Leveraging simulation in the post Covid world

Prof Makani Purva

Hull Teaching Hospitals NHS Trust

OBJECTIVES

- Analyse trends pertaining to simulation innovation
- Review the role of simulation in emerging healthcare challenges
- Identify key areas of focus for simulation going forward.

SIMULATION TAXONOMY REVIEW

IJoHS

International Journal of Healthcare Simulation V

ORIGINAL RESEARCH

Transformative forms of simulation in health care – the seven simulation-based 'I's: a concept taxonomy review of the literature

Sharon Marie Weldon[1], Andy Graham Buttery[2], Ken Spearpoint[3], Roger Kneebone[4]

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SBI
Innovation
Improvement
Intervention
Involvement
Identification
Inclusion
Influence

MASS SIMULATION EXERCISE IN HULL

HILS
Hull Institute of Learning and Simulation

SIMULATION BASED INNOVATION

Kim et al. Advances in Simulation (2021) 6:37
https://doi.org/10.1186/s41077-021-00190-0

Advances in Simulation

IJoHS

International Journal of Healthcare Simulation Vol.2, Issue no.2

SHORT REPORTS ON SIMULATION INNOVATIONS SUPPLEMENT (SRSIS)

Development of a standalone and low-cost simulation switchboard

Scott Clarke[1,2], Alan Gilchrist[2]

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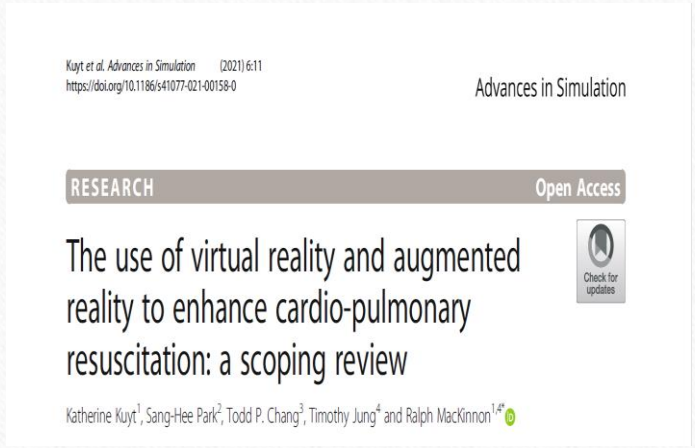
[2]Information Services (College of Medicine & Veterinary Medicine), The University of Edinburgh, Edinburgh, UK

Corresponding author: Scott Clarke, scott.clarke@ed.ac.uk

SIMULATION BASED IMPROVEMENT



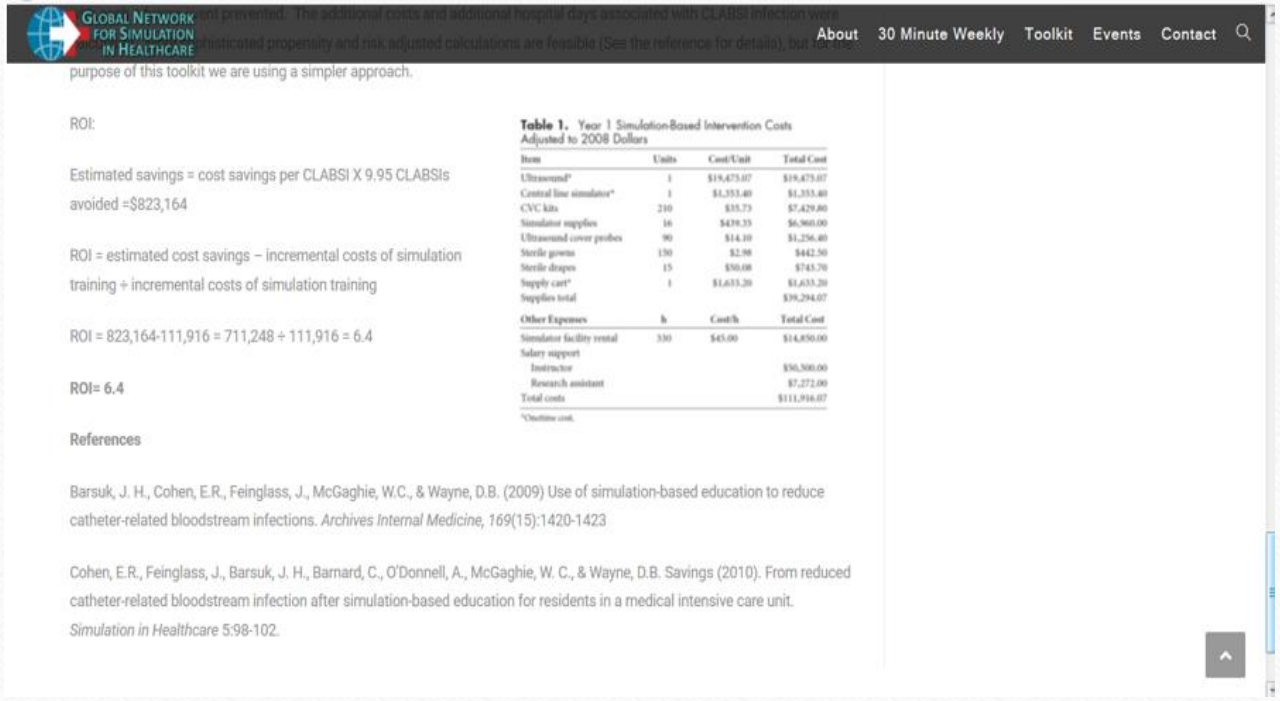
Kuyt et al. Advances in Simulation (2021) 6:11
https://doi.org/10.1186/s41077-021-00158-0

Advances in Simulation

RESEARCH Open Access

The use of virtual reality and augmented reality to enhance cardio-pulmonary resuscitation: a scoping review

Katherine Kuyt[1], Sang-Hee Park[2], Todd P. Chang[3], Timothy Jung[4] and Ralph MacKinnon[1,4*]



GLOBAL NETWORK FOR SIMULATION IN HEALTHCARE

About 30 Minute Weekly Toolkit Events Contact

purpose of this toolkit we are using a simpler approach.

ROI:

Estimated savings = cost savings per CLABSI X 9.95 CLABSIs avoided =$823,164

ROI = estimated cost savings – incremental costs of simulation training ÷ incremental costs of simulation training

ROI = 823,164-111,916 = 711,248 ÷ 111,916 = 6.4

ROI= 6.4

Table 1. Year 1 Simulation-Based Intervention Costs Adjusted to 2008 Dollars

Item	Units	Cost/Unit	Total Cost
Ultrasound*	1	$19,475.07	$19,475.07
Central line simulator*	1	$1,353.40	$1,353.40
CVC kits	210	$35.73	$7,429.80
Simulator supplies	16	$439.35	$6,960.00
Ultrasound cover probes	90	$14.10	$1,256.40
Sterile gowns	150	$2.98	$442.50
Sterile drapes	15	$50.08	$745.70
Supply cart*	1	$1,633.20	$1,633.20
Supplies total			$39,294.07
Other Expenses	**h**	**Cost/h**	**Total Cost**
Simulator facility rental	330	$45.00	$14,850.00
Salary support			
Instructor			$50,500.00
Research assistant			$7,272.00
Total costs			$111,916.07

*One-time cost.

References

Barsuk, J. H., Cohen, E.R., Feinglass, J., McGaghie, W.C., & Wayne, D.B. (2009) Use of simulation-based education to reduce catheter-related bloodstream infections. *Archives Internal Medicine, 169*(15):1420-1423

Cohen, E.R., Feinglass, J., Barsuk, J. H., Barnard, C., O'Donnell, A., McGaghie, W. C., & Wayne, D.B. Savings (2010). From reduced catheter-related bloodstream infection after simulation-based education for residents in a medical intensive care unit. *Simulation in Healthcare* 5:98-102.

SIMULATION BASED INTERVENTION

Díaz-Guio *et al. Advances in Simulation* (2021) 6:30
https://doi.org/10.1186/s41077-021-00183-z

Advances in Simulation

INNOVATION Open Access

Online-synchronized clinical simulation: an efficient teaching-learning option for the COVID-19 pandemic time and: beyond

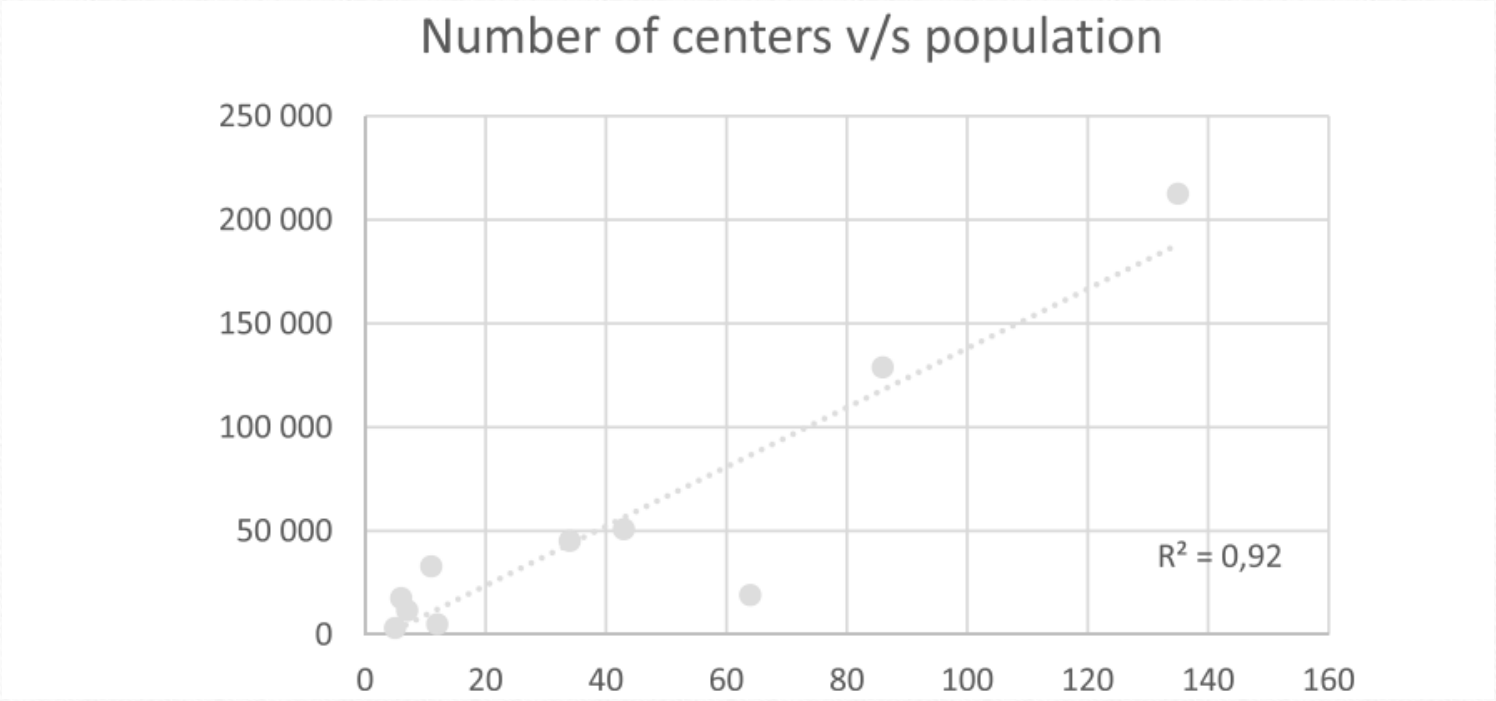
Diego Andrés Díaz-Guio[1,2,3*], Elena Ríos-Barrientos[4], Pablo Andrés Santillán-Roldan[5], Santiago Mora-Martinez[1], Ana Sofía Díaz-Gómez[1], Joel Alejandro Martínez-Elizondo[4], Adrián Barrientos-Aguiñaga[4], Maria Nathalie Arroyo-Romero[5], Alejandra Ricardo-Zapata[1] and Alfonso J. Rodríguez-Morales[6]

Table 1 Demographic Characteristics of Centers by Location (N = 159)

Center Characteristics	Within a School (%), n = 91 (57.2)	Within a Hospital (%), n = 24 (15)	Multiple Locations (%), n = 21 (13.2)	Stand-Alone Facility (%), n = 16 (10.1)	InSitu (%), N = 1 (0.6%)	Other, n = 6 (3.8)
Center size (N = 159)						
(%) Frequency by location						
InSitu (n = 3)	0 (0)	2 (66.7)	0 (0)	0 (0)	1 (33.3)	0 (0)
Under 5,000 sq ft (n = 51)	29 (56.9)	10 (19.6)	4 (7.8)	4 (7.8)	0 (0)	4 (7.8)
5,000-10,000 sq ft (n = 48)	34 (70.8)	7 (14.6)	3 (6.3)	4 (8.3)	0 (0)	0 (0)
10,000-25,000 sq. ft (n = 39)	23 (59)	5 (12.8)	7 (17.9)	2 (5.1)	0 (0)	2 (5)
>25,000 sq. ft (n = 18)	5 (27.8)	0 (0)	7 (38.9)	6 (33.3)	0 (0)	0 (0)
Annual learner encounters (N = 159)						
Weighted mean by confidence intervals						
5	50	400.00	500.00	400	NA	600
10	120	750	500	460	NA	600
25	275	3,300	1,405	1,250	NA	700
50	900	5,786	5,306	3,750	NA	1,700
75	6,178	6,500	10,000	8,467	NA	4,750
90	14,280	20,000	15,800	77,500	NA	
95	19,634	—	73,600	—	NA	
Accreditation (N = 159)						
None (n = 99)	13 (76.5)	62 (68.9)	9 (40.9)	9 (39.1)	0 (0)	0 (0)

Results of a nationwide descriptive survey of simulation center operations, Clin Sim in Nursing,2021

EQUITY OF ACCESS-can we achieve this?



Armijo-Rivera et al. Advances in Simulation (2021) 6:41

SIMULATION BASED INVOLVEMENT

Pillay *et al. Advances in Simulation* (2021) 6:29
https://doi.org/10.1186/s41077-021-00181-1

Advances in Simulation

ADVANCING SIMULATION PRACTICE Open Access

Optimising frontline learning and engagement between consultant-led neonatal teams in the West Midlands: a survey on the utility of an augmented simulation training technique

Thillagavathie Pillay[1,2,3*], Lynsey Clarke[4,5], Lee Abbott[5,6], Pinki Surana[7], Asha Shenvi[5], Sanjeev Deshpande[8], Joanne Cookson[5,6], Matthew Nash[9], Joe Fawke[1], Vishna Rasiah[9] and Jonathan Cusack[1,3]

Box 3 Randomised trial on the impact of sleep deprivation on non-technical skills

- The impact of sleep deprivation on the performance of anaesthetists is still uncertain, and research so far has mainly focused on technical skills. Neuschwander *et al*[79] studied the impact of sleep deprivation on non-technical skills, including 'team working, situation awareness, decision-making, and task management'. The authors developed a crisis management simulation scenario, using a high-fidelity manikin. Also, 10 participants undertook the scenario after a night shift and 10 after a rested night. Two blinded assessors rated the performance of participants using a validated scoring tool.
- The non-technical skills score was significantly lower for the sleep-deprived anaesthesiologists. In particular, team working scores were significantly lower. Self-confidence in anaesthesia skills just before the simulation was also significantly lower in the sleep-deprived group. These findings are important since non-technical skills are suspected to play a key role in avoiding serious adverse events. This study also illustrates the difficulty of recruiting when participation is voluntary: 100 participants were screened, but only 21 agreed to participate. However, the authors argue that the significant difference in non-technical skills makes lack of power unlikely.

Br J Anaesth 2017;119:125–31.

SIMULATION BASED IDENTIFICATION

Kaba and Barnes *Advances in Simulation* (2019) 4:17
https://doi.org/10.1186/s41077-019-0107-8

Advances in Simulation

INNOVATION Open Access

Commissioning simulations to test new healthcare facilities: a proactive and innovative approach to healthcare system safety

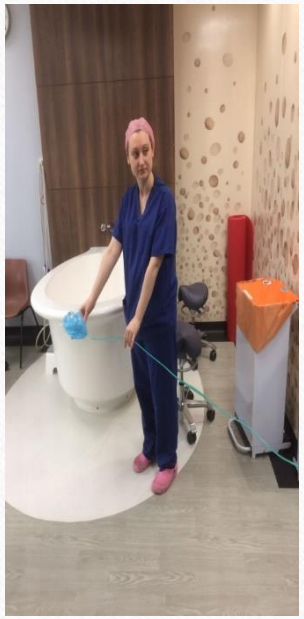
Alyshah Kaba[1,2*] and Sue Barnes[3]

Systematic review

In situ simulation as a tool for patient safety: a systematic review identifying how it is used and its effectiveness

Graham Fent, James Blythe, Omer Farooq, Makani Purva

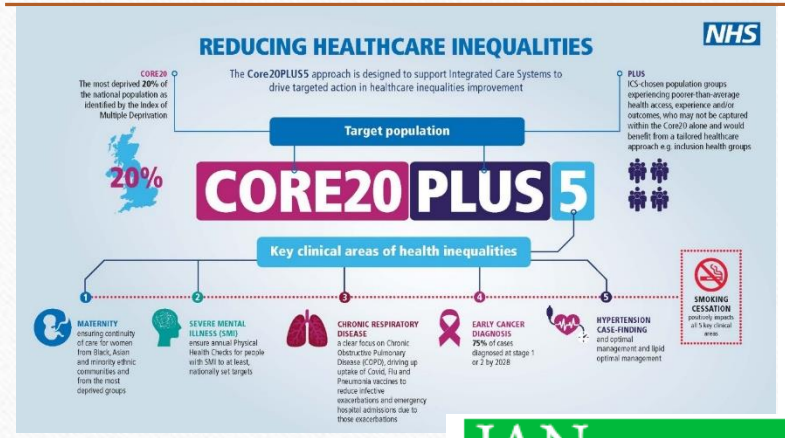
PROACTIVE APPROACH CONTINUOUS SURVEILLANCE

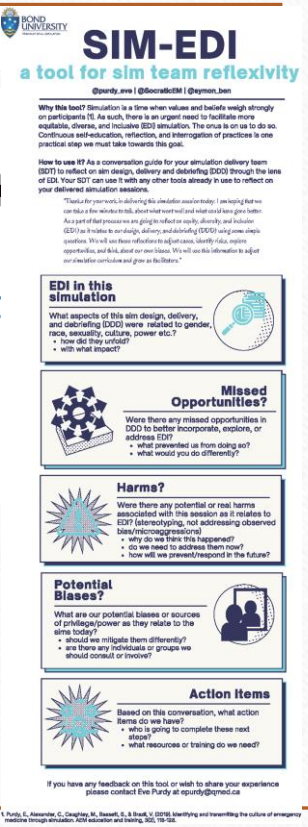


Data gathering that provides management with insights regarding the quality of human performance, the extent to which it is a problem and the current state of the defences

Qual Saf Health Care 2009;18:256–260.

SIMULATION BASED INCLUSION





Purdy *et al. Advances in Simulation* (2023) 8:11
https://doi.org/10.1186/s41077-023-00250-7

Advances in Si

RESEARCH Ope

Exploring equity, diversity, and inclusion in a simulation program using the SIM-EDI t the impact of a reflexive tool for simulation educators

peirs[1] and Victoria Brazil[1,2]

JAN
Informing Practice and Policy Worldwide through Research and Scholarship

ORIGINAL RESEARCH: EMPIRICAL RESEARCH – QUALITATIVE

An analysis of nursing students' decision-making in teams during simulations of acute patient deterioration

Tracey K. Bucknall, Helen Forbes, Nicole M. Phillips, Nicky A. Hewitt, Simon Cooper & Fiona Bogossian FIRST2ACT Investigators

SIMULATION BASED INFLUENCE

Weldon *et al. BMC Family Practice* (2015) 16:109
DOI 10.1186/s12875-015-0327-5

BMC Family Practice

RESEARCH ARTICLE Open Access

Sequential Simulation (SqS): an innovative approach to educating GP receptionists about integrated care via a patient journey – a mixed methods approach

Sharon-Marie Weldon*, Shvaita Ralhan†, Elisabeth Paice†, Roger Kneebone† and Fernando Bello†

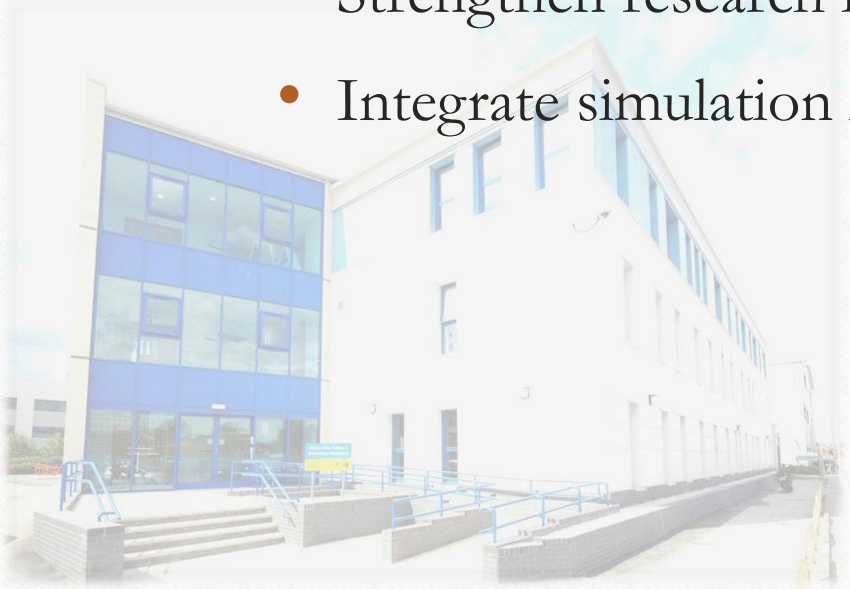
Box 4 Uncontrolled before–after study of a new drug packaging system

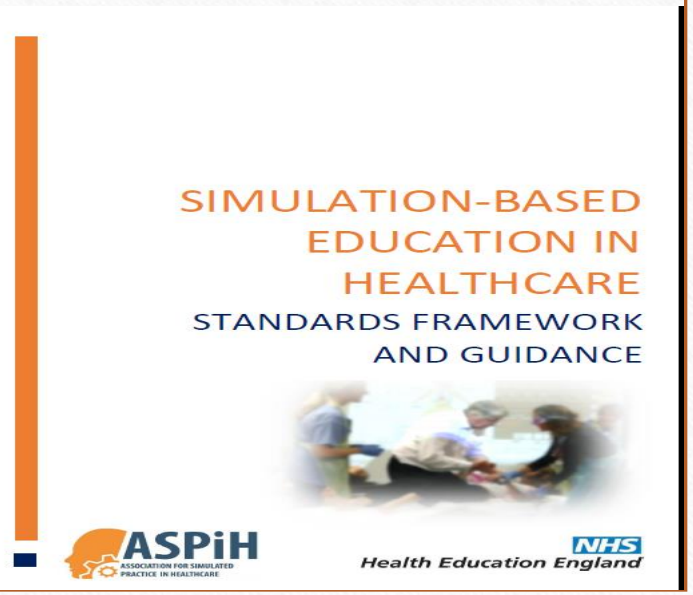
- Medication errors are a leading cause of adverse events in hospitals. Garcia *et al*[92] studied the impact of a new labelling system using a simulated medicine room. For 30 min, each participant was handed a new medication chart once he/she had completed preparation for the previous one. Researchers timed the preparation of each medication chart using a stopwatch and counted the number of errors in preparation with the standard labelling system. They repeated the experience 3 months later, using a new labelling system proposed in the literature by Endestad *et al*.[99]
- The error rate remained low with no significant change, but nurses were significantly quicker in their preparation with the new labelling system. These results contrast with a previous on-screen experiment, where the error rate deceased with the new system.[99]

Hum Factors 2016;58:1206–16.

WAY FORWARD

- Explicit link to financial and quality gains
- Strengthen research in addressing healthcare challenges
- Integrate simulation into mainstream healthcare





Cheng A, Grant V, Auerbach M. Using Simulation to Improve Patient Safety: Dawn of a New Era. *JAMA Pediatr.* 2015;169(5):419-420