Real-time data can allow earlier identification of patients with deteriorating health, free up nurses’ time and help hospitals to better plan staff and resource deployment.

How real-time data can improve patient care

In this article...

- The impact of data on patient care
- How real-time data is gathered
- Benefits to patients, staff and healthcare organisations

**5 key points**

1. Data analysis is vital to improve patient care
2. Real-time data can reduce hospital mortality and the number of infections
3. Using handheld devices to record patient data facilitates observation compliance
4. Receiving patient data in real time can reduce nursing workloads
5. Hospitals can use real-time data to make better use of their human and practical resources

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Ever since Florence Nightingale analysed the causes of death of British soldiers in the Crimea, interpreting and analysing data has been used to improve nursing. Now some forms of data, such as electronically recorded patient observations, are instantly available to nurses and managers. This article outlines how real-time data can be used to improve patient care, staff efficiency and overall management of hospitals.

Florence Nightingale is widely recognised as the founder of the nursing profession, who transformed the care of injured soldiers in the Crimean War, and whose advice on patient care remains relevant almost 150 years later. What may be less well known is that she was also a pioneer in the use of statistics to improve healthcare, and was the first female member of the Royal Statistical Society.

Nightingale’s insights were based on detailed analyses of the causes of death of British soldiers in the Crimea, and later in parts of the British Empire. She used data – often painstakingly extracted by hand from surgeons’ records – to identify trends in deaths. This enabled her to look at the root causes of these trends, and suggest changes in care. Her reforms in the Crimea, including the introduction of mandatory hand-washing, cut the death rate in military hospitals from 42% to 2% (Lee, 1912).

Patient care has come a long way since the military hospitals of the 1850s. What has not changed, however, is the potential for rigorous analysis of healthcare data to deliver insights into how care can be improved. Increasing amounts of that data is now collected electronically as part of routine care, which makes analysis far easier than in Nightingale’s day. Perhaps even more important is that electronic data is now available in real time, rather than simply a record of past events. This means it can be used to improve care as it is delivered, rather than just retrospectively to see what might have been done differently.

Real-time electronic data is a potential treasure trove of insights, which can be analysed to improve patient care and use nurses’ time more effectively.

When I started nursing 30 years ago, I took patient observations by hand and recorded them on paper charts – a process that was, in many ways, unchanged since Nightingale’s day. Today hospitals increasingly use handheld electronic devices to record these observations. For example, nurses in 50 hospitals across England use one electronic system, VitalPAC, to record five million patient observations a month on the iPad Touch handheld device.

Reduced mortality

This enormous amount of data has already brought real benefits: the Royal College of Physicians used the first few years of electronic observations at Portsmouth Hospitals Trust to help create the National Early Warning Scores (NEWS) (RCP, 2012) for patients whose health was deteriorating. Electronic records meant researchers could check trends in observed indicators and track which tended to lead to deterioration. The amount of stored data meant theories about deterioration could be
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rigorously tested against thousands of real-life cases, developing statistically robust processes for calculating the chances that patients with particular patterns in their observations were likely to deteriorate. A similar analysis of paper records would have taken years.

The NEWS system was programmed into VitalPAC and now warns nurses when worrying patterns emerge in observations; these warnings are likely to occur sooner than a nurse might have noticed if looking at a hand-written chart. When the system was rolled out across Queen Alexandra Hospital in Portsmouth and University Hospital Coventry; reductions in crude mortality fell from 7.75% to 6.42% (overall decrease 17.2%) and 7.52% to 6.15% (overall decrease 18.8%) respectively (Schmidt et al., 2014). It is estimated that this led to 397 and 372 fewer deaths respectively at the hospitals.

Reduced infections

Data can also be used to identify patients who may have infections. For example, handheld devices can be programmed not only to record bowel movements but also to immediately flag up patients with potential gastrointestinal infections. The infection control team can then be alerted automatically and the patient moved to isolation, reducing the risk of cross-infection and the need for ward closures and staff to be sent home.

Improved compliance

Electronic recording of observations improves compliance: the system alerts nurses – and their managers – if they are late making scheduled checks on patients. Croydon University Hospital found observations were taken within 1.5 hours of the scheduled interval in 80% of cases, compared with 60% before the system was rolled out in 2013; at night, compliance with scheduled intervals rose from 45% to 80% (Cooper et al, 2015).

Reduced workload

Better compliance of observation-taking can also reduce nurses’ workload; if patients are checked on time and action is taken, they are less likely to deteriorate, and so less likely to need such frequent observations. At one 628-bed hospital in 2014, an active programme of “walk arounds” to improve compliance of observation-taking led to a reduction in the number of observations needed by almost 6%. This equated to 3,700 observations per month and gave nurses across the hospital an additional 332 hours per month for care, while the number of critical and high-risk escalations reduced by 40% and 23% respectively.

Improved governance

Electronic recording provides a clear audit trail of the clinical data recorded. The date and time of observations and assessments are automatically recorded, and of actions to be taken. Nurses can use the information to demonstrate that care has been given to time. Electronic information also provides accessible information during investigation of incidents and complaints.

Improved resource deployment

Data recorded on each handheld device is automatically uploaded wirelessly to the hospital’s system so all ward staff can immediately see not only the condition of all patients, but whether observations are late. As a ward sister, I had to visit each patient and read their charts to work out how sick they were and prioritise my staff’s workload. Two hours later that information was out of date and had to be collected again. Now ward sisters can see the entire ward on a screen and allocate work quickly and efficiently.

Teams have reported working more collaboratively. For example, when nurses with patients who are particularly time-consum­ing fall behind with observations, colleagues have offered to take on some of their workload without needing to be asked. Equally, if all staff are hard-pressed and falling behind, the data gives ward managers an evidence base with which to examine how the ward is resourced and whether workloads can be organised differently, or to justify requests for extra staff.

Instant access to individual patient data is also invaluable for managing the whole hospital. My colleagues at The Learning Clinic who have come from industry are astonished how little up-to-date information hospital managers have. The managers of factories or supermarkets always know exactly what supplies and products are in the building. By contrast, most NHS trust executives simply do not know how many of their beds are full or which patients are where; they can only get a true picture by sending staff to every ward with clipboards; by the time they return with the information it is inevitably out of date.

Electronic patient observation recording systems record not only each patient’s condition, but where each patient is. That gives an immediate picture of how many beds are empty and whether any patients are in the wrong type of ward. Simply having that information available improves the ability to move people to the appropriate unit. More importantly, an overview of cases in accident and emergency or an admissions unit is also a picture of imminent demand for beds in specialist wards. That information allows managers to plan whether beds are open or closed, and where staff may be deployed to help patients move through the hospital quickly and safely.

This management information can also speed up discharges. If managers can see that a number of patients are ready to leave but waiting for prescribed drugs, they can focus on unblocking delays in pharmacy.

The potential for improvement

All this takes us back to where we started – with Florence Nightingale. “What you want are facts, not opinions,” she once wrote. She added: “Who can have any opinion of any value as to whether the patient is better or worse, excepting the constant medical attendant or the really observing nurse?” (In: McDonald, 2004)

Today, we might add, a well-programmed electronic device, linked in real-time to the hospital’s network, can also make an important contribution.

Conclusion

Real-time data enables staff and organisations to work more efficiently and productively and, in turn, results in improved care for patients, who can move through the care pathway in a timely fashion. The use of electronic devices must become a routine part of healthcare to make the best use of increasingly limited resources. NT

References


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