FOR INCREASED PATIENT PROTECTION

In addition to SpO_2 and pulse rate from Masimo SET pulse oximetry, expandable rainbow® technology in Masimo bedside devices enables you to also measure noninvasive and continuous respiration rate (RRa) and total haemoglobin (SpHb)

These parameters can provide you with continuous indicators of:

- > Oxygenation (SpO_2)
- > Circulation (PR)
- > Ventilation (RRa™)
- > Bleeding (SpHb®)

ACOUSTIC RESPIRATION RATE (RRa)

Accurate > Easy-to-Use > Enhances Tolerance

Respiration rate is a critical vital sign that provides early detection of respiratory compromise and patient distress

Continuous monitoring of respiration rate is especially important for post-surgical patients receiving patient-controlled analgesia (PCA) for pain management as the sedation can induce respiratory depression and place patients at considerable risk of serious injury or death.[1-5]

- > rainbow Acoustic Monitoring™ noninvasively and continuously measures respiration rate using an innovative adhesive sensor with an integrated acoustic transducer that is easily and comfortably applied to the patient's neck.
- > End-tidal CO_2 monitoring is also available on Patient SafetyNet, using either the Oridion Capnostream 20 or the CAS 750 monitor.

> When used with other clinical variables, RRa may help clinicians assess respiratory status and help determine treatment options

rainbow Acoustic Sensor™

[1] Joint Commission on Accreditation of Healthcare Organizations. Sentinel event alert: patient controlled analgesia by proxy. *JCAHO.* 2004.
[2] Institute for Safe Medication Practices. Safety issues with patient-controlled analgesia: Part I – How errors occur. *ISMP.* 2003.
[3] Institute for Safe Medication Practices. Safety issues with patient-controlled analgesia: Part II – How to prevent errors. *ISMP.* 2003.
[4] Bird M. Acute pain management: a new area of liability for anesthesiologists. *ASA Newsletter.* 2007; 71:8.
[5] Weinger MB. Dangers of post-operative opioids: APSF workshop and white paper address prevention of postoperative respiratory complications. *APSF Newsletter.* 2006; 21(4):61-68.

TOTAL HAEMOGLOBIN (SpHb®)

Noninvasive > Continuous

Post-surgical bleeding is a risk factor for many procedures and patients

- > Internal bleeding can be difficult to detect as vital signs can be a very late indicator.
- > Low haemoglobin can help identify patients with internal bleeding, but traditional laboratory measurements are infrequent and delayed.[1]
- > Blood loss can significantly increase the cost of treatment.
- > Noninvasive and continuous monitoring of haemoglobin may help you assess the patient to determine treatment and additional test options.

rainbow® ReSposable Sensor for SpHb in addition to SpO_2 and pulse rate

HALO INDEX™*

Halo Index provides a cumulative trending assessment of the global patient status

- > Physiologic deterioration often occurs long before a patient crisis and manifests through subtle and often undetected changes in multiple physiologic parameters.
- > Masimo designed Halo Index to mimic the systematic approach that expert clinicians use in assessing patient physiologic deterioration – analysing the patient history and extracting key vital sign parameter characteristics to assess global patient status.
- > Halo Index currently uses available Masimo parameters but is scalable to include additional information from the patient data repository.
- > Each parameter's significance is weighted and combined into the Halo Index, a single displayed number with a range from 0 to 100 that provides a cumulative trending assessment of global patient status.
- > Increases in Halo Index suggest physiologic deterioration and may indicate a need for clinicians to more closely assess the patient.

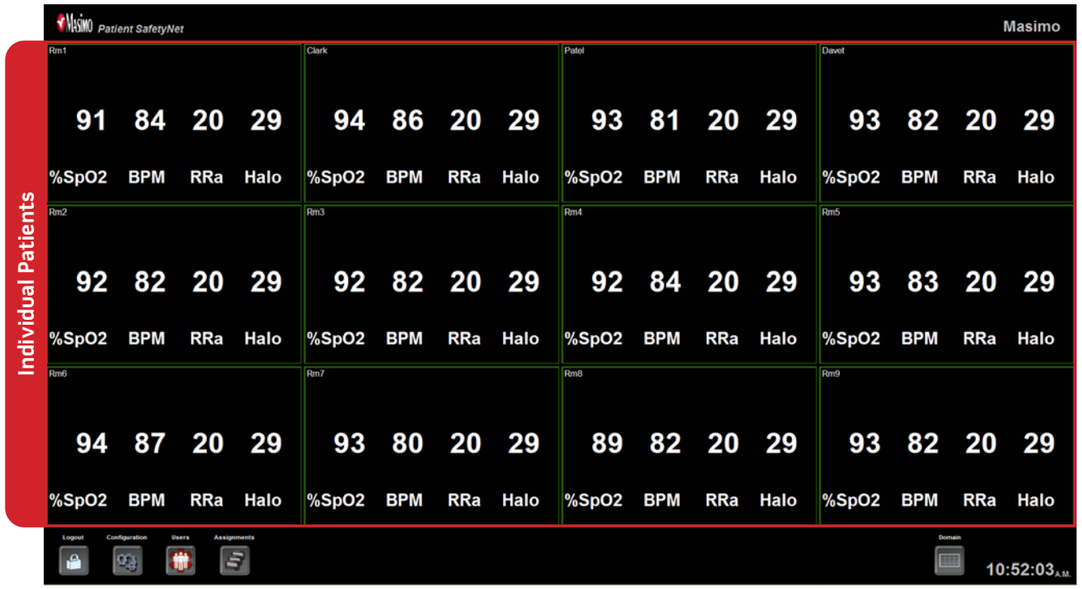
[1] Ehrenfeld JM, et al. *American Society of Anesthesiologists.* 2010;LB05.

* Pending US 510(k) Clearance

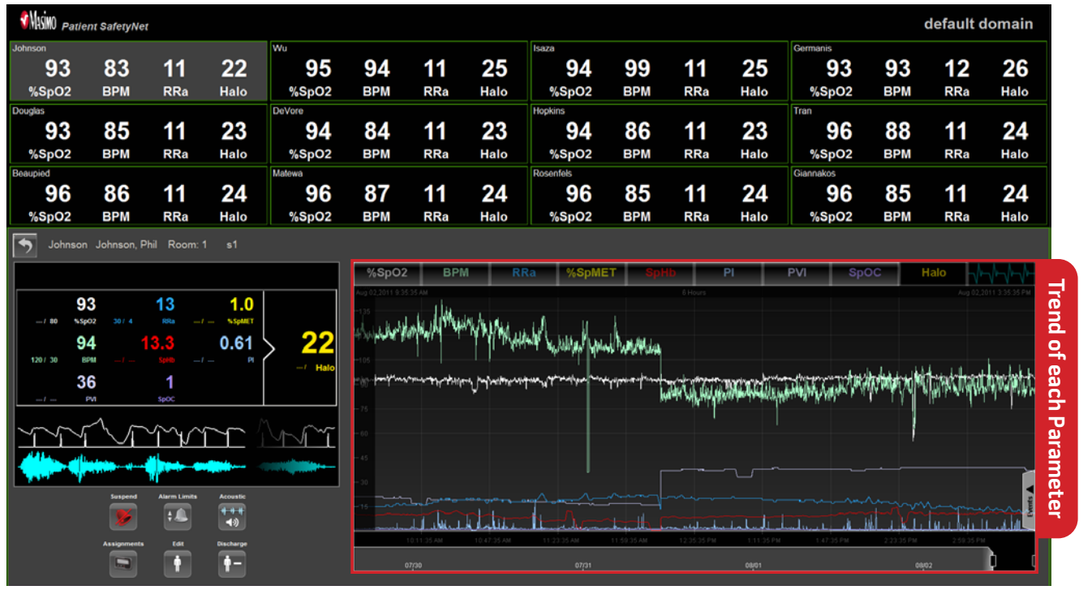
MULTIPLE PATIENT DATA VIEWS PROVIDE CLINICAL FLEXIBILITY

Configurable screens allow you to view the number of patients, clinical measurements, and level of detail that are important to you

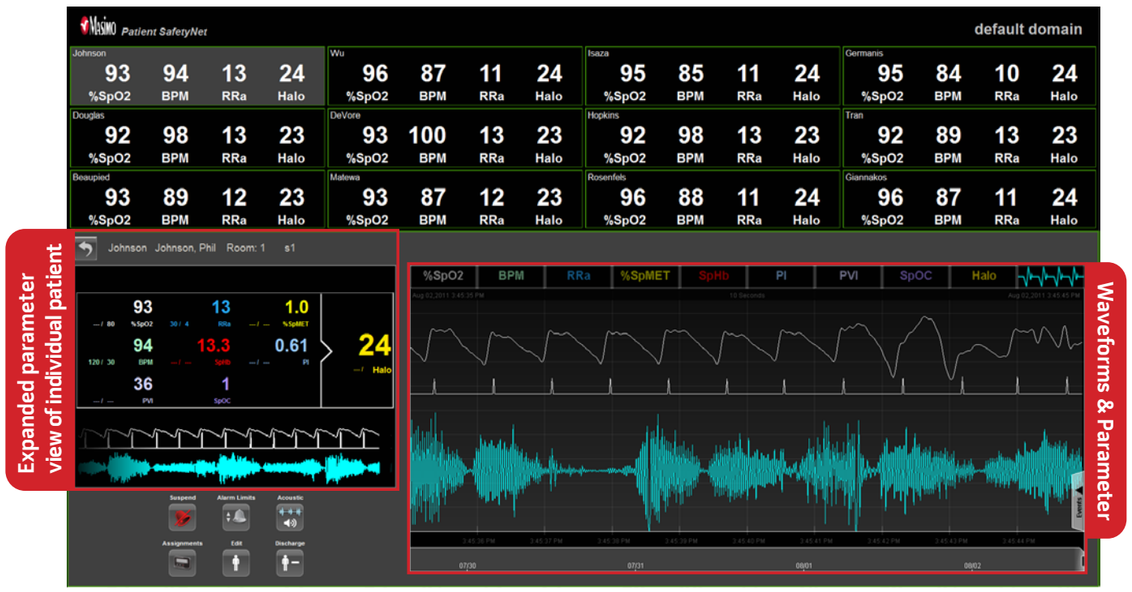
With Patient SafetyNet, you choose the system configurations that meet your specific clinical need. You can display real-time data from up to 40 patients at a time and select up to four parameters based on your patient population and clinical practices.



Parameter View: View up to four parameter values and alarm status of all patients at a glance



Trend View: Review up to 96 hours of history from all monitored parameters and with an easy-to-use touchscreen



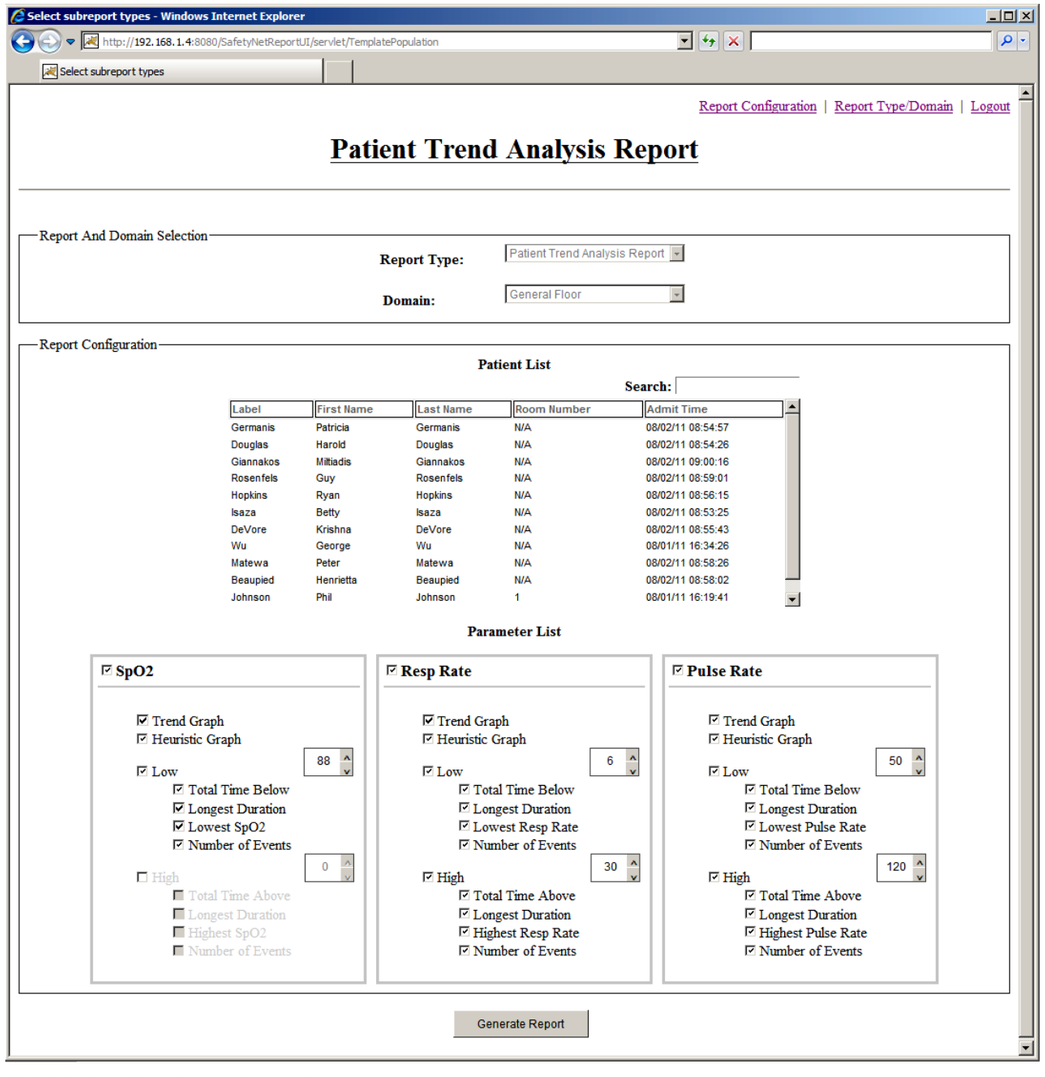
Detailed View: Expanded view for a single patient with all parameters and waveforms

Halo Trend View: Assess global patient status with a single index and easily investigate individual parameter contributors

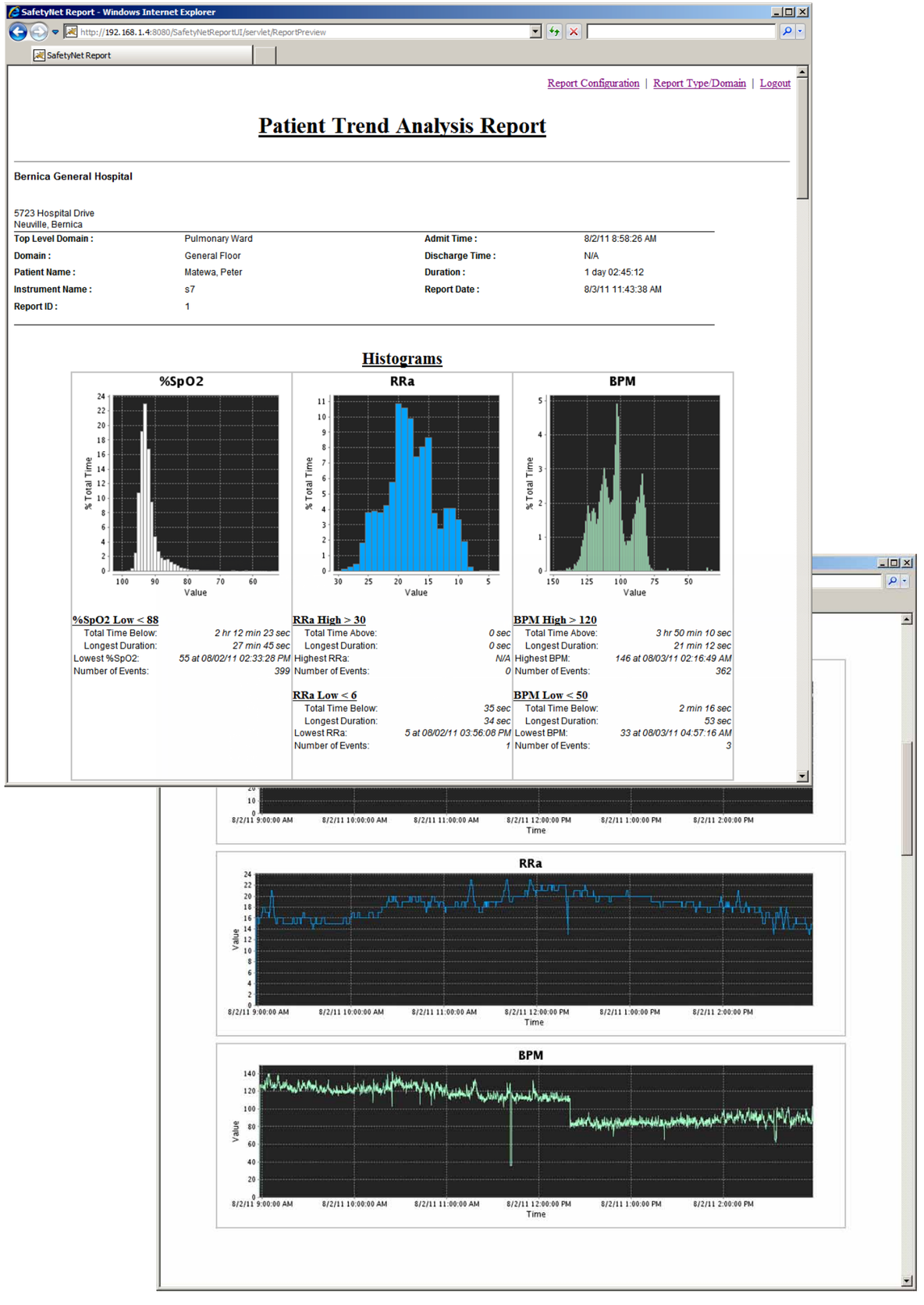
POWERFUL INFORMATION TO MANAGE PATIENTS, OPTIMISE WORKFLOW, AND ASSESS I.T. INFRASTRUCTURE

Flexible and convenient access with the ability to generate and print reports from any hospital-approved computer, eliminating the need to download data directly from the bedside device.

- **Events Report** – Improve clinical workflow by optimising alarms and notification settings
- **System Report** – Summarizes system level events
- **Trend Report** – Evaluate historical trend data to determine additional testing needs (*example below*)



Web Interface: Sample report generator



COST-EFFECTIVE, SEAMLESS INTEGRATION INTO YOUR HOSPITAL'S I.T. INFRASTRUCTURE

Patient SafetyNet remote monitoring and clinician notification system is designed from the ground up to be an integrated IT solution, using IEEE industry standards for connectivity to allow for more efficient sharing of data across your hospital's IT platforms. By leveraging existing IT infrastructure when possible, Patient SafetyNet may provide your hospital with a lower overall cost of ownership and improved financial benefits. Alternatively, Patient SafetyNet can operate as a standalone system on its own network.

STEP 1

> Select which wards and number of beds to monitor

STEP 2

> Select bedside instruments and measurements

BEDSIDE INSTRUMENTS AND MEASUREMENTS

Required: SpO_2 and PR

Optional: Acoustic Respiration Rate (RRa), Total Haemoglobin ($SpHb$), $EtCO_2$, BP, and Temp

STEP 3

OPTION A

Wireless

OPTION B

Wired

> Select Network Option

OPTION A: WIRELESS CONFIGURATION SUPPORT

IEEE Standard: 802.11 a, b, g

Encryption: TKIP, AES

OPTION B: WIRED CONFIGURATION SUPPORT

Ethernet: Standard IEEE 802.3

STEP 4

> Select system components

PSN View

INSTALL IN YOUR DATA CENTER

Halo Index Appliance

PSN Appliance

OPTION

> Connectivity to EMR

Patient SafetyNet incorporates the Masimo Adaptive Connectivity Engine™, which enables two-way, HL-7 based connectivity to clinical/hospital information systems.

STEP 4 SYSTEM COMPONENTS

Number of licenses: Up to 80 per server

Number of views: Up to 4

Halo Index option

EMR option

OPTION A

Paging

OPTION B

> Select a notification device

3rd Party Gateway

IP Phone Notification

OPTION NOTIFICATION SUPPORT

Masimo dedicated pager

or

Notification gateway (Allows 3rd party messaging gateways that complies to TAP1.6/1.8 over ethernet)

Platforms: Emergin, Radianta, Conexall, MessageNet, and more

MASIMO GLOBAL PROFESSIONAL SERVICES

The Masimo team is here to help

Our regional-based, full-time team is experienced in implementing continuous patient monitoring systems in hospitals.

WE DELIVER

- > Project management support
- > Wireless site survey assessment
- > Network performance testing at implementation
- > Post-implementation support

SPECIFICATIONS

PATIENT SAFETYNET BEDSIDE RADIO

Dimensions .....6.5" x 3.3"x 1.2" (16.5 cm x 8.5 cm x 3.0 cm)
Interface Ethernet (RJ-45) serial (DB-9) 802.11a/b/g
Security..... WPA-TKIP, WPA2-AES (128-bit) 40/64-104,128/152-bit WEP IEEE 802.1X wireless client support and wired LAN authentication EAP-TLS, PEAP and LEAP-compatible authentication
Operating Temperature .....32 - 104° F (0 - 40° C)
Power Supply.....110 - 240 VAC
Compatible Masimo Devices..... Radical-7, Non-Masimo Instruments

PATIENT SAFETYNET SERVER

CPU .....minimum Quad-Core Intel Xeon 2.0 Ghz
Memory.....minimum 4GB RAM
Storage ..... minimum 160 GB RAID 1 storage array
Management..... remote access capable
Communications ..... redundant Gigabit 10/100/1000 BaseT Ethernet NICs
AC power..... redundant power supplies (110 – 240 VAC, 50/60 Hz)
Accessories ..... monitor/keyboard/mouse
Temperature, Operating..... 50 – 95° F (10 – 35° C)
Form Factor .....2U Chassis Enclosure
Physical Dimensions ..... 3.44" x 17.64" x 27.50" (8.75 cm x 44.80 cm x 69.88 cm)
Weight.....51.5 lb (19.22 kg)

PATIENT SAFETYNET CLINICIAN ASSIGNMENT STATION

CPU ..... minimum 1.0 GHz
Memory.....minimum 1 GB RAM
Storage .....minimum 8 GB HDD
Graphics ..... minimum 1280 x 1024 resolution
Operating System .....Windows XP, Vista
Communications ..... minimum ethernet 10/100 BaseT
AC power.....110 – 240 VAC 50/60 Hz
Accessories ..... keyboard/mouse

PATIENT SAFETYNET PSN VIEW CLINICIAN ASSIGNMENT STATION

CPU ..... minimum Intel Core 2 Duo, 2.0 GHz
Memory..... minimum 4 GB RAM
Storage .....320 GB HDD
Operating System ..... Windows Vista Home Premium
Communications .....10/100/1000 BaseT Ethernet NIC
AC power..... 110 – 240 VAC, 50/60 Hz)
Temperature, Operating .... 50 – 95° F (10 – 35° C)
Physical Dimensions ..... 17.4" x 21" x 2.6" (44.20 cm x 53.34 cm x 6.60 cm)
Weight..... 24 lb (10.89 kg)

PATIENT SAFETYNET PAGING TRANSMITTER PERFORMANCE

Transmit Power.....5w
Frequency.....UHF 440 - 470 MHz
AC power..... 110 - 240 VAC 50/60 Hz
Dimensions ..... 2.8" x 8.5" x 10" (7.3 cm x 21.6 cm x 25.4 cm)
Weight.....1.9 lbs (850 g)

EXTERNAL CONNECTORS

RJ45 ..... standard network cable
Antenna ..... BNC

PATIENT SAFETYNET PAGER

Display Type.....LCD
Information ..... date, origin and type of alarm, current clinical parameter, and level of alarm
Notification Modes ..... tone and/or vibrate
Dimensions .....80 x 54 x 19 mm
Weight (with battery)..... 65 grams
Battery Type ..... 1 AA alkaline

Transmit distances for the Patient SafetyNet bedside radio and the Patient SafetyNet paging transmitter will vary depending upon the structural surroundings (construction, shielding, interfering devices, etc.)

MASIMO SET PERFORMANCE

Refer to Masimo Radical-7™ and Masimo Rad-87™ product specifications.

INTERFACE MASIMO PATIENT SAFETYNET TO A MASIMO PAGING SYSTEM, YOUR OWN INTERNAL PAGING, OR OTHER MESSAGING/NOTIFICATION SYSTEM:

Masimo Americas
Irvine, California
tel 1-877-4-Masimo
info-america@masimo.com

Masimo International
Neuchâtel, Switzerland
tel +41-32-720-1111
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Masimo

7684-50755-0811