

## FOCUS ON . . . HOSPEX

# THE ADVANCED LIFE SUPPORT GROUP'S VIEW OF HOSPEX

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### Introduction

"No industry in which human life depends on the skilled performance of responsible operators has waited for unequivocal proof of the benefits of simulation before embracing it." [1]. In conventional (i.e. hospital or simulation centre) settings, simulation can be seen as an opportunity to explore something approaching real life. Jones gives this definition: "*simulation in education is an untaught event in which sufficient information is provided to allow the participants to achieve reality of function in a simulated environment.*" [2]

A simulation can be thought of as role play with equipment. The environment for a simulation is, however, considerably more complex, involving equipment, assistants, and decisions (for the organiser) about mannequins or actors. At its heart, learners seek to replicate behaviour mastered in previous teaching and learning episodes in something approaching real life. Learners interact within a context, including other health specialists acting as assistants and with instructors providing clinical and other information.

While there is limited evidence to draw firm conclusions, there are indications that simulations facilitate learning under certain conditions, including:

- Provision of feedback
- Repetitive practice
- Capture of clinical variety
- Controlled environment where learners can make, detect and correct errors without adverse consequences
- Educational experiences where learners are active participants, not passive bystanders

The high level of context-dependent nature of medical learning means that, participants develop knowledge, understanding and skills through participation in legitimate socio-cultural practices [3]. Simulations can therefore be evaluated according to four criteria (Box 1).

- Simulations should allow for sustained and deliberate practice in a safe environment and that simulations ensure skills are consolidated and aligned with other curricula activity
- Simulations should provide access to expert tutors who are available only when needed
- Simulations should map on to real life clinical experience
- Simulation-based learning should provide a supportive, motivational and learner-centred environment

Box 1. Simulation evaluation criteria [4]

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### Rationale for using simulation

In civilian clinical practice approximately 11% of the patient attendances to hospital experience an adverse event following a medical mishap, 48% of which are preventable. Six percent of these lead to disability and 8% to death and cost the UK taxpayer £1 billion per annum. [5].

In the military context, it is clear that complexity is higher by virtue of a host of factors (Table 1), consequently there is a greater risk for both practitioners and patients. Military medical history is replete with lessons learnt as a result, often after the event. Tragically many are being re-learned by successive deployments of medical personnel. Today the public demands, and expects, greater accountability in military conflicts. All those involved must therefore consider ways of assessing these risks and either eliminating them or minimising their impact.

Hostile environment  
Unpredictable patient surges  
Mandated timelines  
Chain of care  
Complex and varying organisations  
Complex transfers  
Limited equipment  
Team variation  
Team training

Table 1. Factors increasing the risk of adverse incidents in a military context

Simulation represents an important part of this process. The HOSPEX programme provides a totally realistic training experience, duplicating, as far as possible, the environmental, human, physical and organisational issues that personnel will face in a combat zone. It is therefore unique in allowing development in several key areas listed in Box 2 before there is real patient contact.

Command and control	Medical intervention - familiarity and development
Situational awareness	Competences – clinical, administrative, strategic
Communication systems	Team training – membership and leadership
Ongoing triage	Team organisation
Equipment – familiarity and development	Multi-speciality drill over realistic time frames
Protocols – familiarity and development	Transport systems

Box 2. The factors that can be developed during HOSPEX simulation

By using a combination of video and direct observation all aspects of the system can be reviewed. This allows strengths to be acknowledged and retained and weakness to be corrected. Linking this feedback to training, procurement, and Research and Development enables lessons learnt to be acted upon at the appropriate level.

The commercial potential in achieving these goals should not be ignored. All those aims are being actively sought in civilian, academic and business practice. Appropriate mutual agreements with private industry would help in ensuring all the potential benefits of this project can be met.

HOSPEX is unique in that it combines a large number of individual simulations in a full scale replication of a field hospital. Based on a long tradition of military exercises, it is designed to be functional at the meso (reception, triage, ward etc) level as well as the hospital as a whole (macro) under the overall control of a central administration. There is an expectation that at the meso level, there are already high levels of clinical and managerial competence at a micro level. What is being simulated is the interactions taking place between functions at the meso level.

The achievements of HOSPEX thus far rely on a variety of resources:

1. Infrastructure which reflects current operational situations
2. Equipment which reflects that used in current operations
3. Materials which reflect the clinical cases found in the current operational situation
4. Instructor/facilitators with requisite knowledge and skills
5. Co-ordinators with requisite knowledge and skills
6. Participants with requisite knowledge and skills

The future direction of HOSPEX will require robust provision of all of these resources at the required level. Feedback mechanisms are in place, which ensure that the first three are achieved but these need to be consolidated. The next step is to define the requisite knowledge and skills of all of the human resources involved and then produce a mechanism for those to be achieved and assessed and measured.

Experience in the area of life support training has shown that the quality of course provision relies on several quality assurance measures. Regulations defining requirements which should be consistent across all episodes of a course provide the back-bone to this. These regulations define specifically:

- Candidate selection and any baseline knowledge and skills required
- Instructor selection and training and instructor/candidate ratios
- Minimum equipment requirements
- Use of standardised, consistent teaching materials with defined learning outcomes and assessment criteria
- Pre-course and post-course validation processes

One area that is key for HOSPEX is to consider the instructor selection and training mechanism. Within the NHS setting, availability of instructors is becoming an increasingly difficult issue and this can only be exacerbated in the combined NHS and military setting with additional demands on time.

### What Next For HOSPEX?

The initial vision for HOSPEX [6] has largely been achieved. HOSPEX provides relevant scenarios, informed by Defence Professors and Consultant Advisers, using mixed media simulation, facilitated by Regular and Reserve Faculty members, accurately to represent contemporary clinical cases requiring military medical responses, which facilitates the development of team, department and hospital cohesion. HOSPEX is responsive both to changes in clinical practice and Operational Theatre environments and it provides assurance for commanders. Most importantly it makes a significant contribution to reducing clinical and institutional risk to patients. It is indeed an exemplar

of macro-simulation [7,8] and may well be unique in this context in the UK, but further evolution will be necessary.

It is recognised that during its evolution, HOSPEX has focussed on trauma, potentially to the detriment of the non-trauma related specialties. Recent engagement with the Defence Dental Service has resulted in the creation of some interesting dental cases, which appear to provide deploying dental teams with appropriate and relevant scenarios. It is acknowledged however, that more should be done to develop greater depth and applicability of internal medicine and psychiatric case histories and storyboards.

Internal validation of HOSPEX often reveals the frustration that the equipment provided within the hospital trainer at the Army Medical Services Training Centre (AMSTC) does not always accurately reflect that fielded in either of the current operational Theatres. This is acknowledged and procurement is in hand to provide to AMSTC that equipment that has been procured as urgent operational requirements and the departmental scales of equipment currently being used. In this way, the tactical level HOSPEX can become more accurate and representative of DHC.

A fair criticism of HOSPEX is that a proportion of its assessments and validation report is subjective, reflecting military and military medical judgement and experience. Whilst judgement and experience can be effective and compelling they are not readily auditable. Effort should be made to introduce greater objectivity into performance assessment. As a collective training modality HOSPEX has been subjected under the Defence System Approach to Training (DSAT) to first and second party audits [9,10]. These recognised that greater objectivity in assessment was being sought. The production of more precise Operational Performance Statements (OPS) for collective training and its validation should enhance audit accuracy during audit and provide greater objectivity in assessment of performance. Work continues in defining more precise OPS through a series of internal validation questionnaires and structured interviews with personnel that have completed HOSPEX.



Figure 1. Casualty assessment in the CH47 mock up.

Although described as an exemplar of macro-simulation, HOSPEX focuses on the care pathway undertaken by the patient between the hospital reception and their discharge from the ward or transfer back to the UK. AMSTC is the proud owner of an accurate mock-up of a Chinook CH47 and whilst emergency response team serials are conducted during HOSPEX, these are designed primarily to represent as accurately as possible the predominant mechanism by which patients arrive within the deployed Emergency Department (Figure 1). Such serials do not routinely form part of the formal assessment of the HOSPEX unit's performance. Perhaps, a further reduction in risk to patient safety and greater assurance to commanders would be achieved if the macro-simulation covered the whole care pathway from point of wounding/presentation to transfer to the UK. Significant investment and provision of additional resources would be required to support assessment on this scale and must be weighed against the potential benefits.

### Summary

This paper explores some of the principles and intentions behind simulation in medical education and explores the extent to which HOSPEX fits within an accepted design. It further points to the direction that HOSPEX will need to take in order to maximise its capacity to aid the delivery of exemplary patient safety.

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