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Baker, Andrea; Hardie, Lynn; Somerville, Susan; Ker, Jean

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## PROJECT REPORT

### Analysis of the use of a mobile simulation unit using the principles of a managed educational network

#### AUTHORS

Andrea Baker<sup>1</sup> PhD, Manager \*

Lynn Hardie<sup>2</sup> Project Officer

Susan Somerville<sup>3</sup> MSc, Lecturer, [s.g.somerville@dundee.ac.uk](mailto:s.g.somerville@dundee.ac.uk)

Jean Ker<sup>4</sup> MD, Associate Postgraduate Dean and Clinical Lead

#### CORRESPONDENCE

\*Dr Andrea Baker [andrea.baker@nhs.scot](mailto:andrea.baker@nhs.scot)

#### AFFILIATIONS

<sup>1, 2, 4</sup> Clinical Skills Managed Educational Network, NHS Education for Scotland, Dundee, UK

<sup>3</sup> Centre for Medical Education, University of Dundee, Dundee, UK

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#### ETHICS APPROVAL

As this is an educational evaluation no ethical approval was required. see NHS guidelines - <http://www.nhsresearchscotland.org.uk/services/research-ethics>

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## ABSTRACT:

**Introduction:** One of the challenges of delivering safe, reliable, quality health care is ensuring the workforce have access to the right training at the right time wherever they are practising. Like other high reliability fields, healthcare education has recognised the important role of simulation based education in embedding a culture of readiness for practice. Managed clinical networks

(MCNs) have a proven track record in enhancing services for patients. Adapting this approach to ensuring the healthcare workforce has access to the right training at the right time can provide a more equitable national approach to simulation based education. One of the advantages of the MCN concept has been the flexibility to respond to local needs while reliably delivering

national standards.

**Methods:** This article shares 5 years of data from a mobile simulation unit (MSU) analysed using the principles of a national managed educational network (MEN). An action research approach was used to identify how the MSU was changing the delivery of simulation based education as part of a national MEN for clinical skills education. One of the key deliverables of the Scottish Clinical Skills Strategy was to support the training needs of the National Health Service workforce, particularly in remote and rural Scotland. The MSU was proposed as part of the solution to the 'inequity of provision of clinical skills education using simulation'. Between 2014 and 2018, data were collected by the Clinical Skills Managed Educational Network (CSMEN) team on the performance of the MSU. Venues visited, job titles of participants and courses attended (a mix of local and national) were recorded by the venue hosts and collated by CSMEN staff.

**Keywords:**

clinical skills, managed educational network, mobile simulation unit, mobile skills unit, Scotland, simulation, simulation based education.

## FULL ARTICLE:

### Introduction

One of the challenges of delivering safe, reliable, quality health care is ensuring the workforce have access to the right training at the right time wherever they are<sup>1,2</sup>. Like other high reliability fields, healthcare education has recognised the important role of simulation based education in embedding a culture of readiness for practice<sup>3</sup>. This article shares the development of a national managed educational network (MEN) for clinical skills and how its principles were used to analyse the performance of a mobile simulation delivery unit over a 5-year period.

In Scotland, the requirement to raise the quality of healthcare services through local delivery, particularly in remote and rural

**Results:** Evidence of the impact of the MSU using the seven MEN principles to analyse the data (functioning with explicit management arrangements, embedding systems of accountability, agreed expected outcomes, using an evidence base, having a multiprofessional and multidisciplinary focus, engaging in a system of dissemination, generating better value for money and engaging in research and development) are shared.

**Conclusion:** Few examples of mobile simulation facilities exist in the UK, and none have the longevity of the CSMEN MSU. The results of the analysis supported the business case for an upgraded new MSU and identified the need to explore in more depth the variation in impact across the venues visited. However, some localities did not use the MSU during 2014–2018 and there are still some unanswered questions around its impact in some venues, which require further exploration.

locations, has recently been highlighted<sup>4,5</sup>. The National Health Service (NHS) Education for Scotland (NES), a non-territorial health board with responsibility for the training and education of the health service workforce, commissioned a national review of clinical skills using simulation based training. This led to the implementation of the Scottish Clinical Skills Strategy Partnerships for Care<sup>6</sup>, which advocated a national approach to using simulation to assure standards of educational practice<sup>7</sup>. This strategy identified four key priority outcomes for the NHS workforce (Box 1).

Whilst there is substantial literature on the use of simulation in healthcare education and practice<sup>8-11</sup> there is relatively little on the use of a mobile simulation unit<sup>12,13</sup>.

- Multiprofessional access
- Consistency of clinical skills standards
- Improved geographic access (remote and rural)
- Supporting clinical skills training

### Box 1: Key priority outcomes for the National Health Service workforce with a particular emphasis on remote and rural practitioners<sup>14</sup>

### Methods

An action research approach<sup>15</sup> was used to identify how the mobile simulation unit has changed the delivery of simulation based education as part of a national MEN for clinical skills education.

### *Development of a managed educational network in clinical skills*

Simulation is known to be a powerful educational tool, but to be 'most effective' it needs curricular institutionalisation and endorsement by the host organisation<sup>6</sup>. The implementation of the Scottish Clinical Skills Strategy identified the opportunity to

develop a national educational network to deliver quality assured, simulation based education irrespective of geographical or professional boundaries<sup>14</sup>.

The seven core principles agreed for managed clinical networks (MCNs)<sup>16</sup> were adapted to an educational context of:

- functioning with explicit management arrangements
- embedding systems of accountability
- agreeing expected outcomes
- utilising an evidence base
- having a multiprofessional and multidisciplinary staff engagement focus
- engaging in a system of dissemination
- generating better value for money
- committing to research and development.

This provided a national approach to meeting the four key priority outcomes (Box 1) for the NHS workforce.



**Figure 1: The mobile clinical skills unit.**

### ***Collection and analysis of data***

Between 2014 and 2018, data were collected by the CSMEN team on the performance of the mobile simulation unit. Venues visited, job titles of participants and courses attended (a mix of local and national) were recorded by the venue hosts and collated by CSMEN staff.

### **Results**

Findings for the previous 5 years (2014–2018) were analysed using the framework of the principles of the MEN. The results show the type of simulation and clinical skills education, the number of participants from different professional backgrounds involved and where this occurs, and includes evaluations from educators and participants.

### ***Functioning with explicit management arrangements***

The MSU local facilitators are known as hosts and provide crucial

### ***Development and implementation of a mobile simulation unit***

The mobile simulation unit (MSU) was part of the proposed solution to the 'inequity of provision of clinical skills education using simulation', to support the training needs of the NHS workforce, particularly in remote and rural Scotland<sup>7</sup>.

Utilising the principles of the Clinical Skills Managed Educational Network (CSMEN), the MSU (Fig1) was developed with the same facilities and equipment found in fixed specialist simulation centres.

support for the MSU visit. Prior to the visit, hosts attend a 2-day faculty development course held centrally or occasionally at local venues and created specifically for educators who will use the unit, ensuring hosts are equipped with the knowledge and training to best use the equipment on board.

A total of 125 people from a range of health boards and other organisations have been trained on the faculty development course (Table 1).

The impact of this course has led to the development of a national faculty database for the MSU to facilitate the concept of flying faculty (providing faculty where required).

Another aspect of the explicit management is the operational group, which has responsibility for all operational activities relating to the unit including logistics, vehicle maintenance, driver availability, servicing and purchasing of equipment, data collection and liaison with educational providers.

**Table 1: Number of people who attended faculty development course, according to National Health Service organisation**

Organisation	No. of attendees
NHS Ayrshire & Arran	2
NHS Dumfries & Galloway	1
NHS Forth Valley	1
NHS Greater Glasgow & Clyde	12
NHS Grampian	5
NHS Highland	10
NHS Lanarkshire	15
NHS Lothian	2
NHS Orkney	4
NHS Tayside	2
Scottish Ambulance Service	56
Armed forces	5
Emergency services	1
Other	5
Non-territorial health boards	4

NHS, National Health Service.

**Utilising an evidence base**

Three areas demonstrate the principle of utilising an evidence base in relation to the mobile simulation unit:

- **Local adapted guidelines from Scottish Intercollegiate Guidelines Network:** Those attending the MSU program have access to adapted clinical guidelines on common conditions such as asthma, acute coronary syndromes and sepsis developed by the Emergency Medicine Retrieval Services.
- **Online resources:** Online evidence based resources for clinical skills<sup>17</sup> have been developed by the CSMEN group using expert input from the NHS and universities, providing learning opportunities prior to and after the face-to-face programs of the MSU.
- **Quality assurance system:** A framework for simulation based education (SBE) was developed to reflect the simulation based educational process. Each part of the process has been led by the CSMEN core team and agreed through consultation and consensus with the wider CSMEN community (Fig2).

A three-tiered approach was developed to identify key improvement outcomes for faculty: (1) educator awareness of SBE, (2) introduction for SBE educators and (3) advanced SBE for educators.

This outcome framework matches frameworks of the Academy of Medical Educators, Association for Simulated Practice in Healthcare and General Medical Council so that national standards can be locally implemented.

A national scenario template for designing a SBE session has been developed to ensure standards of design are considered in the development of new scenarios for the MSU. The quality assurance of debriefing on the MSU is part of the national faculty development program, ensuring the quality of simulation based education delivered locally.



**Figure 2: The simulation based education process**

**A multiprofessional and multidisciplinary staff engagement focus**

The mobile unit was primarily intended to provide opportunities for multiprofessional healthcare staff training using simulation

across geographical and professional boundaries in remote and rural Scotland. The spectrum of healthcare and emergency services professions trained as well as members of the public is shown in Table 2.

**Table 2: Number of people trained on mobile simulation unit, according to job family, for National Health Service and emergency staff**

Job family	2014†	2015†	2016	2017	2018
Allied health professions			29	11	34
Dentistry			4	38	57
Medicine			149	156	192
Midwifery				3	10
Nursing			415	360	508
Scottish Ambulance Service			17	237	55*
NHS Scotland	802	780	614	805	856
Coastguard			10	46	18
Fire service				119	7
Police				7	0
Royal National Lifeboat Institution				32	2
Social care					20
Other agency		1	4	85	0
Total agency	134	229	14	289	47
Public	74	157	0	144	21

† Individual job family data not available.  
NHS, National Health Service.

### Agreeing expected outcomes

There has been a prevalence of acute and emergency care sessions

delivered using simulated scenarios as well as the related procedural skills as a focus (Fig3). The most popular training sessions are shown in Table 3.

**Table 3: Twelve most popular sessions run on mobile simulation unit, 2014–2018**

Session type	No. times run (2014–2018)
Paediatric emergencies	40
Basic life support	37
Emergency medical retrieval	28
Faculty development	28
Medical emergencies	21
Advanced life support	17
Airway management	16
Cannulation	11
Cardiac emergencies	11
ECG training	10
Maternity emergencies	10
Immediate life support	10



**Figure 3: Courses run on the mobile simulation unit.**

### Engaging in a system of dissemination

Between 2014 and 2018, the MSU provided access to training for 10 of the 14 territorial health boards. It was also utilised by the Scottish Ambulance Service and the armed forces.

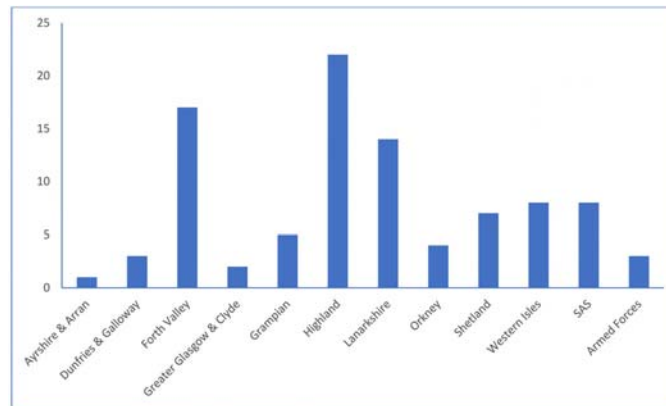
Four health boards (NHS Highland, NHS Forth Valley, NHS Lanarkshire and NHS Shetland) have requested the MSU every

year. NHS Ayrshire & Arran and NHS Greater Glasgow & Clyde have requested visits for only 2 years or less (Table 4). Four health boards (NHS Lothian, NHS Tayside, NHF Fife and NHS Borders) did not request the unit for a training session during 2014–2018. These boards all have access to fixed simulation facilities.

**Table 4: Frequency of visits to the various health boards, 2014–2018**

Organisation	2014	2015	2016	2017	2018
NHS Highland	8	4	3	2	5
NHS Forth Valley	5	4	4	2	2
NHS Lanarkshire	2	3	4	1	4
NHS Shetland	2	2	1	1	1
NHS Western Isles	2		2	2	2
NHS Orkney	1		1	1	1
NHS Grampian	1		1	1	2
NHS Dumfries & Galloway			1	1	1
NHS Greater Glasgow & Clyde	1	1			
NHS Ayrshire & Arran				1	
Scottish Ambulance Service		2		4	2
Armed forces				2	1

NHS, National Health Service.



SAS, Scottish Ambulance Service.

**Figure 4: Number of visits to the various health boards 2014–2018.**

### Generating better value for money

The average cost per course, per participant for training on the MSU has been calculated to be £37.50. Comparing this to estimated costs to local health boards to either send staff to a central simulation centre or provide basic skills training at an external location works out to be £265 per course per participant (based on 595 individual NHS Scotland employees with a total cost of £157,468, which includes course fees and travel costs but not costs for backfill). In addition, there is the equivalent of an estimated 770,000 km saved by the unit travelling to locations rather than staff travelling to central/local locations.

### Generating research and development

During 2014–2018 the MEN disseminated the analysis of the data in relation to the mobile simulation unit at both national and international meetings, including 17 regional, national and international workshops, four poster and eight oral presentations.

There have also been seven peer reviewed publications and two grants of over £50,000.

### Conclusion

An MSU as described in this article is not unique, but few examples of mobile simulation facilities exist in the UK, and none have the longevity of the CSMEN MSU.

These results demonstrate the effective use of simulation based education ensuring equity of access, irrespective of geographic location or professional background. This has been achieved without compromising national standards through local delivery by embedding systems of accountability with an explicit management system while generating value for money. The structure of a MEN embeds the infrastructure support required in relation to logistics and integrating the MSU as one of the delivery units aligned to the overall national strategy.

## REFERENCES:

- 1 Cook RI, Rasmussen J. Going solid: a model of system dynamics and consequences for patient safety. *Quality and Safety in Health Care* 2005; **14**: 130-134. DOI link, PMID:15805459
- 2 Scottish Government. *The healthcare quality strategy for Scotland*. 2010. Available: web link (Accessed 13 February 2019).

- 3 Houghton C, Casey D, Shaw D. The benefits and challenges of using simulation in nurse education: a review of the literature. *International Journal of Clinical Skills* 2010; **2**: 53-55.
- 4 Scottish Government. *Building a health service 'fit for the future'*. 2005. Available: web link (Accessed 13 February 2019).



- 5** Scottish Government. *Better health, better care*. 2007. Available: [web link](#) (Accessed 6 May 2018).
- 6** NHS Education for Scotland. *The Scottish Clinical Skills Strategy: Partnerships for Care*. 2009. Available: [web link](#) (Accessed 26 July 2018).
- 7** Ker J, Cachia P, Beasant B. A national approach for the use of simulation to educate and train the NHS workforce: the First National Clinical Skills Strategy. *Scottish Medical Journal* 2015; **60(4)**: 220-222. DOI link, PMID:26403570
- 8** Ker J, Bradley P. Simulation in medical education. In: T Swanwick (Ed.). *Understanding medical education: evidence, theory, and practice*. Chichester: Wiley Blackwell, 2014. Chapter 13. DOI link
- 9** MCGaghie WC, Issenberg SB, Petrusa ER, Scalese RJ. A critical review of simulation-based medical education research: 2003-2009. *Medical Education* 2010; **44**: 50-63. DOI link, PMID:20078756
- 10** Issenberg SB. The scope of simulation-based healthcare education. *Simulation in Healthcare* 2006; **1**: 203-208. DOI link, PMID:19088590
- 11** Bradley P. The history of simulation in medical education and possible future directions. *Medical Education* 2006; **40**: 254-262. DOI link, PMID:16483328
- 12** Somerville S, Copper C, Wilmlot S, Dalkin S, Lhussier M. *Operationalisation of realist synthesis as a PhD student; what works, for whom, and in what circumstances?* 2016. Available: [web link](#) (Accessed 13 Feb 2019).
- 13** Marlow N, Maddern G. Research in mobile simulation. In: P Carstens, P Paulman, A Paulman, M Stanton, B Monaghan, D Dekker (Eds). *Comprehensive healthcare simulation: mobile medical simulation*. Cham: Springer, 115-127. DOI link
- 14** Cropper A, Hopper A, Spencer SA. Managed clinical networks. *Archives of Disease in Childhood* 2009; **87(1)**: 1-4. DOI link, PMID:12089108
- 15** Kemmis S, McTaggart R. Participatory action research. In: NK Denzin and YS Lincoln (Ed.). *Handbook of qualitative research*. 2nd edn. Thousand Oaks, CA: Sage, 2000; 567-607.
- 16** National Health Service. *Promoting the development of managed clinical networks*. 2002. Available: [web link](#) (Accessed 13 February 2019).
- 17** Clinical Skills Managed Educational Network. *Online resources*. 2020. Available: [web link](#) (Accessed 9 Nov 2020).

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