Using point-of-care simulation to better manage acute deterioration

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Abstract With the shift to more localised healthcare, new models of education and training are needed to improve quality and safety, while being engaging and empowering for staff. Point-of-care simulation is gaining popularity in healthcare as a training method, and has several advantages over standard simulation. This article describes the design, implementation and evaluation of a point-of-care simulation training project to improve acute illness recognition and management in a community hospital setting. The project assessed skills, delivered tailored educational content and re-evaluated learning. It enabled the implementation of organisational safety changes, as well as improving staff knowledge and confidence in recognising and managing a deteriorating patient.

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In this article...
- The benefits of point-of-care simulation training
- Using point-of-care simulation as a tool to improve the management of acute deterioration
- How this approach increases knowledge retention and staff confidence

Key points
- Patients who are acutely unwell are increasingly being cared for in community settings
- Educational programmes are needed to enhance emergency management skills for community hospital staff
- Point-of-care simulation increases staff confidence and helps embed knowledge into practice for safer, more-effective patient care
- Point-of-care simulation supports and enhances multidisciplinary team working
- This training approach can improve the recognition and management of acute illness in community hospitals

Keywords Acute illness/Education/Simulation training/Deterioration

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NHS England’s (2019) The NHS Long Term Plan aims to shift healthcare closer to home, which requires new service models. This includes strengthening and developing community services to relieve increasing burdens on acute hospitals. Cornwall Partnership NHS Foundation Trust provides community services across an isolated peninsula in 10 adult physical health community hospitals and in people’s homes. The area is rural, with a widely dispersed population that is served by only one acute hospital. Developing the community hospitals in the region is essential to meet the goals of The NHS Long Term Plan, improve the quality of patient care, ensure long-term sustainability of services across the county and reduce unnecessary acute hospital admissions.

An enhanced skilled and cohesive community workforce is critical to this. It requires sufficient competent and skilled staff, equipped to meet healthcare demands and deliver consistent, safe and effective care. Patients need to receive care that is proportionate to their needs and in the right care setting, with the right care professional, at the right time. This poses various challenges, including around training; point-of-care simulation is one potential solution to this.

Simulation education has been shown to improve knowledge, confidence and communication in teams when specifically focused on emergency management (Crowe et al, 2018). Effective use of simulation has been identified as a key priority in supporting development of the healthcare workforce. Former chief medical officer Sir Liam Donaldson described it as a “vital part in building a safer healthcare system” (Donaldson, 2009).

Simulation training has also been validated as a learning method by the Royal College of Nursing (2017), Department of Health (2011) and General Medical Council (2011); Health Education England (2018).
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has published a framework on its use. It provides a true-to-life learning environment, mirroring real-life scenarios and enabling staff to put knowledge and skills into practice.

Point-of-care simulation training

Traditional medical simulation training is prescriptive, done in a controlled, highly technical environment, usually with staff from the same professional cohorts. It is delivered in a non-clinical setting, which is simulated to look like the clinical environment. In contrast, the newer more innovative point-of-care, or in-situ, simulation allows multidisciplinary teams to train together in their usual patient care environment.

Learning in familiar teams and environments gives some advantages over traditional simulation training. Sleeman et al (2018) showed training multidisciplinary teams in an acute hospital setting can improve staff morale and enhance education at the coalface. They found the key was ensuring staff used their own knowledge, resources and equipment while running the simulation in real time. This was also found to be useful in addressing human factors and team working dynamics to improve patient care.

There is increasing support in the medical profession for simulation-based learning as an effective teaching and training method (So et al, 2019). Studies suggest simulation can improve recognition and intervention in a deteriorating patient (Lee et al, 2019), along with nursing skills and confidence when dealing with complex emergency situations (Crowe et al, 2018). This contributes to safer patient care.

Less has been written about point-of-care simulation training, even though it would be expected to give similar benefits. Highly interactive and immersive learning is known to be far more effective than traditional learning that is solely content-driven (Pagano, 2013). Health Education England’s simulation framework (2018) states that blended learning, using simulation alongside other techniques, should become commonplace in training pathways and continuing professional development.

Healthcare staff are still largely educated in professional ‘silos’ via classroom methods. Arguably, traditional educational approaches are not conducive to interprofessional learning or improving multidisciplinary collaboration and communication (Vyas et al, 2012). Future learning needs to be inclusive, accessible and time sensitive; these are all crucial elements for staff development in today’s pressurised healthcare working environments.

Shrestha et al (2020) showed an increase in knowledge and skills of junior doctors after in-situ simulation and recommended its incorporation into existing medical education. Smith and Jankowski (2014) found engaging nurses in regular simulation training boosted skills, knowledge, and confidence levels. They also proposed it has potential for cost savings by improving patient clinical outcomes.

Point-of-care simulation with the multidisciplinary team could also tease out latent safety processes or clinical issues that are not always apparent in simulation rooms, to improve patient safety (Shah et al, 2019).

Bridging the theory–practice gap

Simulation training provides opportunities to bridge gaps between theory and the transition of knowledge into practice (Brown, 2019). Our trust requires registered inpatient nurses to:

- Hold Resuscitation Council UK Immediate Life Support (Bit.ly/Ilsresus) and Manchester Critical Care Network Acute Illness Management (Bit.ly/AcuteillnessmanagemFMT) certificates;
- Complete various local courses;
- Use locally developed treatment protocols.

These were mandated for safety due to the geographical spread of our hospital teams, remote community locations and reduced on-site doctor capacity. This should provide staff with essential knowledge and skills, including use of the ABCDE (airway, breathing, circulation, disability, exposure) approach to recognise, assess, manage and treat, and resuscitate adult patients who are acutely unwell. However, local systematic incident reviews and staff responses identified a lack of confidence around applying the acquired knowledge and skills when transitioning into practice.

There are numerous theories on the different ways in which learners learn; these need to be taken into consideration to make teaching practices suitable for groups of diverse learners, while helping with the transfer of knowledge and skills into clinical practice.

Kolb’s (1984) experiential learning cycle theorises a four-stage continuous learning process and quantifies why skills and knowledge learnt in the classroom may not fully transition into the clinical environment. Many barriers have been documented as impacting on learning.

In the first ‘concrete learning’ stage in the classroom, barriers could include the environment and unmet needs in terms of differing learning styles. In the second ‘reflective’ stage, lack of time for reflection on knowledge learnt, due to work demands, could be a barrier. The third stage of ‘conceptualisation’, involving delivery of teaching in a classroom, lacks the context of a clinical environment. Lastly, in the final stage of ‘active experien-

Box 1. Aims and objectives of the point-of-care simulation project

Aims
- To review and improve clinical practice around:
  - Recognition of deterioration
  - Provision of treatment for medical emergencies, including sepsis and hypoglycaemia
  - Management of a patient in cardiac arrest

Main objectives
- Assess clinical practice around:
  - Recognition of patient deterioration
  - Treatment of sepsis or hypoglycaemia
  - Management of a patient in cardiac arrest
  - Embed the use of ABCDE (airway, breathing, circulation, disability, exposure) assessment using the National Early Warning Score (NEWS2)
  - Ensure appropriate escalation and care planning using clinical protocols and the SBARD (situation, background, assessment, recommendation, decision) communication tool
  - Develop a knowledgeable multidisciplinary team in the community hospital setting that can identify, treat and manage the deteriorating patient effectively
  - Report and make recommendations to improve patient care in terms of identifying and managing deterioration and acute illness, including latent safety and human-factor issues
tial learning’, staff must be able to:

- Learn directly from experience and each other;
- Apply that learning to clinical practice;
- Embed their newly acquired skills – this could be lacking in practice due to the constraints posed by a busy inpatient ward.

Some, if not all, of the barriers identified could prevent the transition of skills and knowledge to practice. Point-of-care simulation is a way to promote Kolb’s learning processes, and enable staff to explore and reflect on real-life situations in their team in their usual working environment. This helps to increase confidence and embed knowledge, as well as improving the team’s response and performance in emergency situations.

With the shift to more localised healthcare, new models of education and training are needed to improve quality and safety, while being engaging, inspiring and empowering for staff. As such, point-of-care simulation was chosen by our trust as the educational technique to enhance the recognition and management of acute illness in a community hospital setting.

The overall vision was to develop a point-of-care simulation programme that was replicable and transferable and, if successful, could be rolled out across all wards and departments in the trust. Specific aims and objectives are outlined in Box 1.

**Implementation**

We used a plan, do, study, act (PDSA) cycle for the project (Aguayo, 1990). This was chosen for its pragmatic methodology and longevity of effectiveness in implementing change and helping teams to improve quality of care.

The project was planned in three phases. Each involved a range of planned activities and was subject to its own PDSA cycle, allowing evolution and progression to the next phase. Three simulation scenarios were identified and devised:

- Sepsis;
- Severe hypoglycaemia;
- Cardiac arrest.

The project was delivered in ward-based teams across two hospitals at separate times over 12 months. A 20-bed ward at one hospital was used to test the model. Amendments were made after review, and then simulation was delivered on two wards at the second hospital. An advanced simulator manikin with high-fidelity functions was used and patient simulation scenarios were developed.

Three assessment tools were devised to measure potential improvements:

- Pre- and post-project staff knowledge and confidence surveys;
- Point-of-care simulation assessment of staff performance – skills, knowledge, team working/human factors;
- Post-simulation feedback.

The pre- and post-project staff confidence surveys were used to analyse staff perception of their knowledge and confidence about aspects of managing a deteriorating patient and their participation in managing a cardiac arrest. The questionnaires used a five-scale Likert score for responders to specify their level of agreement to a statement; the pre-project survey had additional questions on previous experience and involvement in simulation training.

Staff were asked to provide formal feedback after every simulation session. Feedback was based around six questions on the value of the point-of-care simulation working experience, improving confidence and ability, and modifying practices.

**Phase one**

Three simulation scenarios were delivered with no advance warning or additional training; during each one, staff performance was assessed using one agreed performance criteria tool for hypoglycaemia and sepsis, and another for cardiac arrest. Staff were graded on whether they met the assessment criteria fully, partly or not at all for each of the seven domains outlined in Box 2.

**Phase two**

Phase two involved evaluating the results from phase one, and implementing safety actions and bespoke training where needed.

**Phase three**

The next step was to deliver identical simulations using the same assessment tool to evaluate performance. However, on the first hospital site, this was only possible for hypoglycaemia and sepsis, as clinical and organisational challenges prevented us running simulations for cardiac arrest. Due to Covid-19, we were also unable to run phase three at the second hospital site.

**Results**

Overall, 107 participants were involved in 31 simulations, comprising nurses (32%), healthcare assistants (38%), doctors (5%), nursing students (18%) and others (7%). Delivery of training at the point of care enabled the different professions to train and learn together.

**Knowledge and confidence**

The initial survey showed that more than half (58.2%) of staff had previously participated in some form of simulation training, but only a third (32.7%) in point-of-care simulations. A comparison of pre- and post-project survey responses showed that staff felt more knowledgeable and confident after the project’s completion (Fig 1). The greatest improvement was seen in staff confidence in the management of sepsis and hypoglycaemia. The area of least improvement was confidence in using the SBARD (situation, background, assessment, decision) communication tool, but there was no decrease in confidence.

**Simulation assessment**

Measurement of performance improvement for all seven domains for sepsis and hypoglycaemia.
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**Post-simulation feedback**

Analysis of feedback at the end of the project suggested point-of-care simulation was well received as a learning resource by staff; the average score regarding its value was 4.6 out of 5 for all six questions.

**Discussion**

We have shown that point-of-care simulation training has several advantages, including providing experiential learning opportunities that facilitate interprofessional experiences. This fits with the vision of the NHS’s (2014) Five Year Forward View for services to be integrated around the patient journey and involve multidisciplinary team working.

Point-of-care simulation can have two key advantages:
- Enhancing development of community hospital inpatient staff knowledge, skills and confidence;
- Increasing multidisciplinary working and collaboration.

This is a concept already well developed with nursing students, for example, through the Collaborative Learning in Practice method, which creates interactions with others using collective skills, knowledge and attitudes (Hill et al, 2020).

We trained whole teams together in real time, across varying staff disciplines, working in their usual environments using familiar equipment. This was highly advantageous for staff learning and the documented outcomes. Our results showed improvements in all three assessment measures used.

Interestingly, at the project end, although staff expressed least confidence in using SBARD, this was seen to be the most improved area of staff performance. Least improvement was in the use of protocols/policies to help manage patient deterioration, although the correct treatment options for sepsis and hypoglycaemia were well delivered by phase three.

As our clinical staff receive regular training in the ABCDE approach to recognising deterioration, they were expected to be confident and demonstrate it well in both phases. However, in the pre-project survey, only 22% of staff felt very confident in assessing and recognising a deteriorating patient (which would include the ABCDE approach); post project, this rose to 50%. Overall, the proportion of performance criteria being fully met increased from 30% pre-project to 65% after delivery of all the simulations, a rise of 35%.

We have already mentioned the barriers in the transition of knowledge from classroom to practice, and had hoped point-of-care simulation would help bridge that disparity between theory and practice. The opportunity for a debrief is an integral part of simulation, as well as being important to help meet role expectations for graduate nursing education (Ali et al, 2020). Prior to the project, most staff were not aware of any debrief models and highlighted that debrief rarely occurred after emergency events. We used Denning and Davis’ (2018) learning conversation to explore performances during the post-simulation debrief.

Feedback is also pivotal to the learning process when focusing on skills, leadership, human factors and non-technical skills. Productive conversations initiated and led by the learners and mediated using active listening and advocacy with enquiry, as needed – proved extremely valuable. Staff learnt with, and from, each other, which further supported their growth and development.

The benefits of embedding point-of-care simulation are clear, not only in addressing development and change, as identified in the plan for the NHS, but in driving forward measures for the safe and effective delivery of high-quality care. Point-of-care simulation also resulted in the identification of several clinical and patient safety issues, as well as organisational risks (such as incorrect equipment and protocols in emergency boxes); this allowed them to be rectified before harm could occur.
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In the second half of the project, the UK was hit by the Covid-19 pandemic. To take pressure off the acute hospital, our trust developed community assessment treatment units (CATUs) that accepted direct GP or ambulance referrals.

The first CATU was developed on the second project site, where the simulation training turned out to be advantageous, boosting staff knowledge and clinical development. Without it, the launch may have been delayed and services in the development. Without it, the launch may have been delayed and services in the region may not have coped as well.

Limitations

As already touched on, we experienced some challenges in providing and evaluating the point-of-care simulation training:

- At the first hospital site used to test the model, only the hypoglycaemia and sepsis scenarios could be re-assessed as we were unable to run the cardiac arrest simulations in phase three;
- Rota planning at the first hospital also meant different staff attended in phases one and three. This meant some staff missed a first attempt at the scenarios and, without this baseline data, we could not demonstrate improvement in their subject knowledge;
- At the second hospital, we were only able to deliver phases one and two due to Covid-19, so data on staff improvement in knowledge, confidence and overall performance was lacking;
- Again, the same staff did not always attend phases one and three, so in-situ assessment data, and evaluation of knowledge and confidence was collated using generalised responses rather than tracking individual progress;
- The planned blended learning approach (phase two) was challenging to achieve. Limited uptake of taught sessions meant we changed to planned working with staff on the ward to embed the knowledge clinically. However, this was then cancelled due to Covid-19, and both areas evolved into self-directed study with electronically disseminated resources.

Conclusion

Simulation training is a tried-and-tested educational method. Increasingly, it is used to deliver training across a variety of professions and organisations worldwide. Point-of-care simulation has many advantages over standard simulation and is gaining popularity in healthcare. It addresses venue, transport and staff time constraints, while being immersive at the point of care delivery, helping staff knowledge, retention and recall. It also improves confidence in dealing with emergency situations and multidisciplinary team working.

Training multidisciplinary teams in their usual workplace makes sense and is supported by the literature. If delivered regularly, it may help create a more resilient workforce.

The exposure of safety issues, along with process, ergonomic or environmental errors, is also unique to the point-of-care training process. It allows remedial action to be taken before a real-life incident occurs, thereby improving patient safety.

Our project showed that point-of-care simulation could be used to update staff knowledge, and improve their ability and confidence in acute illness management. It gave staff greater self-assurance in dealing with emergency events, while encouraging multidisciplinary team integration, interprofessional learning and effective care delivery. Point-of-care simulation is an innovative training tool that is very well received by staff as a mode of learning, as shown by our qualitative and quantitative project evaluation feedback data.

We intend to build on the project’s success by creating and embedding a sustainable point-of-care simulation programme trustwide. This could be replicated by other organisations developing training in acute illness recognition and management.

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