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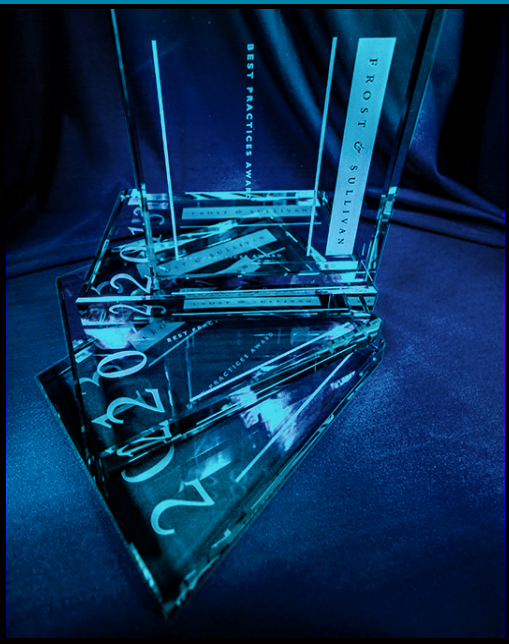
PHILIPS

2016 North American
General Acute Care Workflow Solutions
Product Leadership Award

FROST & SULLIVAN

2016 BEST PRACTICES AWARD

NORTH AMERICAN
GENERAL ACUTE CARE WORKFLOW SOLUTIONS
PRODUCT LEADERSHIP AWARD

2016
BEST PRACTICES
AWARDS

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About 10% of hospitalized patients experience adverse events, many times resulting in unplanned transfer to intensive care units (ICU), cardiac arrest, or—as in 5 to 8% of cases—death[1]. Research shows that 35 to 40% of unexpected hospital deaths occur on the general floor[2], many of which are preventable. Almost all inpatient events are preceded by warning signs for an average of 6 to 8 hours[3]; the most common of which is changes in vital signs. Many times, nurses fail to recognize these changes for a variety of reasons, including lack of organization or knowledge, failure to appreciate clinical urgency, lack of supervision, and failure to seek advice[4].

In order to raise the level of care provided, many hospitals have begun to utilize rapid response teams to bring intensive care expertise into acute care settings. While this marks a step in the right direction, many times nursing staff are ill-informed on the appropriate patient status to call response teams, and often call teams too late to be able to prevent the inpatient critical event. As a result, many hospitals have created early warning score (EWS) protocols, where nurses must calculate a patient score based on a patient's vitals. Crowded wards combined with overburdened nurses and sicker patients sometimes result in scoring errors or low compliance with EWS protocols. As such, hospitals need more efficient EWS workflow solutions that can implement a streamlined patient care workflow and identify patient deterioration earlier to prevent adverse events.

Product Family Attributes and Business Impact of Philips

Philips designed the IntelliVue Guardian solution to provide general floor, medical-surgical units, and emergency department waiting areas an accurate and efficient workflow solution to identify deterioration signs that predict a future event. The entire solution is composed of the spot-check monitors, IntelliVue Cableless Measurement devices, IntelliVue Guardian Software and associated infrastructure, and clinical transformation consultancy. This advanced level of monitoring can lower response times, enacting high-quality patient care and reducing length of hospital stays, and therefore, financial burden of hospital visits.

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[1] Al-Qahtani S, Al-Dorzi HM. Rapid response systems in acute hospital care. Ann Thorac Med.2010;5(1):1–4.
[2] Rutherford P, Lee B, Greiner A. *Transforming Care at the Bedside* .IHI Innovation Series white paper. Boston: Institute for Healthcare Improvement; 2004.
[3] Hillman KM, Bristow PJ, Chey T, Daffurn K, Jacques T, Norman SL, et al. *Duration of life-threatening antecedents prior to intensive care admission*. Intensive Care Med. 2002;28:1629–34.
[4] McQuillan P, Pilkington S, Allan A, Taylor B, Short A, Morgan G, et al. *Confidential inquiry into quality of care before admission to intensive care.* BMJ. 1998;316:1853–8.

Changing the Face of Patient Monitoring: The IntelliVue Guardian Solution

The IntelliVue Guardian System

The IntelliVue Guardian System is an overall solution designed to aid in accurate and quick identification of signs warning of general floor patient deterioration, facilitating appropriate intervention to eliminate potential health events; thereby improving patient care, financial outcomes, clinician workflow, and patient stay times. Philips works with hospitals to identify challenges faced by the institution regarding care workflow and data collection related to patient deterioration. Together, Philips and the hospital's clinical team identify process changes and may even develop customized EWS protocols, helping hospitals improve response times to events, accuracy of patient identification, effectiveness of communication among caregivers, and reduce rates of healthcare associated infections. The IntelliVue Spot-check monitor automatically calculates a patient's EWS and presents the results and action list right at the bedside, eliminating the time and possible error of manual calculations as well as reducing time spent by manual documentation of vital signs. Meanwhile, the IntelliVue Guardian system collects and collates patient data and scores, and forwards spot-check records to the EMR with bedside user authentication and validation, ensuring that data is charted in to the EMR automatically with minimal delay. The system can be deployed on a hospital's hardware or virtual environment using its LAN/WLAN infrastructure, facilitating easy installation and seamless integration.

As a patient's EWS rises into a warning phase, the system automatically sends an alert through the Philips CareEvent system or equivalent 3rd party event management software to the mobile device chosen by nurses, calling for an intervention based on each hospital's specific protocol. Should the protocol call for more frequent vital signs, nurses can choose to use an IntelliVue Cableless Measurement device to send measurements every five minutes, or every fifteen minutes, etc. This capability frees nurses up to care for the other patients on the floor. The cableless measurements seamlessly integrate with the Guardian system, enabling clinicians to view changes in patient status in real-time from a point-of-care station or from the patient's individual monitor. If the patient's EWS continues to rise, clinicians can be alerted, and can take necessary measures to prevent further deterioration and a possible serious adverse event (i.e. cardiac arrest).

Early Warning Score (EWS)

EWS protocols selected by clinicians and implemented on Guardian aids the early and accurate identification of deterioration signs. Each patient vital sign—such as heart rate, respiratory rate, temperature, pulse rate, pain level and so on—is assigned an individual score based on how close to normal the sign is; the more abnormal , the higher the score. Guardian automatically calculates an overall patient EWS score, or Modified Early Warning Score (MEWS) using these individual sub-scores, which is displayed on the spot-check monitor right at the bedside as the nurse is performing the assessment, facilitating quick and easy identification. When the EWS breaks certain scoring thresholds based on the hospital's specific protocols, clinicians are sent a warning of the patient's status and can take appropriate monitoring or treatment steps. IntelliVue Guardian system and the IntelliVue spot-check monitors support not only EWS type scores, but also body systems

based scoring, Pediatric EWS (PEWS), complex algorithms such as electronic Cardiac Arrest Risk Triage (eCART) and multi-threshold single parameter triggers.

IntelliVue Cableless Measurement Devices

Philips designed the IntelliVue Cableless Measurement devices to heighten patient comfort and conduct vital sign readings at set—usually high frequency—intervals. The devices transmit measurement results to either the bedside monitor or the Guardian software, ensuring that the individual device's measurements are properly integrated and displayed with other patient vitals. If a cableless device becomes disconnected from a patient and is unable to conduct valid vital measurements, the device sends a notification to the caregiver's paging device so that the device can be repositioned to accurately monitor vitals. Philips' current IntelliVue Cableless Measurement devices include:

- Pulse Oximetry (SpO2) pod measures 54 X 27 X 65 millimeters (mm) and weighs about 0.3 pounds. Its battery can last between 24 hours and three days, dependent on vital measurement frequency. Sensors are designed for a single use.
- Non-invasive Blood Pressure (NBP) pod is 66 X 31 X 138 mm and weighs 0.7 pounds. Its battery will last between four and five days, depending on measurement frequency. Hospitals can choose to either utilize re-usable or single-use cuffs dependent on their sanitization protocols.
- Respiration pod is 45 X 14X 65 mm and weighs 0.3 pounds. Its battery lasts between two to three days dependent on capabilities desired—including or not including posture and activity detection. Attachments are designed for a single patient use.

All of the IntelliVue Cableless devices can be plugged into the charging station and fully recharged in two and a half hours. Philips maintains a commitment to creating high quality, accurate monitoring devices; its devices are tested and validated against appropriate standards. Furthermore, each IntelliVue Cableless Measurement devices undergoes comprehensive software, hardware, and safety testing before being sold. The devices are easy to use and as they are similar to tethered monitoring devices, hospital staff does not need additional training to properly use the devices.

High Value Results

Hospitals implementing the IntelliVue Guardian solution have experienced up to a 92% improvement—from 19.6 hours to only 1.5 hours—in notification times between vital sign instability and the activation of rapid response teams and a 12% reduction in the average length of hospital stay. These improvements have resulted in a 70% reduction in hospital code blues, leading to an estimated $800,000 reduction in code blue cost annually. Furthermore, hospitals utilizing the IntelliVue Guardian solution have seem to have higher vital sign collection compliance from automation of the EWS and cableless devices, simplifying patient care workflow and alleviating pressure on nurses from reduced calculation responsibilities.

Philips' Attention to Enacting Desired Outcomes

Philips goes beyond merely providing technologies and works with its customers to enact their specific desired outcomes. As such, Philips conducts a workflow analysis of its customer's care processes to identify issues hindering adoption of EWS and fast activation of response teams. After conducting this analysis, Philips works closely with hospitals to create a plan to optimize processes and workflows and makes recommendations of solutions to accomplish these goals. As the IntelliVue Guardian solution includes workflow analysis, re-engineering, and change management, hospital's receive end-user training determined by the requirements that arise from their specific programs—usually including elements such as determining when a patient requires closer observation, device attachment, assigning a device to a patient, battery management, and response to deterioration notifications. Philips periodically assesses the hospital's workflow progression using key performance indicators and recommends corrective measures if the original system settings and/or hospital processes are not enacting desired outcomes.

Philips' Commitment to Continual Customer Satisfaction

Philips' motivation to enact enterprise-wide changes in hospital's workflow has been met with high rates of customer satisfaction. Philips maintains close relationships with its customers through its continual tracking and optimization support. Relying on these relationships, Philips solicits customer feedback at all stages—from analysis and planning to full-launch—of its solutions to ensure it is meeting customer's needs. Furthermore, Philips teams with customers through interviews, feedback sessions, and onsite observations of customer's solutions during the development phase of new solutions, ensuring that new solutions fulfill customer needs. As such, Philips is able to maintain a wide portfolio of solutions that enact desired outcomes specific to its customer's needs.

Conclusion

An estimated 10% of patients in surgical areas of hospitals experience complications—many of which are preventable—as patients display subtle signs warning of the future event. Utilizing clearly defined early warning scores, the IntelliVue Guardian solution allows clinicians to track, predict, and react to health events before they happen, reducing code blue alarms, and unnecessary transfers into the intensive care unit, thereby lessening patient stay times and the associated financial burden. Philip's close customer relationships enable Philips to utilize customer feedback during innovation stages of new product development, ensuring that the company can continue to meet its customer's evolving needs.

Because its strong overall performance, Philips Healthcare earns Frost & Sullivan's 2016 Product Leadership Award in the general acute care workflow solutions market.

Significance of Product Leadership

Ultimately, growth in any organization depends upon customers purchasing from your company, and then making the decision to return time and again. A comprehensive product line, filled with high-quality, value-driven options, is the key to building an engaged customer base. To achieve and maintain product excellence, an organization must strive to be best-in-class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.

Understanding Product Leadership

Demand forecasting, branding, and differentiation all play a critical role in finding growth opportunities for your product line. This three-fold focus, however, must be complemented by an equally rigorous focus on pursuing those opportunities to a best-in-class standard. Customer communications, customer feedback, pricing, and competitor actions must all be managed and monitored for ongoing success. If an organization can successfully parlay product excellence into positive business impact, increased market share will inevitably follow over time.

Key Benchmarking Criteria

For the Product Leadership Award, Frost & Sullivan analysts independently evaluated two key factors—Product Family Attributes and Business Impact—according to the criteria identified below.

Product Family Attributes

Criterion 1: Match to Needs
Criterion 2: Reliability and Quality
Criterion 3: Product/Service Value
Criterion 4: Positioning
Criterion 5: Design

Business Impact

Criterion 1: Financial Performance
Criterion 2: Customer Acquisition
Criterion 3: Operational Efficiency
Criterion 4: Growth Potential
Criterion 5: Human Capital

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often, companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry players and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS
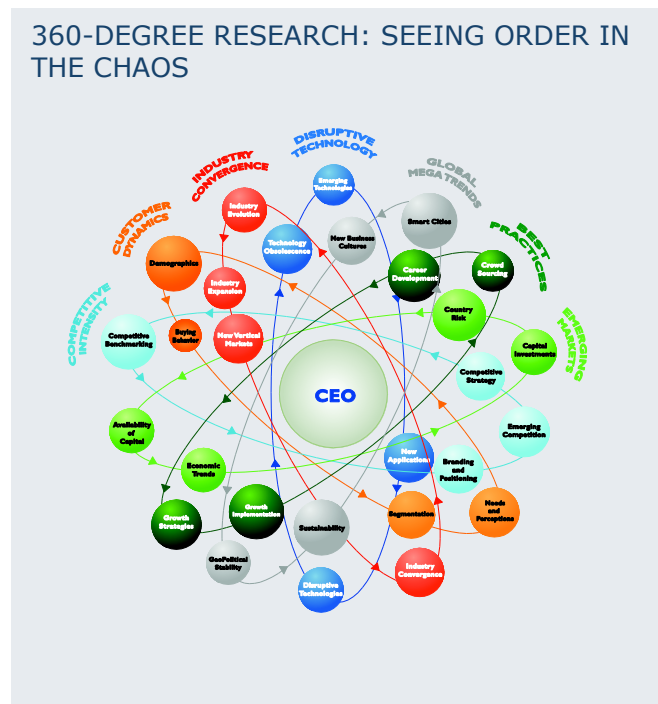
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