Simulation training in infection control

Differences and similarities in Infection prevention in European countries

Berlin, 26 June 2015

Pierre Parneix
pierre.parneix@chu-bordeaux.fr
@peyo3319
Conflict of interest
Never the first time on a real patient!
Impact of a simulation training curriculum on technical and nontechnical skills in colonoscopy: a randomized trial

Samir C. Grover, MD, MEd, FRCPC,1,2 Ankit Garg, BSc,1,2 Michael A. Scaffidi, BSc(Hon), MEd,1,2 Jeffrey J. Yu, BSc,3 Ian S. Plener, MD,1,2 Elaine Yong, MD, FRCPC,2,4 Maria Cino, MD, MSc, FRCPC,2,5 Teodor P. Grantcharov, MD, PhD, FRCSC,6 Catharine M. Walsh, MD, MEd, PhD, FRCPC3,7,8

Toronto, Ontario, Canada

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Pre-training Assessment

1. Multiple choice cognitive test
2. VR simulation test

Structured Comprehensive Curriculum (SCC) Group
(n=16)
- 8 hours of VR simulation training, accompanied by expert feedback
- 6 hours of didactic sessions

Self-regulated Learning (SRL) Group
(n=17)
- 8 hours of VR simulation training, (no expert feedback)

Immediate Post-training Assessment

1. Multiple choice cognitive test
2. VR simulation test

Delayed Post-training Assessment

1. 2 clinical colonoscopies
2. Integrated scenario test
## Simulation and infection control

### TABLE 1. Summary of the structured comprehensive curriculum

<table>
<thead>
<tr>
<th>Competency domain</th>
<th>Cognitive (6 hr)</th>
<th>Technical (8 hr)</th>
<th>Integrative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content</strong></td>
<td>Theory of colonoscopy, including anatomy, pathophysiology, indications, risks, and benefits of the procedures</td>
<td>Practice of simulated colonoscopy, biopsy sampling, and polypectomy cases Feedback and teaching by an experienced endoscopist Access to simulator metrics</td>
<td>Feedback from experienced endoscopists during training</td>
</tr>
<tr>
<td><strong>Method of delivery</strong></td>
<td>Interactive small-group lectures</td>
<td>Simulation-based training, with mentorship by an experienced endoscopist</td>
<td></td>
</tr>
<tr>
<td><strong>Assessment</strong></td>
<td>Knowledge test (multiple choice)</td>
<td>Performance of a simulated colonoscopy</td>
<td>Performance during an integrated scenario and 2 clinical colonoscopies</td>
</tr>
</tbody>
</table>

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http://www.sf2h.net/sf2h_in-english-as-well.html
Figure 2. Participants’ JAG DOPS scores (expressed as mean ± standard deviation) during their first and second clinical colonoscopies for the SCC and SRL groups. SCC, structured comprehensive curriculum; SRL, self-regulated learning.
American Journal of Infection Control 42 (2014) 643-8

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major article

A multitiered strategy of simulation training, kit consolidation, and electronic documentation is associated with a reduction in central line—associated bloodstream infections

Gilman B. Allen MD a,b,c,, Vincent Miller MD b,d, Cate Nicholas MS, PA, EdD c,e, Sally Hess CIC, MPH f, Mari K. Cordes RN, VA-BC g, John B. Fortune MD b,h, Joan Blondin RRT, MBA f, Takamaru Ashikaga PhD i, Michael Ricci MD b,c,h,j

a Department of Medicine, College of Medicine, University of Vermont, Burlington, VT
b Fletcher Allen Health Care, Burlington, VT
c Fletcher Allen/University of Vermont Clinical Simulation Laboratory, University of Vermont, Burlington, VT
Simulation and infection control

A: Chlorhexidine Use

B: Hand Hygiene

Month of Audit

% Compliance

Compliance
Mean
+/− 3 sigma

GB. Allen et al / American Journal of Infection Control 42 (2014) 643-8
Simulation and infection control

G.B. Allen et al. / American Journal of Infection Control 42 (2014) 643-8
From the 20th century

Howard S. Barrows (1928-2011)

http://en.wikipedia.org/wiki/Howard_Barrows
Simulation session for ICPs
A 2 hour role-play session to mimic a root cause analysis
Simulation and infection control

Medical education

Simulation in clinical teaching and learning

2 Kirkpatrick’s four levels of education evaluation

- **Organisational performance:** The impact of learning on patient outcomes
- **Behavioural change:** The transfer of learning to behaviour at work
- **Learning:** The degree to which learning occurs as a result of the intervention
- **Reaction:** Participant reaction to the intervention
Simulation and infection control

**Full-body mannequins**

**Part-task trainers**

http://www.sf2h.net/sf2h_in-english-as-well.html
Simulation and infection control

Simulated patients,

Computer-generated simulators

http://www.sf2h.net/sf2h_in-english-as-well.html
Simulation and infection control

Hybrid simulators

http://www.sf2h.net/sf2h_in-english-as-well.html
Simulation session chronology

From Jean-Claude Granry, SF2H 2015 congress
Simulation and infection control

The error room

http://www.sf2h.net/sf2h_in-english-as-well.html
Why?

The Congress finds as follows:

(1) Simulation-based education and training in medicine, nursing, allied health, podiatry, osteopathy, dentistry, and emergency response teams can enhance procedural skills and reinforce best practices by allowing students, experienced clinicians, and health care professionals to practice procedures in a realistic setting.
Why?

(2) The enhanced clinical skill development provided by simulation-based training benefits patients and health care consumers in the form of improved health outcomes, patient safety, and quality; reduced medical errors and deaths; and reduced costs associated with providing patient care.

(4) The creation of medical simulation centers of excellence to provide guidance and leadership to educational institutions and health care entities will facilitate the deployment of medical simulation technologies and the commercialization of cutting-edge medical simulation research.
Simulation accouchement

Programme scientifique

Accueil

REALISEZ UNE VISITE GUIDEE DE VOTRE CENTRE DE SIMULATION ET PARTICIPEZ A UNE SESSION INTERACTIVE CE SAMEDI 13 FEVRIER AU PLUS TARD, VOS INSCRIPTIONS SERANT VALIDEES A PARTIR DE LA PROCHAINE ANNEE.

SIMULATION ACCROCHEMENT

www.mci-group.com

Simulation

accouchement
Les Précautions standard

D’après D. Zaro-Goni – Paris 2015
Conseil Administration

<table>
<thead>
<tr>
<th>NOM Prénom</th>
<th>Titre et Organisme</th>
<th>Bureau</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Pierre PARNEIX</td>
<td>CCLIN Sud Ouest</td>
<td></td>
</tr>
<tr>
<td>Daniel ZARO-GONI</td>
<td>Vice-président de la Société Française d'Hygiène Hospitalière</td>
<td></td>
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<tr>
<td>Pr Yves AIGRAIN</td>
<td>Président Société Française de Chirurgie pédiatrique (SFCP)</td>
<td></td>
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<tr>
<td>Pr Christine GRAPIN</td>
<td>SFCP</td>
<td></td>
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<tr>
<td>Nguyen TRAN</td>
<td>Directeur Opérationnel, IÉcole de Chirurgie de Nancy-Lorraine</td>
<td></td>
</tr>
<tr>
<td>Pr Christine AMMIRATI</td>
<td>Présidente de l'Association Nationale des Centres d'Enseignement des Soins d'Urgence (ANCESU)</td>
<td></td>
</tr>
<tr>
<td>Pr Jeannot SCHMIDT</td>
<td>Président SFMU</td>
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<tr>
<td>Pr Françoise CARPENTIER</td>
<td>Société Française de Médecine d'Urgence (SFMU)</td>
<td></td>
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<tr>
<td>Dr Marie-Christine MOLL</td>
<td>Société Française de Gestion des Risques en Etablissement de Santé (SoFGRES)</td>
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</tbody>
</table>

http://www.sofrasims.fr/
Evaluation of simulation centres

1) Training sessions design should associate ICPs
2) IC materials (Gloves, gowns, hand rub products…) should be available in the centres
Gamification du quotidien et des tâches
LETTER

Video game training enhances cognitive control in older adults

J. A. Anguera¹,²,³, J. Boccanfuso¹,³, J. L. Rintoul¹,³, O. Al–Hashimi¹,²,³, F. Faraji¹,³, J. Janowich¹,³, E. Kong¹,³, Y. Larraburo¹,³, C. Rolle¹,³, E. Johnston¹ & A. Gazzaley¹,²,³,⁴

http://www.nature.com/nature/journal/v501/n7465/full/nature12486.html
Instructions during NeuRacer training for both Multitasking and SingleTask training.

Respond to relevant signs:

- Drive!

No response
Amélioration du contrôle cognitif par les jeux vidéo (Anguera et al, 2013) :

Trois groupes de personnes de plus de 60 ans comparés :

- Tâche simple (15 sujets),
- Tâche multiple (15 sujets),
- Groupe contrôle (15 sujets).

Entrainement et évaluation via NeuroRacer :

- 1 heure par jour, 3 fois par semaine pendant 4 semaines
- Performances immédiates puis à 1 mois et 6 mois post intervention.

http://www.nature.com/nature/journal/v501/n7465/full/nature12486.html
Serious game: Impact

http://www.nature.com/nature/journal/v501/n7465/full/nature12486.html
This is a playable prototype of the Emergency Birth! game.
Created by the Engender Games Group Lab at UWW.

Project funded by a Strategic Initiative Grant from the University of Wisconsin at Whitewater.

Project Director and Programmer: Elena Bertozzi
Consulting Physician: Dr. Dilys Walker
Audio Lead: Jon Sorenson
Graphic Design, Illustration: Moutafue Yang and Natalie Nguyen
Animation: Natalie Nguyen
Audio Engineer: Josh Bartels
A need to improve Flu management in healthcare premises

- Annual outbreaks
- Good vision of our weaknesses
  - Knowledge
    - Interest and limits of flu vaccine
    - Symptoms of flu - diagnosis
    - Contagiousness
    - Treatment
    - Difference between seasonal flu and variant flu
  - Practices
    - Influenza rapid diagnostic test
    - Droplets precautions
    - Communication
Difficult to change behaviors and beliefs

- Classical methods exist but...
  - Efficacy is limited
  - Time-consuming bundles are necessary

- Need for an innovative tool!
Serious game: learn good practices with fun!

- **Flu.0**
  - 3rd serious game for Infection control of CCLIN Sud-Ouest
  - French or English-speaking tool
  - Free, can be used everywhere, online or downloaded
  - Healthcare worker avatar - 9 scenes
    - 8 key point questions + 1 crazy question
    - 3 possible answers
    - explanation of why the answer is correct or not
  - A final score evaluates the player’s performance
Example – First scene

Simulation and infection control

http://www.sf2h.net/sf2h_in-english-as-well.html
Example – First scene

Simulation and infection control

http://www.sf2h.net/sf2h_in-english-as-well.html
To evaluate the impact of Flu.0

- Call for participation to play and evaluate the game

- Questionnaire before and after the game
  - Opinion on sentences about flu
  - What players learnt thanks to the game
  - Rate the game
  - Main thing they would do differently after this game

- Descriptive analysis – khi-square test for evolution
Impact of Flu.0 - Results

- 264 physicians (213 fellows), 62 Senior nurses, 577 nurses students

Rate given to the game: **7.9/10**

<table>
<thead>
<tr>
<th></th>
<th>Physicians / Senior nurses</th>
<th>Nurse students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before the game</td>
<td>After the game</td>
<td>Before the game</td>
</tr>
<tr>
<td>Seasonal flu = benign disease</td>
<td>156 (48%)</td>
<td>207 (36%)</td>
</tr>
<tr>
<td>Flu vaccination of health care workers = useful</td>
<td>302 (93%)</td>
<td>496 (86%)</td>
</tr>
<tr>
<td>I know the indications of the antiviral treatment</td>
<td>201 (62%)</td>
<td>234 (41%)</td>
</tr>
<tr>
<td>I feel well prepared to face a flu case</td>
<td>257 (79%)</td>
<td>433 (75%)</td>
</tr>
<tr>
<td>Well prepared to perform rapid flu diagnostic test</td>
<td>95 (29%)</td>
<td>140 (24%)</td>
</tr>
</tbody>
</table>

Rate given to the game: **7.9/10**

Simulation and infection control
Impact of Flu.0 - Results

1. 95% learnt at least one key point

   Two
   - 52% Physicians/senior nurses,
   - 82% nurse students

   Three
   - 16% Physicians/senior nurses
   - 45% nurse students
Impact of Flu.0 - Results

94% would change their practices after the game

- Better droplets precautions
  - Physicians / Senior nurses 47%
  - Nurses students 80%

- Better Flu diagnosis
  - Physicians/senior nurses 17%

No change of practices: 11% physicians/senior nurses, 4% nurses students.
Conclusion

Simulation training and infection control:
– A fast and marvellous rising world,
– Some basics to learn for us,
– Collaborations to create:
  • Simulations centres, scientific societies,
– A step not to miss in order to go forward!
Welcome to the SESAM Website

A rich source of information for simulation enthusiasts from all over the world and from different professions and disciplines.

SESAM Literature Highlights

For the second time, SESAM invited members to submit suggestions for reading material within specific topic areas. For the respective topics experts reviewed the literature...