Bedside ‘Point of Care’ Workstations

Facilitating quality patient care and delivering value for money to hospitals.

Executive summary
Hospitals face two key challenges in the present climate. How do they deliver quality patient care and how do they secure value for money and return on investment (ROI) from their budgetary spending?

Evidence is pointing to health information technologies to address these concerns as they can improve patient care by reducing medical error and its associated costs. Yet acquiring and implementing these technologies can be very expensive for a hospital.

However, new bedside digital media and entertainment workstations offer a unique means of generating revenue for hospitals to offset these costs as well as providing the hardware to access these technologies at the point of care.

These bedside workstations provide patients with digital media and entertainment as well as giving clinicians secure and reliable bedside access to the patient’s electronic health record and health information technologies. Finally, they provide hospitals with a valuable revenue stream to offset the purchase of the bedside workstations themselves and possibly fund further health information technologies for the hospital.

This solution offers a unique and compelling business case to hospitals to purchase these systems. They deliver value for money to hospitals and can ultimately deliver improved patient care.

Introduction
Today’s hospitals are complex organizations operating in difficult economic situations. They face two key challenges in the present climate.
• How do they deliver quality patient care with limited resources?
• How do they ensure they get real value for money and return on investment from their budget spending?

Despite what one may think, delivering quality patient care is one of the largest challenges facing hospitals. The Institute of Medicine’s report ‘To Err is Human’ identified that between 44,000 to 98,000 deaths each year are due to medical error\(^1\). Medical error or adverse events are defined as ‘injuries caused by medical management that prolonged admission or produced disability at the time of discharge’. The various types of errors can include misdiagnoses, clinical omissions, procedural errors and medication errors to name but a few\(^2\).

In the case of medication-related error alone, it is estimated that over 1 million serious medication errors occur each year in US hospitals\(^3\) causing an estimated 7,000 deaths.\(^1\) The costs of this specific type error are estimated to range from $2,000 to $4,700 per hospital bed\(^13\). If this figure is applied nationally, these preventable adverse drug events could be costing American hospitals up to $2 billion per year. In addition to this, there are other costs that are more difficult to measure such as the loss of trust in the hospital system as well as decreased patient and clinical satisfaction.

The other concern facing hospitals is delivering value for money from their budgetary spending as well as return on investment from any capital expenditure. Healthcare is an expensive industry, in 2008 alone health spending in the United States reached $2.4 trillion, and it is projected to reach $3.1 trillion by 2012.\(^4\)

The current economic environment will now add to this pressure, compelling hospital management, purchasers and clinicians to deliver value for money by stamping out inefficiencies and excessive expenses. A key element of this must be eliminating the unnecessary expenditure resulting from medical error, which will also significantly improve patient care.

**The Solution**

Increasingly, medical literature is pointing to health information technologies to improve the quality of patient care and reduce costs to hospitals. Such systems build on the Electronic Health Record (EHR) and provide Clinical Decision Support (CDS) to clinicians. These systems can include: \(^5\)\(^10\)

- Electronic prescribing systems known as Computerized Physician/Provider Order Entry systems (CPOE);
- Systems capturing patient physiological vitals with/without ‘track and trigger’ systems which calculate Early Warning Scores (EWS); and

- Standard hospital systems such as the electronic test ordering systems, pathology systems etc.

**Computerised Physician/Provider Order Entry (CPOE)**

CPOE are electronic prescribing systems, which use CDS to identify medication errors at the time of ordering and bring them to the attention of the clinician. Medication orders are inputted directly into the computerized record and the system then utilizes all the laboratory and prescription information contained in the patients EHR. Any identified errors are then flagged to the clinician. According to the literature, such systems can be effective in reducing the rate of medication-related error. One hospital in Boston carried out two studies and found that CPOE reduced error rates from 10.7 to 4.9 per 1000 patient days, a reduction of 55%. Furthermore, an additional study found it reduced medication error by 88%. Another study by King et al demonstrated a 70% reduction in antibiotic-related adverse drug reactions after implementing decision support for these drugs.

**Patients physiological vitals systems**

Patient’s vitals are collected routinely during the clinical day. These can include temperature, respiratory rate, blood pressure, state of consciousness etc. Historically, they were inputted onto paper observation sheets but increasingly they are collected and inputted directly into an electronic system. In many cases this system then calculates an EWS as part of a physiological ‘track and trigger system’ to identify if patients are deteriorating clinically and to alert the nursing and medical team. Literature highlights that these systems are correctly calculating the EWS, facilitating patients receiving early clinical intervention and possibly prevent a costly ICU admission and/or increased length of stay. One study also showed less error when using an electronic system versus the conventional pen and paper method.

**Electronic test ordering systems.**

Clinicians routinely order and review tests during the course of a patient’s hospital stay. Tests such as laboratory tests, imaging etc allow the clinician to build an objective picture of the patient and plan their course of treatment. Historically, tests were ordered by paper and results sent back in the same format. Currently, many of these systems are electronic, allowing clinicians to order tests and review the results the moment they are completed on the patients EHR. This facilitates rapid decision-making underpinning the CPOE and CDS systems in place.
Whilst the evidence is certainly present to validate the procurement of such systems by hospitals, the literature would also suggest that uptake has been poor. In the case of CPOE, fewer than 5% of US hospitals have fully implemented this type of system, a figure attributed to the high initial purchase costs of the systems and the hardware to deliver them. The upfront cost of implementing such a system can vary from $500,000 to almost $15 million per hospital as even ‘off the shelf’ applications can require customization for each hospital. In addition, maintenance costs can vary from $200,000 to $2 million per year.\textsuperscript{10}

The extensive financial outlay for these clinical applications and related hardware can be hard to justify especially in changing economic circumstances where hospital budgets are under enormous pressure.

So how can hospitals provide their clinicians with the necessary health information technology yet offset some of this large financial outlay?

**Delivering the Solution**

The answer could be to look to major technology advances seen in hardware and digital media in terms of TV, Video on Demand and internet over the last few years. Many of these new technologies are now moving into healthcare.

Until now, patients were provided with bedside entertainment by means of an old television set. Yet peoples’ entertainment needs are now much more advanced and expectations are much higher. In order to address this, some hospitals are providing their patients with bedside entertainment i.e. a digital bedside terminal for entertainment, communication and internet access. The same system also generates revenue as patients purchase credit to access the services. Holy Name hospital, New Jersey, implemented this type of system and find that the revenue stream is so effective that they anticipate it will offset the cost of technology investment within 18 months of its deployment.\textsuperscript{11}

Innovative hospitals such as Holy Name Hospital NJ, have also taken this bedside workstation a step further and are using it to provide clinicians with secure and immediate access to the patient’s EHR and health information technologies. The bedside workstation allows them:

- Access the hospitals existing systems (via the HL7 protocol) such as the electronic patient test ordering systems to order tests, review results and facilitate clinical decision making;
Access the patient’s EHR and patient’s vitals systems. Clinicians can input the patients’ observations immediately into the EHR without having to leave the patients bedside;

Access to the CPOE to prescribe, and review the dispensing of patients medications.

The bedside workstations are secure and prevent unauthorized access by using highly secure smart card readers and challenge response mechanisms incorporated into the system software. They are designed specifically for the hospital environment and comply with all infection control standards. These workstations are being developed further to support other applications, such as patient education, electronic meal ordering and an integrated nurse call system. From a hospital management systems perspective, they could also support applications to improve bed management and discharge planning.

Bedside workstations offer hospitals a number of unique opportunities. They allow hospitals offer ‘state of the art’ digital media and entertainment to a more demanding and sophisticated patient. The workstation allows a clinician access to the patients’ EHR and key health information technologies at the ‘point of care’. Finally, the system provides hospitals with a definite ROI and ongoing revenue, which can support the purchase of further health technologies to improve patient care.

This solution offers a unique and compelling business case to hospitals. It allows them to secure value for money for the hospital and deliver improved patient care.

Conclusion
Hospitals have two key concerns in the present climate: delivering quality patient care and value for money with their budgetary spending. Health information technologies can help them address both these concerns yet purchasing them can be very expensive. However, new bedside digital media and entertainment workstations offer a unique means of offsetting these costs. They provide patients with bedside digital media and entertainment, while also providing clinicians with a bedside workstation to access the EHR and health information technologies and finally they provide hospitals with a valuable revenue stream to offset the purchase of the system as well as potentially fund other health technologies.

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