



Dutch Society for Simulation in Healthcare

Medical Simulation

- Time for change?! -

10th Congress Dutch Society for Simulation in Healthcare

14 March 2018, University of Twente, Enschede, the Netherlands





10th Congress

Time for change!?

Dear colleagues and friends,

It has been 10 years since the Dutch Society for Simulation and Healthcare launched its first congress and we would therefore like to take this fantastic opportunity to celebrate this with you! This year's congress of the DSSH will take place at the University of Twente with the title; 'Time for change?!'. A moment great moment to look back at 10-year DSSH and most important; to look ahead. University of Twente is a public research university located in Enschede, Netherlands. It offers degrees in the fields of social sciences, exact sciences and is highly specialized in engineering. The University is committed to making economic and social contributions to the Netherlands, namely the region of Enschede, the former powerhouse of the Dutch textile industry. Therefore, the entrepreneurial spirit is one of the core values of the institution.

The campus of the University of Twente is where students and staff live, work and study. All education and research buildings of the university are grouped together on an area of approximately 1 kilometre wide and 1.5 kilometre long, on the westside of Enschede.

'Health' is a key research theme at the University of Twente. Several hundred researchers are active in the field. They apply various perspectives based on a wide range of disciplines, including medical technology, psychology and logistics. The strengths of all UT Health researchers are brought together in several national and international networks and partnerships. Doctors, nurses and - of course - patients are central to the knowledge and technologies developed by UT Health researchers. UT Health is making a real contribution to progress in healthcare.

During this conference a tour will be provided to the Experimental Centre for Technical Medicine (ECTM), which offers the latest state of the art simulation technology for research, development and the education of students and professionals in health care. It is used as a large high-tech and safe learning space in which the authentic professional environment is simulated. It fits our high demands for training of Technical Medicine students and other professionals, offering them numerous courses and postgraduate courses, such as: Laparoscopic or Endovascular Interventions, Advanced Life Support, Fundamentals of Ventilation.



10th Congress

Time for change?!

The strong focus on health education makes the University of Twente a proud and suitable host of the 10th annual DSSH conference. This year's theme of the conference is "Time for change?!".

New theories and scientific research about simulation-based education, serious gaming and CRM training have been developed, evaluated and implemented in training programs in the last decades. Now, the time has come to translate all these efforts into sustainable improvement of patient safety- building widely accessible foundations for the future.

Therefore, we would like to invite professionals involved in healthcare to present their research and visions, to network and to become actively involved: nurses, midwives, engineers, psychologists, designers, developers, physicians, human factor managers, healthcare managers, insurances, government and the industry.

The exhibition hall allows attendees to interact with developers, the industry, experts in the field and friends. In the afternoon, a meet and greet has been organized to ask questions to key opinion leaders about research, scientific writing, simulation and serious gaming in daily practice. The congress is in Dutch; however all presentations and workshops will be supported by English slides but some international presenters may present in English.

So, are you actively involved in building foundations for patient safety? Do you evaluate the impact of fidelity of simulators or serious games on skills acquisition and patient outcomes? What about issues such as team performances, curriculum design, quality outcomes, costs and implementation of simulation or serious gaming in daily training programs? Do you train, assess or debrief using any type of simulation or serious games? Are you active in E-health? Then, do not miss the DSSH congress in Enschede, March 14th 2018.

We hope to meet you soon in Groningen and increase our network!

Lex van Loon, congress president

Isabelle Van Herzeele, MD, PhD, president DSSH



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I. (Isabelle) Van Herzeele, MD PhD
Vascular Surgeon | Ghent University Hospital, Ghent, Belgium
isabelle.vanherzeele@ugent.be

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wmbrinkman@gmail.com

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e.z.barsom@amc.nl

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Program manager e-learning | Erasmus University Medical Centre, the Netherlands
m.dankbaar@erasmusmc.nl

L.M (Lex) van Loon
Teacher Technical Medicine | University Twente, PhD candidate, Radboud University Medical Centre
l.m.vanloon@utwente.nl

J.M. (Joya) Smit, MSc
Lecturer and Researcher | Research Group Nursing Diagnostics School of Nursing
Hanze University of Applied Sciences, Groningen, the Netherlands
j.m.smit@pl.hanze.nl

U. (Uli) Strauch, MD PhD
Anaesthesiologist-intensivist | Maastricht UMC
Directeur simulatiecentrum Maastricht UMC
u.strauch@mumc.nl

M.L. (Marinka) Hol, MD
PhD-Candidate Oral and Maxillofacial Surgery | Academic Medical Centre
m.l.hol@amc.uva.nl



The Dutch Society for Simulation in Healthcare

The Dutch Society for Simulation in Healthcare - DSSH- was founded in June 2007 and aims to:

Support the development and implementation of Simulation and 'Serious Gaming' in Healthcare; and improve evidence-based education, team training, quality in healthcare and ultimately patient safety. The Society aims to achieve this goal by:

- Facilitating, exchanging and improving the use of simulation technology and its appropriate application in Belgium and the Netherlands and with the affiliated foreign Societies (networking function).
- Development and promotion of standards for evidence-based simulation training in healthcare and its associated research through the Society's Commission activities, newsletters and annual Congress.
- Supporting a global Dutch network for, by and through all professionals involved with Simulation and 'Serious Gaming' in Healthcare.



DSSH Committees

To accomplish this goal, the DSSH has four committees:

Committee on Serious Gaming:

To promote and facilitate initiatives contributing to a thoughtful and safe implementation of Serious Gaming in Healthcare. We facilitate collaboration between game developers, ICT professionals, educationalists and medical professionals by implementing the 'Quality Label for serious games' in the medical domain.

With this label, we want to stimulate transparency in the design process and the efficacy of games. For more information on how to apply for the quality label, please visit the DSSH Website www.dssh.nl/qualitylabel.

Chair: Dr. M.E.W. (Mary) Dankbaar; m.dankbaar@erasmusmc.nl

Committee on Education and Accreditation:

To promote and facilitate the quality of medical teaching and education within the DSSH, and to offer a platform for educational activities and improve the collaboration between various professionals and professions involved in educational activities including any type of simulation-based education. In addition, to promote and facilitate (inter-) disciplinary standards for accreditation, standardization and certification for professionals in Healthcare. To stimulate scientific activities and establish collaboration between various professionals and professions involved in accreditation and standardization for medical simulation

Chair: Dr. U. (Uli) Strauch; u.strauch@mumc.nl

Committee on Scientific Research:

To promote and facilitate research activities within DSSH. To establish a network between various professionals and professions active in research focusing on the use and implementation of medical simulation in daily practice.

Chair: M.L. (Marinka) Hol; m.l.hol@amc.uva.nl

Financial committee:

The commission examines the balance of income and expenses and reports the findings during the General Assembly at the annual congress of the DSSH.

Chair: Dr. A. (Anique) Bellos-Grob; a.t.m.bellos-grob@utwente.nl



Quality Label

Quality Label for Serious Games in Medicine

We have seen a rapid surge in newly developed serious games in medicine. Although we wholeheartedly encourage this development, we fear the risk of losing overview on the quality and safety of the individual games. This threatens their implementation in medical training and patient care programs and will ultimately threaten future investments and funding. Therefore, the DSSH has instigated the Quality Label for Serious Games in Medicine, through which owners / developers of serious games can show the world that their serious game is a valid and responsible product, according to current scientific and legal standards. The extent to which these requirements are met, is judged using a scientifically based framework.



The framework for Quality Label has been described in : Graafland M, Dankbaar M, Mert A, Lagro J, De Wit-Zuurendonk L, Schuit S, Schaafstal A, Schijven M. How to Systematically Assess Serious Games Applied to Health Care. JMIR Serious Games 2014;2(2):e11 DOI: 10.2196/games.3825

The DSSH welcomes and encourages new input!

Not only physicians or medical students but all healthcare professionals (e.g. nurse practitioners, physician assistants, obstetricians, anesthesiology assistants and OR assistants...) are cordially and actively invited to join and participate within our Society. We are also looking for motivated software developers, game designers, ICT professionals who would like to work in close collaboration with medical professionals.

Are you interested to join the activities of one of these Committees? Please send an email to the DSSH board via secretariaat@dssh.nl



Congress Program

08.30-09.45 Foyer	Registration & Congress opening Registration & coffee
09.00-09.30 Waaier 3	General Assembly (DSSH members only)
09.45-09.50 Waaier 3	Congress opening Lex van Loon, Congress president
09.50-10.00 Waaier 3	Welcome to Twente Heleen Miedema, Director of Health Education
10.00-10:45 Waaier 3	Session 1: Crew Resource Management Moderator Isabelle van Herzele Technology enhanced medical team training in obstetrics in high, middle and low-income countries Prof. dr. S.G. (Guid) Oei
10.45-11.15 Foyer	Coffee Break Time to visit Expo and posters
11.15-12.00 Waaier 3 Auditorium	Parallel session Moderators; Henk Schreuder & Esther Barsom Moderator; Ada van den Bos
12.10-12.50 Waaier 3	Session 2: Serious Gaming Moderator Mary Dankbaar Homo Ludens 2.0 Prof. dr. J.J.G. (Jeroen) van Merriënboer
12.50-13.45 Foyer	Lunch Time to visit Expo and posters



Congress Program

13.45-15.00	Workshops See congress booklet for more details
ECTM	1. Interactive facility tour ECTM - <i>Technical Medicine students (Utwente)</i>
Auditorium	2. Same or change in scernario design - <i>Lars Mommers (UMCM)</i>
CR2116	3. Faculty development in simulation based education - <i>Anneke van der Niet (UMCM)</i>
CR3106	4. Highlights of the METS preconference workshop - <i>Ron Brendel (METS center)</i>
15.00-15.15 Waaier 3	Short pitches Moderator Willem Brinkman
15.15-15.55 Waaier 3	Session 3: Simulation Moderator Joya Smit A promise not kept - time for change! Dr. S. (Stefan) Mönk, MD
15.55-16.15 Waaier 3	Awards ceremony Moderators Marinka Hol & Mary Dankbaar & Lex van Loon Awarding the DSSH Grants Quality Label Serious Games Award best oral and poster presentation Closing remarks
16.15-17.00 Foyer	Drinks Time to network and celebrate 10 years of DSSH



Keynote Speakers



Guid Oei is studied at the medical school of Leiden University in the Netherlands and specialised as Obstetrician Gynaecologist. He subspecialised in perinatology at Flinders University in Adelaide. Since 1996 he is working as OB/Gyn Perinatologist at Máxima Medical Center (MMC) in Eindhoven. In 2003 he was appointed Professor of Fundamental Perinatology at the Eindhoven University of Technology. He is Head of the Department of Obstetrics of MMC. From 2005 until 2011 he was founder and Dean of the MMC Acad-

emy and Medical Director of the Medical Simulation and Education Centre in Eindhoven. In 2011 he became member of the board of the Dutch Society of Obstetricians and Gynaecologists (NVOG). Guid Oei is founder and past president of the Dutch Society for Simulation in Healthcare. His main research interests are preterm delivery, fetal monitoring, and medical modeling and simulation. He is (co)author of more than 200 scientific papers and/or book chapters.

Jeroen van Merriënboer is professor of Learning and Instruction at Maastricht University and Research Director of the School of Health Profession Education (SHE). His main area of expertise is instructional design and the use of new media in innovative learning environments. He has published widely on four-component instructional design (4C/ID) and cognitive load theory. He holds several academic awards for his research and his books *Training Complex Cognitive Skills* and *Ten Steps to Complex Learning* had a major impact on the field of instructional design.





Keynote Speakers



Stefan Munk is an anaesthesiologist, emergency medicine specialist and educator who began his career with CAE Healthcare (formerly METI) in 2010. In his role as Manager of the International Academy, Stefan collaborates with a global team of experts in simulation, clinical care and healthcare education to dispense cogent instruction, evidence-based insights and essential medical knowledge to a worldwide community of healthcare simulationists.

Stefan's professional history includes stints at Mainz University and the German Air Rescue Service. He was also Chief Emergency Physician of the City of Mainz, Germany. Stefan is a published author and subject matter expert who has written for, and contributed to, numerous international books and articles on medical simulation. The co-founder and manager of two simulation centers, Stefan was pivotal in the successful introduction of simulation into Germany's undergraduate medical education.

As a member of the German Anesthesia Society, the Society in Europe for Simulation Applied to Medicine, the Society for Simulation in Healthcare (SSH), and the Association for Medical Education in Europe, Stefan devotes his professional time to the expansion of simulation in healthcare all over the world.



Workshops

WORKSHOP 1 Interactive facility tour ECTM

Visit our Experimental Centre for Technical Medicine (ECTM); with a fully equipped intensive care and operation simulation rooms and get acquainted with simulation capabilities from low cost simulation till high fidelity simulators. The ECTM offers the latest state of the art simulation technology for research, development and the education of students and professionals in health care. It is used as a large high-tech and safe learning space in which the authentic professional environment is simulated. It fits our high demands for training of Technical Medicine students and other professionals, offering them numerous courses and postgraduate courses, such as: Laparoscopic or Endovascular Interventions, Advanced Life Support, Fundamentals of Ventilation. The ECTM is one of the Centres of Expertise of the University of Twente. It is used as a 'beta test site' by the market leaders in simulation technology and, of course, several scientists of the MIRA institute carry out their research with the help of advanced technology.

WORKSHOP 2 Same or change in scenario design

Lars Mommers (UMCM)
Location: Auditorium

The workshop "Same or change in scenario design" is aimed at professionals creating and/or using simulation scenarios. The first part of the workshop focuses on 'scenario design'. What should be included in a simulation scenario? How do you ensure complete, up-to-date and high quality scenarios? Participants introduce their current practices and discuss these with their peers in small groups. It is useful to exchange ideas and practices in order to gain new insights and explore opportunities for (future) collaboration. After the small group discussions, plenary feedback and a short presentation will be provided highlighting current 'best practice' advisory regarding scenario and curriculum design. The second part of the workshop focuses on 'collaboration'. A small group discussion is held regarding challenges, barriers and facilitators for collaboration in scenario development. After plenary feedback, a short present-



Workshops

Finally, the development process and functionalities of one (Dutch) web-based scenario database are shared in order to invite participants to collaborate on this project or to provide them with insight on the set-up, challenges and pitfalls of starting such a collaborative project. Participants will have the opportunity to experience this web-based database themselves, either during the workshop (in a small group session) if time permits or afterwards on their own pace.

WORKSHOP 3

Faculty development in simulation based education

Anneke van der Niet (UMCM)

Simulation based education is gaining momentum within medical education worldwide. Simulation can be used to train technical and non-technical skills in a risk free environment, making use of human simulation (simulation patients) or various non-human simulators such as part-task trainers or high fidelity full body mannequins. Also at several places in the Netherlands simulation based education is provided. The simulation centres are either part of a medical faculty or academic hospital, or function as a commercial and independent institute. In order to make simulation education successful, good operators and instructors/educators are crucial. Most often, the educators are clinicians or nurses with various levels of knowledge and expertise with regard to didactic and educational aspects.

In this workshop, we want to dive into this topic of faculty development and try to explore what faculty development programs are used in the various simulation centres throughout the Netherlands. We are interested in what requirements are set for what persons in each centre concerning (refresher) courses



Abstracts

Session 1

Topic: Simulation

Face-validiteit van de eoSim take-home laparoscopie simulator voor het trainen van laparoscopische basisvaardigheden

Elke Arts - RadboudUMC

Background: Er is behoefte aan toegankelijke, eenvoudig te gebruiken simulators om laparoscopische vaardigheden te trainen. De eoSim laparoscopie simulator [EoSurgical™ Ltd., Edinburg, Schotland, Groot-Brittannië] met tracking software werd ontwikkeld met dit doel voor ogen. Als eerste stap in het validatie proces werd onder gebruikers geïnventariseerd of dit trainingsinstrument van waarde is voor het trainen van laparoscopische basisvaardigheden.

Methods: Participanten werden verdeeld in 3 groepen op basis van ervaring: novices (geen ervaring), intermediates (<50 simpele laparoscopische procedures) en experts (>50 laparoscopische procedures). Er werden 3 taken verricht waarin laparoscopische basisvaardigheden centraal stonden. Daarna werd een vragenlijst ingevuld met 12-items die werden gescoord op een 5-punts likertschaal. Parametrische en non-parametrische analyses werden gebruikt om scores te vergelijken tussen de drie groepen, per taak.

Results: Scores voor realisme, didactische waarde en gebruiksvriendelijkheid waren vergelijkbaar tussen de drie groepen ($p=0.31$, $p=0.42$, $p=0.71$ respectievelijk). Overall werden de taken als realistisch beschouwd (gemiddelde scores tussen 3.3 en 4.3) waarbij novices en experts het hoogste scoorden (figuur 1A). De simulator werd als nuttig beschouwd, zowel om vaardigheden te trainen als om iemands vaardigheden te beoordelen en monitoren (figuur 1B), vooral door novices en intermediates. Gebruiksvriendelijkheid werd het hoogst gewaardeerd, met alle gemiddelde scores tussen 4.1 and 4.3 (figuur 1C). Intermediates, de target groep, waardeerden de eoSim als een nuttige trainingmethode voor alle drie de taken, mediaan (P25-P75) scores of 4(3-5), 4(3-5), 4(3-4).

Conclusion: Concluderend werden geteste taken op de eoSim gezien als realistisch, waardevol en nuttig met betrekking tot het trainen en evalueren van laparoscopische basisvaardigheden, door zowel novices, intermediates en experts en werd face validity hiervoor aangetoond. Novices waardeerden de eoSim het hoogste, echter was dit verschil niet statistisch significant. De eoSim take-home laparoscopie simulator is een realistische, nuttige, eenvoudig te gebruiken en toegankelijke techniek voor de training van laparoscopische basisvaardigheden van chirurgen in opleiding zonder daarbij patiëntveiligheid te compromitteren.



Abstracts

Session 1

Topic: Simulation

Construct validiteit van de eoSim take-home laparoscopie simulator voor het trainen van laparoscopische basisvaardigheden

Elke Arts - RadboudUMC

Background: Het bepalen van de construct validiteit van de eoSim take-home laparoscopie simulator voor het trainen van laparoscopische basisvaardigheden.

Methods: Novices (geen ervaring met laparoscopie, N=20), intermediates (<50 eenvoudige laparoscopische procedures), experts (>50 eenvoudige laparoscopische procedures) werden getest op de eoSim (eoSurgical™, Edinburgh, Scotland, United Kingdom) laparoscopie simulator. Twee oefeningen voor basis vaardigheden werden door elke deelnemer doorlopen; thread transfer (draad door ronde targets heen manoeuvreren) en cyst dissection (uitpellen van een opgeblazen ballon in een slappe ballon). Construct validiteit werd bepaald door de volgende variabelen tussen de verschillende groepen te vergelijken; tijd tot voltooiën taak (snelheid), afstand tussen instrumenten (instrument controle, efficiëntie), afstand afgelegd door instrumenten (precisie, instrument controle), percentage van de tijd dat instrumenten buiten beeld zijn (precisie), soepelheid van bewegingen (efficiëntie, instrument controle), gemiddelde snelheid van instrumenten. Niet-parametrische tests werden gebruikt om scores te vergelijken.

Results: Experts voerden beide taken significant sneller uit dan intermediates en novices met mediane(P25-P75) duur van 75ms (63-104), 94ms (111-163) en 161ms (110-231) voor thread transfer, en 170ms (79-239), 242ms (134-398) and 243ms (141-302), ($p < 0.001$) voor cyst dissection respectievelijk. Experts lieten een hogere mate van precisie en instrument controle zien. Afstand afgelegd door instrumenten om thread transfer te voltooiën was namelijk significant lager in deze groep vergeleken met novices of intermediates ($p < 0.001$). Opvallend was dat voor de taak cyst dissection novices in dit opzicht beter scoorden dan intermediates en experts ($p = 0.006$). Hoewel niet significant verschillend, resultaten voor afstand tussen instrumenten, soepelheid van beweging en snelheid van manipuleren van instrumenten lieten een trend zien waarbij experts beter scoorden op de eoSim dan novices op het gebied van instrument controle en efficiëntie bij voltooiën van taken.

Conclusion: Deze studie laat zien dat er sprake is van construct validiteit van de eoSim take-home laparoscopie simulator als instrument voor het trainen van basisvaardigheden op verschillende maten van precisie en instrument controle. Hoewel novices op een uitkomst beter scoorden dan meer ervaren deelnemers bij de taak cyst dissection is het waarschijnlijk dat deze groep hierbij ook meer fouten maakt zoals het punteren van de ballon of de taak in zijn geheel niet voltooiën. Deze data is verzameld maar werd nog niet meegenomen in deze analyse. Groepsgrootte en heterogeniteit in de samenstelling van de intermediate groep (m.b.t. ervaring) zou invloed kunnen hebben op de resultaten waarbij groepsverschillen minder duidelijk naar voren komen. De eosSim lijkt hiermee wel een veelbelovend instrument om onervaren chirurgen in opleiding te trainen in laparoscopische basisvaardigheden zonder patiënt veiligheid te compromitteren.



Abstracts

Session 1

Topic: Simulation

Trainen van basis bekwaamheidseisen voor het veilig gebruik van robotchirurgie

Alexander Beulens - Catharina ziekenhuis / NIVEL

Background: De bekwaamheidseisen zijn de minimale eisen om veilig gebruik te kunnen maken van robotchirurgie. In dit onderzoek worden de volgende vragen beantwoord: is het mogelijk om alle bekwaamheidseisen voor het veilig gebruik van robot chirurgie in een training te vatten?

Methods: De bekwaamheidseisen zijn door het NIVEL (Nederlands instituut voor onderzoek van de gezondheidszorg) ontwikkeld gedurende twee bijeenkomsten met een expertgroep en focussen zich op kennis over o.a. beeld, communicatie en noodsituaties. Op basis van de bekwaamheidseisen is een discipline overstijgende training robot chirurgie georganiseerd voor AIOS en specialisten (heelkunde, gynaecologie of urologie). Deze training bestond uit een online e-module vooraf, een praktisch gedeelte over robot set-up, een theoretisch gedeelte en hands-on oefeningen op virtual reality robotsimulatoren. Aan het einde van de masterclass is in een online vragenlijst gevraagd naar de leerzaamheid van de training en of de deelnemers aan het eind van de training de bekwaamheidseisen beheersten.

Results: 16 deelnemers voltooiden de training tijdens het congres van de Nederlandse Vereniging voor Endoscopische Chirurgie (NVEC) in 2017. De training werd met een 8.2 beoordeeld. Van de deelnemers hadden 6 geen robot operatie ervaring, 7 hadden 1 tot 10 uur ervaring, de overige 3 hadden meer dan 10 uur ervaring. De deelnemers gaven aan dat bijna alle bekwaamheidseisen werden beheerst aan het eind van de training met uitzondering van 4 eisen. Het 'ongedaan maken van de noodstop', 'handelen bij stroomuitval', de 'controle van articulerende instrumenten' en de 'icoontjes op het beeldscherm' werden als onbekend beoordeeld.

Conclusion: Hoewel het mogelijk is om bijna alle theoretische kennis op te doen in de huidige trainingsopzet is voor het verkrijgen van benodigde vaardigheden een uitgebreide voorbereiding in de vorm van simulatortraining nodig. Om de bekwaamheidseisen van robotchirurgie te voltooien in een training van een dag dienen deelnemers goed voorbereid aan de training te beginnen.



Abstracts

Session 1

Topic: Serious Games

Klinisch redeneren met behulp van virtuele patiënten

Judith Geuze - Erasmus MC Rotterdam

Background: Om de vaardigheid klinisch redeneren te ontwikkelen, oefenen medische studenten met verschillende klinische casussen. Ons doel was om de kwaliteit van het klinisch redeneren in het derde jaar en de master te verbeteren door middel van het aanbieden van virtuele patiënten (in plaats van een papieren casus). Dit als efficiënte en aantrekkelijke voorbereiding voor de groepssessies. De virtuele patiënten worden gebruikt om studenten te leren om bij patiënten een diagnose te stellen. Daarnaast trainen studenten in communicatieve vaardigheden door de werkdiagnose en beleid over te dragen aan de docent. Dit wordt gebruikt als input voor de groepssessie.

Methods: We gebruikten de open source authoring tool OpenLabyrinth om de virtuele patiënten te construeren. Na de initiële setup kan de inhoud van de tool zelf worden bewerkt. Bij elke patiëntcasus heeft de student een beperkte hoeveelheid tijd om het diagnostisch proces (anamnese, lichamelijk onderzoek, laboratoriumtests) te doorlopen. Als de tijd om is, moet er een diagnose worden gemaakt en een overdracht worden verzonden naar de docent. We hebben inmiddels 30 verschillende casussen gemaakt. Om het zo realistisch mogelijk te maken hebben we korte video's met simulatiepatiënten toegevoegd.

Results: OpenLabyrinth bleek een nuttig instrument bij het construeren van de virtuele patiënten, hoewel de uitvoering van een aantal gewenste eigenschappen momenteel nog niet mogelijk is. Tijdens de master Interne geneeskunde is het onderwijs geëvalueerd door 42 studenten en beoordeeld met een 8.5 (SD=1) Ook de groepssessies werden goed beoordeeld. Sommige studenten misten in het computer programma expliciete feedback op de gekozen opties en diagnoses.

Conclusion: Over het algemeen waren we tevreden met het gebruik van OpenLabyrinth, ondanks enkele beperkingen van het programma. Om de leerresultaten van studenten te verbeteren, raden wij het gebruik van virtuele patiënten aan als voorbereiding voor de kleine groepssessies, alwaar de feedback kan worden verstrekt.



Abstracts

Session 2

Topic: Simulation

Influence of patient-related characteristics and ventilator-related settings on tidal volume and pressure attenuation during pediatric high-frequency oscillatory ventilation

Sophie Ligtenstein - Universitair Medisch Centrum Groningen & Universiteit Twente

Background: High-frequency oscillatory ventilation (HFOV) is a promising lung-protective ventilation strategy. Tidal volumes (V_T) as low as 1 – 2 mL/kg are delivered, diminishing the risk of ventilator induced lung injury. However, due to conflicting outcomes of previous studies, HFOV is only preferred above conventional ventilation in 3-30% of the patients on pediatric intensive care units. In addition to this lack of evidence, the clinical algorithms used in daily practice worldwide are very heterogeneous. In more detail, weight and age are currently the main determinants for choosing the settings of HFOV but no attention is paid to the underlying disease and the pathophysiologic lung mechanics, which can for example change the total lung resistance. Achieving optimal use of the technique requires new insight in the effect of patient-related characteristics (compliance, resistance, endotracheal tube (ETT) size) and oscillator-related settings (frequency, power, continuous distending pressure) on V_T and pressure attenuation (P_{att}) between intra-oscillatory and intrapulmonary pressure.

Methods: A bench test model was used to simulate the effect of using HFOV on a pediatric lung. The oscillator was connected to a rigid test lung (a 20 L glass flask) with a compliance of 3 mL/cmH₂O via an ETT and a resistor. Flow was measured with a hot-wire anemometer. Results were analyzed with multiple linear regression.

Results: ETT size showed a positive and negative correlation to V_T and P_{att} , respectively. Resistance and frequency were both negatively correlated to V_T and positively correlated to P_{att} . Power and CDP showed both a correlation to V_T and P_{att} with $r^2 \leq 0.01$.

Conclusion: The influence of ETT size, resistance and frequency on both V_T and P_{att} implies the need for a patient-specific approach for pediatric HFOV. For successful use of the HFOV, it is recommended to choose frequency and ETT size carefully, while considering the possibly adapted resistance of the lung.



Abstracts

Session 2

Topic: Simulation

Debriefingsproject

Marie Smet - MMC Veldhoven Gynaecologie

Background: Het debriefingsproject is een vervolg op het ZonMw-project transmurale team-trainingen waarbij zorgverleners getraind zijn middels simulatietrainingen om communicatie en samenwerking van verloskundige teams te verbeteren. Om het meest leerzame moment van deze trainingen (de teamdebriefing) naar de dagelijkse praktijk te halen is bedacht om voortaan te debriefen na iedere partus. Het doel van het debriefingsproject is om continu het teamfunctioneren te evalueren en verbeteren en de kwaliteit van zorg te optimaliseren.

Methods: Het debriefingsproject is een implementatiestudie waarbij het debriefen na iedere partus met zorgverleners en ouders m.b.v. het debriefingsformulier (met nadruk op communicatie en samenwerking) wordt geïntroduceerd en geëvalueerd. Gekeken wordt naar veranderingen in ervaren samenwerking tussen zorgverleners (Obstetric Collaboration Questionnaire), het veiligheidsklimaat op de werkvloer (Safety Attitude Questionnaire (Haerkens et al., 2016)) en de ervaren kwaliteit van zorg door patiënten (middels de Pregnancy and Childbirth Questionnaire (Truijens et al., 2014)).

Results: Voorafgaand aan de implementatie in mei 2017 hebben 176 zorgverleners (responspercentage 51%) en 133 patiënten een vragenlijst ingevuld. In september hebben 176 zorgverleners (responspercentage 33%) een tussenevaluatievragenlijst ingevuld. De eindevaluatie bij zorgverleners en patiënten zal plaatsvinden in januari 2018. Uit de tussentijdse evaluatie bij zorgverleners blijkt dat het debriefen nog niet routinematig is maar men wel positieve effecten rapporteert van het debriefen op de ervaren kwaliteit van geboortezorg. Daarnaast wordt er een betere samenwerking, situatiebewustzijn en patiëntcommunicatie ervaren in het team van zorgverleners. De eindresultaten bij zorgverleners en patiënten zullen getoond worden tijdens het congres.

Conclusion: Men ziet de toegevoegde waarde van het debriefen maar het wordt nog niet routinematig toegepast. Na de tussentijdse evaluatie zijn er aanpassingen doorgevoerd op basis van de gegeven feedback. Simulaties met betrekking tot patiëntveiligheid en kwaliteit van zorg zijn zowel de kernactiviteiten van de DSSH als van dit debriefingsproject.



Abstracts

Session 2

Topic: Simulation

An explanatory model for the effect of patent ductus arteriosus on the pulmonary-systemic flow ratio: the underlying model.

Jantine Smit - University of Twente

Background: The ductus arteriosus is a connection between the pulmonary artery and the descending aorta which ensures that little blood will flow toward the lungs of the foetus. In healthy neonates, the ductus will close after birth. When this closure fails, a patent ductus arteriosus (PDA) arises. This is a prevalent left to right (L-R) shunt, causing volume overload of the lungs and a decrease of blood flow towards the systemic circulation. This is a multifactorial phenomenon that needs to be understood by all neonatal intensive care providers. Our ultimate goal is to establish an interactive, animated explanatory model for PDA. The aim of this study is to derive a mathematical model which gives insight into the main factors influencing the magnitude of the shunt.

Methods: A conceptual model is proposed, and a mathematical model derived. The model is non-pulsatile and has the ductus as the only L/R shunt. The outputs of this model are the flow rate through the ductus (Q_{da}) and the ratio of the pulmonary and systemic blood flow rates (Q_p/Q_s). Simulation data are compared to data published in the literature, and a sensitivity analysis was performed.

Results: Simulation results match target data. The sensitivity analysis leads, for example, to the intuitively correct results that an increase in systemic resistance has a large, negative influence on the ratio, and that the ratio is least sensitive to total blood volume. It also demonstrates that the ratio depends on multiple parameters.

Conclusion: We derived a simple model for the ratio of the pulmonary and systemic blood flow rates in case of a patent ductus arteriosus, which can serve as a basis for an explanatory model of these phenomena.



Abstracts

Session 2

Topic: Simulation

Evaluating Training for Life: acceptability of obstetric simulation-based training in emergency situations in Uganda and the effect on knowledge, teamwork, and medical-technical skills of participants.

Anne van Tetering - MUMC Maastricht

Background: In last 20 years simulation based training was introduced in medicine mainly in high income countries. There is no data available on simulation based learning in Uganda.

Methods: A stepped wedge cluster randomized trial was performed in the Mulago Hospital with an annual delivery rate of over 23,000. Twelve local gynaecologists became certified trainers. In 2015 and 2016 an 8-hour training day focusing on medical technical skills and crew resource management, with at least one repetition training, was provided to 57 residents. They were asked to fill in a knowledge test before and after the training and the ID-SIM after the training for the evaluation of the instructional design. All scenarios were video recorded and assessed by independent researchers. Teamwork and medical-technical skills were evaluated based on the clinical teamwork scale and a checklist of medical-technical procedures.

Results: The highest scores in a range of 0 up to 100 on the ID-SIM were giving on feedback (84.3, 95% CI 80.9 – 87.6), and learning strategies (83.2, 95% CI 78.9 – 87.4). The lowest scores were giving on controlled environment (54.9, 95% CI 48.5 – 61.3), and repetitive practice (62.8, 95% CI 55.8 – 69.8). Overall the training set-up was rated 92.8 (95% CI 89.5 – 96.1). Knowledge improved significantly with a test score of 63.4 (95% CI 60.7 – 66.1) percent before and 78.9 (95% CI 76.8 – 81.1) percent after the training ($p < 0.001$). Only the injection of oxytocin increased statistically after the training (28.6 (95% CI 12.6 – 44.5) to 56.0 (95% CI 46.3 – 65.6), $p = 0.039$). Other medical technical skills and teamwork did not show changes.

Conclusion: This obstetric simulation-based training program in emergency situation at the university hospital in Uganda, did increase knowledge, but did not change most technical skills and teamwork. Evaluation of training sessions is important to optimize learning results. Results about the instructional design can be used to improve the program.



Congress information

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University of Twente
Drienerlolaan 5
7522 NB Enschede
The Netherlands

Congress Agency: Congress & Meeting Services Holland

Postal Box 957 5600 AZ Eindhoven NL

Tel: +31 40 2132222

Email: info@congressservice.nl

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